

**PERFORMANCE OF 15 INTRODUCED BANANA GENOTYPES IN
THREE AGRO-ECOLOGICAL ZONES OF UGANDA**

OKURUT ASHER WILSON (B.Sc. Agric. MUK)

(Reg. No 2004/HD02/679U)

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER
OF SCIENCE IN CROP SCIENCE OF MAKERERE UNIVERSITY**

DEPARTMENT OF CROP SCIENCE

FACULTY OF AGRICULTURE

OCTOBER, 2011

ABSTRACT

Almost all the farmers in Uganda have no idea which banana genotype is best suited for their location. Subsequently there is dire need for information on genotypes and their performance in the different Agro ecological zones of Uganda. This study was conducted to evaluate performance of 15 recently developed banana genotypes in three different agro ecological zones of Uganda between 2005 and 2007. The objectives of the study were to: (i) determine the agronomic and yield performance of recently developed banana genotypes across the three agro ecological zones of Uganda. (ii) determine the response of the recently developed banana genotypes to major production constraints namely : Sigatoka, banana weevil borers, and banana nematodes across the three agro ecological zones of Uganda. (iii) determine the bunch yield weight stability across the different agro ecological zones of Uganda.

The study was conducted in three locations/ districts of Uganda namely: (Ruhinda) Rukungiri located on high altitude with fertile soils, Bujumba Kalangala located on lake victoria islands with highly leached soils and (Zirowwe) Luwero located in medium altitude with highly weathered soils. Fifteen genotypes each planted in a line of ten plants were evaluated at three farms in each of the three different agro ecological zones. The experimental design was a completely randomized block design (CRBD) with plants spaced at 3m x 3m. Selection of farms was based on location, availability and willingness of the farmer to participate effectively.

Data were collected on plant height plant girth, days from planting to flowering, days from flowering to bunch harvesting, days from planting to bunch harvesting, bunch weight, number of hands/clusters, total functional leaves at flowering, total functional leaves at bunch harvesting, youngest leaf with Sigatoka spot, percentage weevil corm damage and nematode

root damage. Data were subjected to analyses of variance using the general linear model (GLM) on SAS. Data on damage by weevils was subjected to arcsine transformation and means separated using Tukey comparison test (SAS 1991). Nematode data was transformed using square root transformation. Stability analysis was done using bunch weight as a parameter; principal component analysis on bunch weights was conducted. Significance levels were set at ($p > 0.05$).

Results of the study indicate that there were highly positive correlations between bunch weight, plant girth, hands/ clusters and functional leaves at flower shooting and functional leaves at bunch harvesting. This implies that the yields of banana highly depend on these variables. Plants with the largest girths were recorded in Rukungiri followed by Luwero and Kalangala districts. Results on genotype stability on the basis of bunch weight across the three agro ecological zones indicated that genotypes FHIA 17, FHIA 23, FHIA 25 and SH 3436-9, Pisang ceylan and Yangambi KM 5 were high yielding with high resistance to pests and diseases. While genotypes GCTCV-119, CRBP-39, and FHIA 21 were very low yielding with poor resistance to pests and diseases. All genotypes took longer period to attain maturity compared to Nfuuka, the local banana used as a check in this study. Stability analysis revealed four categories namely: (i) high yielding and un stable (ii) high yielding and stable (iii) low yielding and un stable (iv) low yielding and stable. This suggests that that performance of the genotypes varies with location. This implies that such information could be used to select and recommend genotypes, based on their performance in various locations. Genotypes that exhibited superior agronomic performance, high and stable bunch yield with resistance to major pests and diseases, possess the potential for acceptability by the farmers and consumers. The recommendation is that such genotypes should further be evaluated on farm for consumer acceptability.