



# Field production of quality sweetpotato planting material

*Guidelines for using rapid multiplication technology to produce quality sweetpotato planting material in an open field*

## 1. INTRODUCTION

These guidelines outline the basic steps in production of sweetpotato vine cuttings (seed) in open nurseries using rapid multiplication technology (RMT). It covers the standard bed size, spacing and other agronomic practices. It is meant for use by any seed producer seeking to produce planting material in open fields.

## 2. PROCEDURE

### A. SOURCING STARTER MATERIAL

i. Obtain clean, virus-tested starter material from a known source, e.g., a National Agricultural Research Institute (NARI) or a private sector seed enterprise. Pre-basic seed (vine cuttings) are produced from virus tested tissue culture plantlets and multiplied under screen house conditions (protected from virus-vector pests).

### B. SITE SELECTION

Select a site that is:

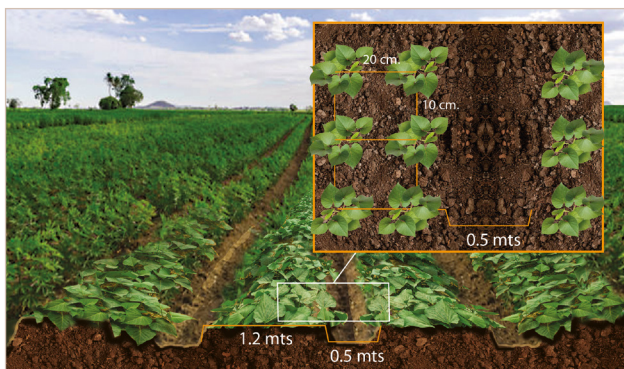
- i. Near a reliable water source with year-round availability of water for irrigation. Check local bye laws for any restrictions on use of swampy areas, riverbanks etc.
- ii. Not steep and has level terrain to avoid water loss from run-off when irrigating.
- iii. Secure with low risk of theft, vandalism, or damage by livestock, (as close to one's home as possible).
- iv. Easily accessible for regular management and monitoring activities, seed inspection by regulators, and purchase by customers.
- v. Free of shade to allow maximum penetration of sunlight and rainwater, but avoid windy areas which may facilitate mite infestations.
- vi. Not heavily infested with weeds, especially perennial weeds.
- vii. Compliant with the national sweetpotato seed standards for rotation practice, and isolation distance.

### C. LAND PREPARATION

- i. Clear bushes or other foliage and till the soil at least one day before bed preparation.
- ii. Soil tillage is best done when the soil is moist. Apply water if this is done during the dry period.

### D. BED PREPARATION

- i. Rapid multiplication technology allows production of large quantities of planting material within a short time. Plants are planted using close spacing (20 cm x 10 cm) which favours production of vines but compromises production of storage roots. Recommended spacing is 20 cm between rows and 10 cm between plants. However, this can be adapted (e.g., 20 cm x 20 cm) to local conditions.
- ii. A standard rapid multiplication bed is 6 m long by 1.2 m wide. Long, narrow beds allow easy management. The size of beds may be adapted to local conditions and needs.
- iii. Leave a space of 0.5 m between beds to allow easy access.

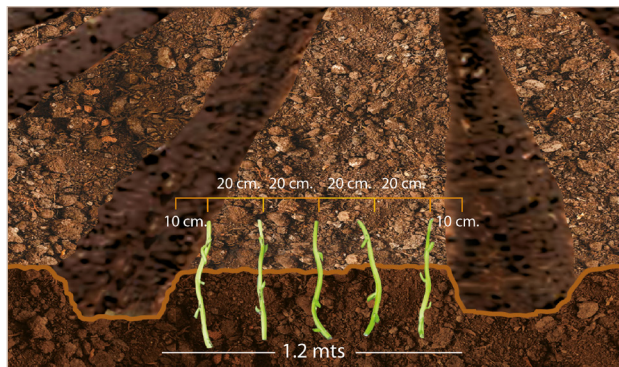


- iv. Prepare sunken beds if in an area that requires frequent irrigation and raised beds if in a marshy area.
- v. Beds should be at a right angle to any field slope so as to reduce water run-off and soil erosion.
- vi. Mix well-decomposed organic manure into the soil of the beds at a ratio of four 20-litre (by volume) buckets per bed shortly before planting time.

