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Mechanical Weed Control in Cassava: Effects on Weed Biomass, Labour Requirements and Root Yields

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Abstract

Weed control is a major labour input in cassava production and commonly burdens women and children with drudgery of bending down and weeding with short handled hoes. Chemical weed control has not been investigated as well as in other crops and mechanical weeding is uncommon. Multi-location trials in major Nigerian cassava growing areas investigated if manually operated or engine driven weeders can attain weeding quality and root yields as manual weeding. Over two years 7 treatments were tested: short handled hoe (SHH), long handled hoe (LHH), rotary weeder (RW), Spike weeder (SW), small motorized tiller (SMT), large motorized tiller (LMT) and motorized brushcutter (BC). Weeding was conducted at 4, 8, 12 and 24 weeks after planting, cassava density was 12,500 plants⁻¹. Net-plots measured 4×8 m. Each implement was tested on ridged versus flat soil and by female and male operators. The rotary and spike weeder and brushcutter were eliminated due to poor quality and high time requirements (60–90 minutes plot⁻¹). The LMT was too difficult to handle. SHH, LHH and SMT required 30–40 minutes plot⁻¹. Ridging the soil was an advantage reducing weed biomass. Small plot data appeared to underestimate the time requirement and did not tally with data reported at field level. In 2017 four large plot trials (1250 m² per plot) were established comparing the SHH and the SMT on ridged soil. At first and second weeding the SMT required significantly less time to weed than the SHH. Cassava root yield was not significantly affected by the weeding implement or the operators' sex. However, fields weeded by male operators attained higher yields (19.7t ha⁻¹ fresh roots) than female operators (15.9t ha⁻¹ fresh roots). The difference between the implements was marginal (17.9t ha⁻¹ SHH versus 17.7t ha⁻¹ SMT). The larger time requirement rendered the SHH the more cost intensive weeding method despite the fuel requirement of the SMT, yet not regarding the purchase cost (600 US\$) and depreciation of the SMT. Labour requirements in the large plots were higher than those measured in small plots. Delayed weeding caused weeding time to increase up to 4 fold.

Keywords: Labour time, motorized weeder, weed control