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Root yield and response to tillage of three improved cassava varieties introduced to Liberia

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Abstract

Cassava is next to rice, the most important food crop in Liberia. Despite its importance smallholders are dominantly growing highly cassava mosaic virus (CMV) susceptible local varieties that have no tolerance against a wide array of insect pests. Agronomic practices are designed for subsistence systems than to produce high yields to process for marketing. Fields are established by horizontally burying 2–3 planting stakes in the same place, producing a large number of small storage roots, which are harvested sequentially from plants without uprooting them (milking). This approach causes delayed sprouting and strong internal competition, aggravating CMV, with consequent low root yields around 5 to 7 Mg ha^{-1} fresh roots. In 2024, the UNIDO GROW2 project introduced three improved cassava varieties to Liberia and conducted on-farm trials, evaluating yield responses to tillage in Bong and Nimba counties.

Single cassava stakes were planted at 1 m by 1 m distance in June 2024 and harvested 12 months after planting. Participating farmers managed the trials sites and participated in the harvest. The varieties TMS95/0289, TMS01/1371 and TMS0040 were compared with the local variety in 5 sites. Tillage was flat, ridged or mounded. The local variety was planted only on flat soil. Variety TMS95/0289 attained the highest average root yield (19.08 Mg ha^{-1}), followed by TMS01/1371 (12.29 Mg ha^{-1}) and TMS0040 (7.14 Mg ha^{-1}). The local variety produced 3.80 Mg ha^{-1} fresh roots. Tillage by ridging attained the highest average root yield across the improved varieties (19.68 Mg ha^{-1}), followed by 13.87 Mg ha^{-1} on flat soil and 12.12 Mg ha^{-1} when mounded. The poor root yield of the local variety was partially related to the low establishment and survival to the harvest rate of 39 %, compared to 65 % in TMS01/1371, 70 % in TMS0040 and 72 % in TMS95/0289. Root yield in the local variety had the following regression with plant density: yield= 28.23 plants m^2 – 7.2 (r^2=0.898). No such relationship was observed in the improved varieties, this however, likely due to the much smaller range of plant densities. Tillage had an effect on survival to the harvest with 64 % in flat soil, 68 % on mounds and 77 % when ridged.

Keywords: Cassava, liberia, root yield, tillage, varieties

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