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

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Introduction

Cassava is one of the most important staple crops consumed in Africa. With an estimated production of 55 million tonnes in 2017 (FAO, 2018), Nigeria is the largest producer of cassava in the world. In spite of this volume, a large yield gap exists, since smallholder production rarely exceeds 11 metric tonnes per hectare. Such low yields could be attributed to declining soil fertility associated with continuous cultivation and the use of unimproved varieties. Although the causes of food insecurity and poverty are numerous, declining soil fertility with resultant decrease in crop productivity is a major contributing factor. While fertilizer application could be a simple way out, the costs and uncertainty of recovering investment prevent most farmers from using fertilizer. Local nutrient sources have not been investigated and the effect of soil pH on nutrient use efficiency is yet to be determined. This study was carried out to assess the influence of compost, lime and NPK 15:15:15 on the growth and yield of three cassava varieties.

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 1m by 0.5m distance and harvested after 12 months.

Fig. 1: Cassava evaluation at 12 months after planting

Results

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

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

Table 1: Effects of compost, lime and NPK 15:15:15 on fresh stem yield of three cassava varieties planted in Ibadan in 2016 planting season

Input Type	TMS-01/1393	TMS-I980581	TMS-I01/0040	Mean
Compost+lime+NPK	22.58	19.17	20.04	20.6
Compost+lime	**42.54**	17.78	12.97	24.43
Compost+NPK	25.08	24.46	18.07	22.54
Compost	17.24	21.64	8.6	15.83
Lime+NPK	13.46	24.05	21.91	19.81
Lime	14.66	16.48	12.04	14.39
NPK	28.6	21.79	12.77	21.05
Control	17.05	19.44	8.03	14.84
Mean	22.65	20.6	14.3	

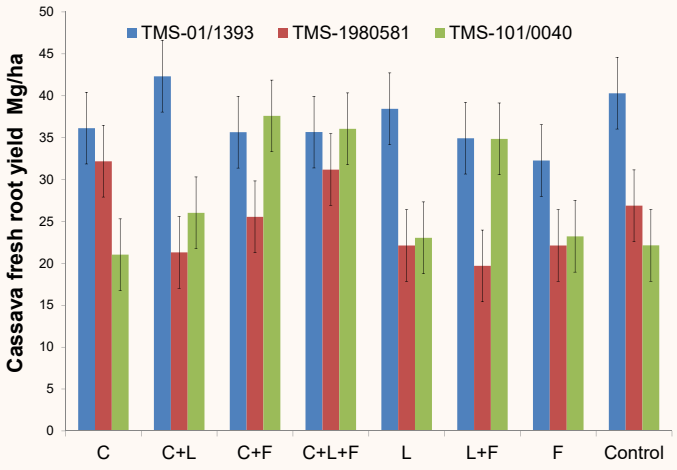

Fig. 2: Effect of compost, lime and NPK 15:15:15 on fresh root yield in three varieties. C- compost, L- lime, F- NPK fertilizer

Conclusion

The overall results depict that combinations of the inputs performed better than sole application of any of the inputs. However, the highly variable response of the varieties to fertilizer will require further investigation and more focus by breeders on considering fertilizer responsiveness in new varieties. An expansion of this type of research to soils with low pH would further open opportunities to farmers to improve their production base with local and low cost materials and to condition their soils for higher nutrient use efficiencies and thus profitable use of fertilizer through small application rates of highly reactive lime.

References

FAO. 2018 Food Outlook - Biannual Report on Global Food Markets – November 2018. Rome. 104 pp. Licence: CC BY-NC-SA 3.0 IGO

Acknowledgement

This study was supported through a free donation of highly reactive lime by the Planting Promise NGO Sierra Leone.