

Research Application Summary

**Assessing effectiveness of macropropagation technology to produce healthy seedlings of banana varieties with high market demand in Eastern and Central provinces, Kenya**

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**Abstract**

Banana is an important food and cash crop in Kenya. However, its cultivation is hindered by scarcity of seedlings, pests and diseases, among other factors. Naturally regenerated seedlings which most farmers rely on are likely to carry pests and diseases. On the other hand adoption of tissue culture has been hindered by high capital and skill requirements. This study is investigating an alternative cost effective propagation method. Macropropagation is an inexpensive technology that can produce large quantities of high quality seedlings. However, this technology has not been evaluated to demonstrate its effectiveness to produce healthy seedlings with regard to local genotypes, pests and pathogen populations in Kenya. This is the focus of this study.

Key words: Bananas, diseases, macropropagation, pests, seedlings

**Résumé**

La banane est un aliment important et une culture commerciale au Kenya. Toutefois, sa culture est entravée par la pénurie de semis, les parasites ravageurs et les maladies, parmi tant d'autres facteurs. Les semis régénérés naturellement sur lesquels comptent la plupart d'agriculteurs sont susceptibles de véhiculer des parasites et des maladies. D'autre part, l'adoption de la culture de tissus a été entravée par les exigences des capitaux élevés et des compétences. Cette étude est une enquête sur une méthode de propagation rentable alternative. La macropropagation est une technologie peu coûteuse qui peut produire de grandes quantités de semis de haute qualité. Toutefois, cette technologie n'a pas été évaluée pour démontrer son efficacité à produire des plants sains à l'égard de génotypes locaux, les ravageurs et les populations d'agents pathogènes au Kenya. C'est l'objet de cette étude.

Mots clés: Banane, maladies, macropropagation, parasites, semis

## Background

Bananas have a high nutritional value (Wall, 2006), are perennial and are a source of steady income all year round. Banana cultivation is greatly hindered by scarcity of high quality seedlings (Nkendah and Akyeapong, 2003). Farmer friendly propagation methods need to be identified to increase availability of high quality seedlings. Macropropagation is a promising technology but is yet to be fully assessed in Kenya.

## Literature Summary

Bananas are a major food crop globally and are grown mostly by small scale farmers in more than 100 countries throughout the tropics and sub-tropics (Baiyeri and Ajayi, 2000; INIBAP, 2000). One of the major limiting factors to large-scale production of bananas and plantains is the difficulty in obtaining good quality planting material. Farmers mostly rely on naturally regenerated suckers, which are sources of pests and diseases that reduce yield and the life span of newly planted orchards (Robinson, 2007). Macropropagation is an effective method which requires less capital and skills to produce large numbers of high quality banana seedlings. If adopted, this technology can narrow the gap between demand and supply of affordable healthy banana seedlings (Mwangi and Muthoni, 2008). In this method the lateral buds in a corm are stimulated so that they grow and form shoots simultaneously. Depending on variety, one corm can yield an average of 10 seedlings, which can be increased by a factor of 3-4 through scarification (Tenkouano *et al.*, 2006). The macropagation technology has only been recently introduced in East Africa. To promote its adoption further research is needed to determine its effectiveness in producing healthy seedlings. A recent survey has shown that pests and diseases are major factors limiting banana production in Central and Eastern Kenya. Use of macropropagation could address this problem.

## Research Approach

A survey was carried out in July 2010 in Eastern and Central provinces of Kenya to determine the major pests and pathogens that are likely to be spread in infected planting materials. Important pests that can be efficiently spread in infected suckers were identified with Fusarium wilt being most important, followed by nematodes. In the ongoing phase of the project the efficiency of macropropagation protocol to produce suckers free of Fusarium, nematodes and weevils will be evaluated. Nurseries will be established on the basis of prevailing pest and pathogen threats. Corms of farmer preferred varieties will be procured from mature orchards following established methods, i.e., selecting corms from visibly healthy mother plants. Before propagating, corms will be assessed for latent infection by

	laboratory isolation and culturing. Organisms isolated from the corms will be subjected to pathogenicity tests. After propagation, the health of generated suckers will be investigated to determine any linkage between health of the mother plant and that of the macropropagated seedlings.
<b>Research Application</b>	The research will identify the key quality control points to ensure consistent quality and pest freedom of macropropagated banana seedlings. The information obtained will support promotion and adoption of the low cost macropropagation technology.
<b>Acknowledgement</b>	Authors thank RUFORUM for financial support, KARI and FaCT Ltd for facilitating research activities and Kenyatta University for administrative support.
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