Participatory testing of improved cassava varieties in heterogeneous environments in southern Cameroon

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1. Introduction

Agriculture in the humid forest of southern Cameroon is still largely based on traditional low in-cut slash and burn systems. Cassava is the staple food in this area. The demand for cassava derived products, especially in urban areas, has been growing rapidly. Due to a combination management, biotic and abiotic production constraints yields are generally low. IITA has developed high yielding varieties capable of increasing production above subsistence levels and improving rural cash income. A set of on-farm trials was carried out to (i) explore production constraints for cassava and (ii) assess the potential of a best-bet IITA variety to improve production levels.

2. Materials and methods

In March 2007 in the periphery of Yaoundé (rainfall: 1530 mm, bimodal) two locations with contrasting land use intensity (LUI) and subsequent soil properties (Table 1) were selected for the purpose of this study. In a total of 25 trial sites (2-4 year-old fallows) a variety trial was established with one best performing local variety and an IITA variety (96/1414). Soil samples were taken to evaluate soil fertility conditions. Overall weed management throughout the growing season was scored from 1 (very poor) to 5 (very good). Disease severity over time was visually scored (range of 0-4) every 3 months and analyzed using an adapted area under severity index progress curve (AUSIPC). At harvest 12 months after planting (MAP) yield components were evaluated together with farmers (Fig. 2).

3. Results

A. Differences of soil properties between sites

Soil properties varied strongly between individual fields (Table 1). Generally soils characterized as acid Ultisols, were more sandy and had lower total N and SOC content in the high LUI location. In 88% of fields at least one of soil fertility parameters was below critical levels identified for cassava, with low SOC being the most frequently found limiting factor (76% of fields). Fields with P, K or multiple limitations for cassava were more frequent in the high LUI area.

B. Effect of location and variety on yield components

Overall cassava yields averaged 10.0 ton ha⁻¹. This is low in comparison to yields attained under on-station breeding trials (30 ton ha⁻¹). Yields were 86% higher in the low LUI location compared to the high LUI location (Fig. 3) due to better soil fertility conditions, higher plant density at harvest, higher HI, higher DM content of roots, better weed management, and less root rot (Table 1 and 2). The improved variety had almost 50% higher yields in both locations (Fig. 2) and was characterized by a higher HI and dry matter content and more marketable roots (Table 2). Yield of improved variety was significantly lower in the high LUI.

4. Conclusion

A combination of low soil fertility, high incidence of multiple diseases and poor weed control can be considered as main constraints to cassava production in the humid forest zone of Cameroon. Improved varieties showed good potential to increase cassava yields. The better performance of the improved variety can be attributed to a combination more marketable roots, a lower susceptibility to diseases, and consequently more foliage and lower weed pressure. The use of improved varieties and efficient weed control, should be promoted to improve yields and revenue potential for farmers in Cameroon.