Technical Manual On Banana and Plantain Seed Production

E. Njukwe, A. Tenkouano, and D. Amah

IITA
Research to Nourish Africa

International Institute of Tropical Agriculture

INTRODUCTION

Plantain and banana are important staples and source of income for the smallholders that grow them in the humid forest and mid-altitude agroecologies of sub-Saharan Africa.

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 on its part has been looking at alternative means of producing planting materials since it is unlikely that the average farmer will develop the capacity to do micropropagation.

The alternative methods can be classified into two categories: field techniques based on complete or partial decapitation and detached corm techniques practiced away from the field.

General objective

IITA is out to assist with the dissemination of superior varieties, and to improve the effectiveness of plantain seed systems, so that farmers in Cameroon will have a better availability of high-quality planting materials of superior varieties.

Specific objectives

. To overcome seed production constraints

. To produce seeds of good quality

. To sustain production by increasing lifetime of plantation

. To increase crop yield

. To alleviate poverty

. To promote enterprising seed production

Field techniques

The two decapitation techniques involve stimulating lateral bud production by destroying the active growing point (meristem) in the pseudostem. Both techniques increase sprouting and sucker multiplication in the field. In false decapitation, a small hole is made on the pseudostem through which the meristem is destroyed. The foliage remains physiologically active for about 3 months. In complete decapitation, the pseudostem is cut down and the meristem is destroyed.

Detached corm techniques

Detached corm techniques are currently promoted by IITA because of higher numbers of seedlings produced and uniformity in growth while being less prone to post-establishment stress in the field.

Detached corm techniques include: whole corm, split corm, excised buds, meristem-drilling and PIF (plants issus de fragments de tiges). These techniques are simple (easy-to-grasp), cheap to establish with minimum investment to set up germination chambers and weaning facilities.

Steps in detached corm techniques

A) Propagators

Propagators should be constructed with cheap materials under 50% shades and well protected measuring 1.5m x 5m x 1m high. Enterprising seed producers could use iron rods and concrete floor.

Propagators should be kept clean and completely covered with transparent polyethylene sheets.

Humidity and temperature should be monitored.

B) Filling of chambers

Propagation chambers are filled ¾ way full with steam sterilized fine sawdust.

C) Type of Suckers used

Healthy sword and maiden suckers or about to flower and already harvested plants free from weevil infestation are used.

Techniques and corresponding sucker type

PIF, Sword sucker. The meristem is present while buds are absent. Propagation is by meristem manipulation.

Meristem drilling, Maiden sucker. The meristem and buds are present but its meristem drilled. Propagation is by bud manipulation.

Whole corm, Split corm and Excised buds, About to flower or already harvested corm. The meristem is absent while buds are present. Propagation is by bud manipulation.

D) Suckers and techniques

Sword suckers

Good for PIF

Mother corm

Good for whole corm, split corm and excised buds

Maiden sucker

Good for corm drilling

Shoots from bud

E) Sucker preparation and planting

Harvested sucker is trimmed off its roots and washed to remove plant and soil debris. Outer leaf sheaths are removed 2mm above the corm at leaf base with a sharp knife to expose all buds and/or meristem. Prepared corm is surface sterilized for 20 min in fungicide mixture, buds scarified and air dried for 24 hours.

With whole corm, the entire corm is planted in the chamber or fragmented into 2 or more bits as the case with split corm.

With excised buds, buds are cut out in minisetts of about 50-100g each before sterilization and planting.

With corm drilling, the meristem is drilled while in PIF, the corm is pared, sterilized and apical meristem scarified or fragmented longitudinally into 2 or 4 bits before planting.

Prepared corms are planted at 10cm interval and cover with 2cm layer of saw dust. PIF fragments are planted with the cut portion (meristem) facing up. The chamber is well watered immediately and thereafter watering is done 2-3 times a week .

F) Propagator management

. Watering should be done only when necessary especially when poly sheets are dried.
. Large shoots should be manipulated (scarified) to obtain secondary plantlets.
. **S**hoots having 2-3 small leaves should be detached to poly pots with roots or rooting chambers without roots but with little portion of corm for nutrient reserve.
. Clean environment should be maintained.

Shoots with 2-3 small leaves

G) Potting mixture preparation

Potting substrate include: top soil, saw dust, coffee husk, cocoa husk, rice husk and oilpalm fiber that is mixed in different proportions and should be prepared in advance. Top soil mixed with saw dust and composted organic matter at 6:3:1 ratio is preferred.

The soil mixture is steam sterilized for 12 hours in a drum. An old oil drum, modified by welding iron cross bars at about 20 cm from the bottom is used for steaming. Steam is prevented from escaping from the mixture when heating. After sterilization, the mixture should be allowed to cool for 24 hours before use.

Steam sterilized potting mixture

H) Rooting and acclimatization

Detached plantlets are sorted and those without roots are planted in rooting chambers for rooting while those with roots are transferred to poly pots for acclimatization. Movement of plantlets to distant nurseries for acclimatization should be in humid transparent polythene bags.

Sorting of plantlets

Rooting of plantlets

Acclimatization

.17cm x 24cm black poly bag is used for potting.

. Acclimatization is under atmospheric condition of 25 – 27 ^{o}C.

. Shade should be 2m high for proper lighting and management. Watering should be 4 times a week.

Further information

For further information, please contact:

International Institute of Tropical Agriculture

PMB 2008, Yaounde, Cameroon

Tel: (237) 223 74 34 / 223 75 22

Fax: (237) 223 74 37

International mailing address

IITA, c/o Lambourn (UK) Limited

Carolyn House

26 Dingwall Road

Croydon Kingdom

www.iita.org