

Rapid Multiplication of Plantain and Banana

Macropropagation Techniques

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A Pictorial Guide

IITA

Research to Nourish Africa

International Institute of Tropical Agriculture

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A MAJOR constraint to the expansion of plantain cultivation is the scarcity of healthy planting materials. Farmers usually depend on natural regeneration of plants for the supply of planting materials. This is a very slow process that often produces small numbers of planting materials that are usually contaminated by various soil-borne pathogens such as nematodes. Transplanting of the contaminated materials often spreads nematodes and shortens the lifetime of plantations to only one or two cycles of cultivation, beyond which lodging occurs. IITA has developed techniques for the rapid multiplication of healthy planting materials.

Macropropagation techniques

These are methods that use whole suckers or relatively large pieces of the parent plants to produce planting materials. Macropropagation techniques include: (A) decapitation (false and complete decapitation) and (B) corm techniques (whole corm, split corm, and excised buds).

Decapitation

The two decapitation methods involve stimulating lateral bud production by destroying the active growing point (meristem) in the pseudostem. Both methods increase sprouting and sucker multiplication in the field. The rate of suckering ranges from 9 to 14 suckers per annum. In false decapitation, a window or small hole is made on the pseudostem through which the meristem is destroyed. The foliage remains photosynthetically active for about 3 months. In complete decapitation, the pseudostem is cut down and the meristem is destroyed.

Corm techniques

A well-developed banana or plantain consists of a clump of meristems of different ages and stages of development. A meristem produces both a stem and a root and the structure is generally referred to as a corm or bulb. Corms from preflowering and harvested plants can be used for corm multiplication. Up to 1000 suckers can be produced within 8 months.

A. False decapitation



Cut a small hole or window on the pseudostem (the trunk), destroy the active growing point (meristem), and stand for a month to allow sprouting.



Detach sprouted plantlets as soon as they reach a height of about 25 to 35 cm with 3 to 4 leaves and transfer directly to field.

B. Complete decapitation



Cut down pseudostem.



Destroy meristem and leave to stand for a month to allow sprouting.



Detach sprouted plantlets as soon as they reach a height of about 25 to 35 cm with 3 to 4 leaves and transfer directly to field.



Dig out corm, wash to remove plant and soil debris.



Remove roots and peel outer leaf sheaths to expose buds.



Scarify (injure) buds.



Proceed to either whole corm, split corm, or excised bud technique.



Plant whole corm in black polyethylene bag and allow sometime for sprouting.



Detach plantlets and transfer to polyethylene bags.



Split corm into two or more fragments.



Plant split corm face down in polyethylene bag.

Detach sprouted plantlets and transfer to polyethylene bags as in step 2 of whole corm.



Cut out buds in minisets (about 100 g each).



Plant buds in polyethylene bags.

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About IITA

THE International Institute of Tropical Agriculture (IITA) was founded in 1967 as an international agricultural research institute with a mandate for improving food production in the humid tropics and to develop sustainable production systems. It became the first African link in the worldwide network of agricultural research centers known as the Consultative Group on International Agricultural Research (CGIAR), formed in 1971.

IITA's mission is to enhance the food security, income, and well-being of resource-poor people primarily in the humid and subhumid zones of sub-Saharan Africa, by conducting research and related activities to increase agricultural production, improve food systems, and sustainably manage natural resources, in partnership with national and international stakeholders. To this end, IITA conducts research, germplasm conservation, training, and information exchange activities in partnership with regional bodies and national programs including universities, NGOs, and the private sector. The research agenda addresses crop improvement, plant health, and resource and crop management within a food systems framework and targeted at the identified needs of three major agroecological zones: the savannas, the humid forests, and the mid-altitudes. Research focuses on smallholder cropping and postharvest systems and on the following food crops: cassava, cowpea, maize, plantain and banana, soybean, and yam.

