

### **KA BYALIDWE KA SOPANO KA NTHOCHI (CUSTOMIZED BANANA TISSUE CULTURE TECHNOLOGY)**

Tissue Culture ni kabyalidwe kasopano ka mbeu ugwisira nchito mbali zosakhala sele. (Tissue culture is propagation of cultivars using plant tissues other than seed)

Kuti zikuyendeleni Bwino, Conde londolani mfundo izi mosamala kwambili (Precautions):

- 1) Sakanizani bwino bwino manyowa pasadakhale (Premix manure or grow media 3 weeks in advance)
- 2) Sukani zipangizo zonse mu mankhwala oteteza ku matenda na tudoyo (Sterilize all utensils & materials)
- 3) Sambani mu mankhwala nthawi zonse pamene mu gwira mbeu kapena zipangizo. (Sterilize your hands on each operation).

Mitundu Ya Maluso Asopano Akabzyalidwe Ka Nthoci (Types of Customized Banana Tissue Techniques)

#### **> UGWIRISILA NCHITO CHINKHOMWA (DETACHED CORM TECHNIQUE):**

- 1) Kumbani ndipo Dulani mtengo wa nthoci ya nthanzi ya miyezi 5-6, kapena masamba 5-9. (Select dig out and cut a healthy 5-6 months old banana plant)
- 2) Cosani mtima (Destroy Meristem).
- 3) Sukani nkhomwa, (Wash the corm clean)
- 4) Cosani mizu yonse. (Remove the roots)
- 5) Cosani masamba bwino bwino. (Remove the leaf sheaves).
- 6) Samalani maso (Buds) omelela (Expose Buds carefully)
- 7) Vuikani mu mankhwala oteteza matenda na tuzilombo kwa 20 minutes. (Sterilize 20 minutes)
- 8) Yumikani na mphepo kwa tsiku lathunthu (24hrs). (Air dry for 24hrs)
- 9) Byalani chinkhomwa conse mu utuchi (saw dust) kapena msanganizo wa nthaka ya conde cabwino. Mzithilila. Mphukila 6-12 zizamela pa 3 weeks iliyonse. (Grow media). (Plant in saw dust or grow media. Keep moist. 6-12 suckers/plantlets will grow every 3 weeks).

#### **> UDULA-DULA MASO OMELELA (EXCISED BUDS TECHNIQUE);**

Satilani malangizo awa (Follow these instructions):

- 1) Kumbani cinkhomwa (Dig out the corm)
- 2) Sukani nkhomwa (Wash the corm clean)
- 3) Cosani mtima (Remove meristem)
- 4) Cosani masamba bwino bwino (Remove leaf sheaths)
- 5) Dulani maso 50g -100g. (cut the Buds 50-100g sizes)
- 6) Sukani mmankhwala oteteza. (Sterilize)
- 7) Yumikani pa mphepo kwa 24 hours. (Air dry)
- 8) Bwalani mu ma plastic, mzithilila. (Plant directly in grow media in pots and keep moist).

#### **> UDULILATU MTENGO (COMPLETE DECAPITATION)**

Kacitidwe kake (know-how):

- 1) Sankhani nthoci ya bwino ya miyezi 5-6. (Select a healthy 5-6 months banana plant)
- 2) Dulani mtengo mnyansi. (Cut the pseudo stem at ground level)
- 3) Osacosa ziphikila zam'mbali. (Do not remove the suckers)
- 4) Cosani mtima wa nthoci 5 cm pakati pa mtengo wa nthoci. (Destroy meristem 5cm diameter)
- 5) Kumbani mbali mwa nthoci. (Dig around the corm)
- 6) Ikani manyowa kapena utuchi (saw dust) mpaka nkhomwa yonse itaundilidwa. (Cover with saw dust or grow media)
- 7) Mzithilila. (Keep moist)
- 8) Mphukila 6-12 zimatuluka pa masabata atatu alionse. (6-12 suckers emerge every 3 weeks)
- 9) Cosani mphukilazo 3 weeks iliyonse, byalani ku dimba. (Remove suckers for field planting)

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**Financial Supported from: World Connect US Technical support from: US PeaceCorps**

## **KAPANGIDWE KA MANYOWA ABWINO UBYALAMO NTHOCI. (HOW TO PREPARE QUALITY BANANA GROW MEDIA.)**

### **ZOFUNIKA (REQUIREMENTS)**

1. Utuchi (Saw dust)
2. Manyowa (Manure)
3. Dothi ya conde yapasinda (Top soil)
4. Coto (Ash)
5. Cimela (malt)
6. Multivitamin (vitamins: B complex)
7. Inositol (Amino acids)

