

BIOPHYSICAL AND CROP MANAGEMENT GRADIENTS LIMITING YIELDS OF EAST AFRICAN HIGHLAND BANANA (*MUSA* SPP. AAA-EA) WITHIN FARMS IN LOW INPUT CROPPING SYSTEMS

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ABSTRACT

The study aimed to quantify the relative contributions of soil fertility factors (*S*), pests and diseases (*P*) and crop management practices (*M*) to highland banana (*Musa* spp. AAA-EA) yields under heterogeneous on-farm conditions. Soil status, nutrient levels, pests, crop management from 150 mats within close (CH), mid (MH) and remote (RH) distances of 10 homesteads in Butare, Southwest Uganda were monitored from 2006-2008. Actual yields ($14.3 \text{ Mg ha}^{-1} \text{ yr}^{-1}$) of dominant cultivar (cv. 'Enyeru') were limited by *S* (62.8%), *P* (22.0%) and *M* factors (15.2%). Bunch mass was limited by low soil pH (< 6.2), low exch. Ca ($< 2.04 \text{ cmol}_e \text{ kg}^{-1}$), Mg ($< 2.3 \text{ cmol}_e \text{ kg}^{-1}$), high K:Mg ratio (0.99 ± 1.2), mat density ($> 1512 \text{ mats ha}^{-1}$) and excessive defoliation (< 9 functional leaves) from boundary line analysis. DRIS norms of exchangeable bases were low relative to N, P & K. Banana weevil and nematode damages contributed 21.7% and 3.3% of yield limitations, respectively. Most *S* factors limited yields in 'fertile' CH (75%) and *P* factors in MH and RH which differed with household resource endowment. Spatial variability in biophysical factors within small farms is so large and should be considered when addressing yield limitations to highland banana yields.

KEYWORDS: Within-Farm Variability, Relative Distance, Yield Limitation, Constraint, Wealth Class, East African Highland Banana, Uganda