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**The influence of arbuscular mycorrhizal fungi on nursery inoculated tissue  
cultured banana and initial field performance in Rwanda**

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**A thesis submitted in partial fulfillment for the Degree of Master of Science in**

**Horticulture in the Jomo**

**Kenyatta University of Agriculture and Technology**

**2010**

## ABSTRACT

Greenhouse and field experiments were carried out to determine the growth performance of two banana cultivars inoculated with three AMF inocula under two different soil conditions. A preliminary experiment (Inoculum potential trial) was carried out to evaluate the potential of mycorrhizal inoculants and non-sterile soils (controls) obtained from sites where the trial was to be established. This experiment comprised three inoculants and two non-sterile field soils at three levels of the inoculant (full dose, half dose and quarter dose). Greenhouse and field experiments comprised of three types of inoculants (Kibungo mixed, Rubona mixed and single species *Glomus mosseae*) and two soil substrates (Non-sterile soils from Kibungo and Rubona). Two tissue cultured banana cultivars (Kamaramasenge and Mpologoma) were used for the experiments. Plants were inoculated with AMF at weaning stage and 18 weeks later transplanted to the field. Plant height, girth, leaf number, leaf length and width of the youngest leaf were measured every two weeks for the greenhouse and field experiments. Prior to field establishment, root colonisation was assessed at planting and in every subsequent month after transplanting. Results showed that mixed AMF from Kibungo and Rubona were more infective than single species (*Glomus mosseae*). The controls (non-sterile soils) had a low infectivity which indicates that the banana plantlets may be inoculated prior to establishment at these sites. In the greenhouse, the effect of AMF inoculants on growth performance was dependent on the banana cultivar. Kamaramasenge was not responsive to inoculation, it attained even higher growth

without inoculation. Under field conditions, inoculation significantly ( $P < 0.05$ ) enhanced all parameters measured for Mpologoma cultivar at Kibungo and Rubona sites whereas, inoculation had no significant ( $P > 0.05$ ) effect on growth of Kamaramasenge. The growth of Mpologoma was however better at Rubona than at Kibungo. Non-inoculated plants (Controls) had the least growth. The intensity of root colonisation was highest in plantlets inoculated with mixed inoculants (AMF Kibungo and AMF Rubona) compared to plantlets inoculated with single species inoculant (*Glomus mosseae*) and plants in non-sterile soils from those sites (control K and control R). From the results, it could be concluded that AMF have positive effects on the growth of banana plants. There is need for further investigation on the efficacy of AMF to control pests and diseases, and their effect on yields and drought tolerance in banana plants in Rwanda.