### **KAPANGIDWE**

1. Utuchi, manyowa, dothi na cimela vikhale mu ratio ya 6:2:1:1. (Mix saw dust, manure, top soil and ash in the ration 6:2:1:1)
2. Phikani utuchi kuti muchose matenda kapena tudoyo tulitonse. (Sterilize mixture by hot mist for 1 hour)
3. Yumikani kwa siku la thunthu 24hrs pa mphepo. (Allow 24 hours air drying)
4. Ku 50kg ya msanganizo wa utuchi na manyowa, ikakoni makapu awili a cimela, tablespoon imozi, ya B complex, na tablespoon imozi ya inositol. (To every 50kg saw dust mixture, add 2 cups malt, 1 tablespoon vitamins, 1 tablespoon inositol)
5. Sakanizani bwino bwino (Mix thoroughly)
6. Thirani mazi kuti vinake ngati dothi ya dindo cabe osatekesa. (Add adequate water and keep moist)

**ZIWANI IZI:** 1) Inositol ipangisa kuti mphukila zomela ziculuke msanga. (Inositol induces cellular cell division). Nethito ya cimela ni utuntha mbeu kuti iyambe umela (malt being rich in auxin and cytokinin stimulates and encourages cell division and elongation thus promoting growth). Multivitamin athandiza kuti mbeu ikule mwa thanz (Vitamins make the plant grow healthy). Coto cipeleka potassium, phosphorous, calcium carbonate komanso cisamalila PH {cikulo}. (Ash provides the needed potassium, phosphorous, calcium, nitrogen and also regulates PH)

- 2) Ngati Inositol siipezeka ikakoni 2 liters ya mteteka. (If you can't get Inositol use 2 liters corn ferment juice).

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## **KASAMALIDWE KA NTHOCI ZA KASIZI KU DIMBA (BANANA PRODUCTION: FIELD PLANTING)**

**MTUNDU: WILLIAMS (variety: Williams; species: Musa Sp Cavendish)**

**MALO:**

Sankhani malo abwino aconde na cinyontho cokwanila kapena ke dimba amene palibe nthoci (Select a virgin well drained, fertile soils with adequate moist and water retention capacity; preferably wetland). Khwapani, dulani mitengo, osatentha. (Slash, cut down trees; do not burn)

#### KUIKA MIZELA (PLOT DESIGN AND PLANT SPACING)

Ikani mizela yanu ucokela kumpoto upita kummawa. (Site your plot in a north east direction pattern). Kumbani ma khau ya nthoci 45cm mu utali, 45cm mu ufupi, 45cm unoka pansi. (Dig plant stations 45cm long x45cm wide x45cm deep). Ikani dothi ya pamwamba 25cm kumbali ina yosalayo kumbali inanso. (Put the top soil from the first 25cm separate from the subsoil).

Kumbani makau 2.5m apart mu mzela komanso 3m ocoka pamzela wina ufika pa wina. (Maintain 2.5m intra-row plant spacing and 3m inter-row).

#### MANURE AND FERTILIZER APPLICATION

ZOFUNIKA (REQUIREMENTS): Manyowa, dothi, coto/phulusa khasu, 40g fataleza (NKP). Manure, topsoil, ash, 40g Fertilizer and hoe. Ratio; 3:2:1 manyowa: Dothi: Coto.

Sakanizani 20kg manyowa ofuka bwino, dothi ya pamwamba, na phulusa/coto. Mix 20kg of well-decomposed manure with topsoil and ash. Put half the mixture in the planting hole.

#### KABYALIDWE (PLANTING)

Imikani mbeu mu khau ija. Thilani dothi ya manyowa sindilani bwino bwino. (Remove the plant from the pot or the sucker from the explant. Press it upright in the planting hole. Put in the remaining manure mixture and press firmly). Thilani fataleza 20cm mbali mwa nthoci (Broadcast fertilizer 20cm away from the plant). Undilani 5cm na sub soil (Cover with 5cm subsoil). Thililani (Water). Mzithilila 30 litazi pa wiki iliyonse. (Irrigate 30 liters per station every week).

Mziika manyowa na 40g urea fataleza kamozi pa 3 months iliyonse. (Apply manure and 40g nitrogen fertilizer every 3 months by band application).

Khwapani mauzu (Slash grasses). Tetezani ku moto na ziweto (Protect from fire and livestock). Pa 9 months zizabala ndipo ikani mitengo kuti zisagwe. (By 9 months it will start fruiting, pop-up to support).

Makhoza akaleka ucoka dulani mcombo (After the last hand sets, cut off the floral). Kololani mkaona kuti nthochi zasalala zakhwima, zapela. (Harvest when round and mature). Mkoko umozi umatulusa makhoza 8-12 ndipo khoza immozi ingakhale na nthoci 22-36 ngati mwasamala bwino. (On average 8-12 hands per bunch and 22-36 fingers per hand under good management)

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