### E. PLANTING

- i. Plan well so that the vines produced will be ready for harvesting during the peak period of demand for planting material from farmers. The number of rapid multiplication beds planted should depend on the quantities of planting material required by local farmers.
- ii. Water the seed beds lightly prior to planting.
- iii. As the plants grow, cut the vines into cuttings of 3-4 nodes (~10-20cm) in length.
- iv. Plant the 3-4 node cuttings upright at a spacing of 20 cm x 10 cm with two nodes buried under the soil. Leave 10 cm from plants to the edges of the bed,

which leaves you with one meter width on which to prepare your rows. Therefore, you will have 5 rows spaced at 20 cm. Each row will accommodate 30 plants spaced at 10 cm, giving you a plant population of 300 per bed.



- v. Only one variety should be planted on each bed.
- vi. A mulch of rice husks or any other available organic material may be spread over the soil after planting to suppress weeds.
- vii. Label each bed clearly indicating date of planting, name of the variety, source of planting material and generation. Labels should be waterproof.



- viii. After two weeks, check the establishment rate, and fill any gaps with new cuttings to maintain optimum plant population density.
- ix. Check that the cuttings are well covered with soil and cover any that have become exposed during watering.

### F. WEED MANAGEMENT

- i. Do regular monitoring and remove any weeds by hand.
- ii. Remove any weeds emerging around the planted area.

### G. PEST AND DISEASE MANAGEMENT

- i. Do regular scouting of the multiplication plots removing (roguing) plants that are not true-to-type and those showing virus symptoms (i.e. stunting, leaf discoloration or deformation), leaving only healthy, vigorous plants.



a) Inspecting the crop for visual symptoms. b) Roguing out infected plants.

## H. IRRIGATION

- i. Irrigate immediately after planting and give light irrigation daily for 15 days until establishment. The frequency of irrigation thereafter should depend on prevailing weather conditions. Do not irrigate during the rainy season if rains are consistent as this might lead to waterlogging.
- ii. Use a watering can if the area under production is small. Use motorized (petrol/solar-powered pump) when the area under production is large.
- iii. It is best to water in the early morning and/or late afternoon.

## I. INSPECTION

- i. The national seed regulatory body should inspect the vine multiplication plot to assess whether the planting material being produced meets the standards in the country's seed regulations.
- ii. The seed producer should register with the seed regulatory body. A minimum of two inspections are typically done, the first about 4-6 weeks after planting when disease symptoms would first start to show up, and at which point the seed producer will be advised to rogue out diseased plants. The second inspection should be done about 2 weeks before harvest. If the pest/disease level is above the tolerance level, the plot will be rejected. During the second inspection, an estimate of the quantity of planting material which can be harvested from the plot is done.

## J. HARVESTING AND POST-HARVEST MANAGEMENT

- i. After 6 to 8 weeks the vines are ready for the first harvest. This should be done early in the morning or late afternoon to avoid excessive evaporation, wilting and transplanting shock.
- ii. Cut apical portions of vines at 10 – 15 cm above the soil level, leaving the stump with some nodes to support secondary vine growth and to ensure harvested cuttings are free from weevils.
- iii. First ratoon or second vine harvesting can be done after 40 to 60 days depending on weather conditions and management. Two to three ratoons can be produced but the number is guided by each country's regulations on seed production.



- iv. Depending on soil fertility, nitrogenous fertilizers such as NPK and urea may be applied at a rate of 200 g/bed after harvesting to boost vine growth. Consult the local extension officer and agrovet for appropriate type and proper use of fertilizer.

## K. PACKING

- i. Cut each vine into 5- to 7-node (25-30 cm) cuttings and arrange them into bundles of desirable quantities e.g., 200-300 cuttings per bundle.



- ii. The bundles can be packed into jute or polypropylene grain sacks. Jute sacks are better than the grain sacks because they allow more air movement. If using grain (polypropylene) sacks, pierce them to increase air flow. In case of transportation of large quantities, the vines can just be arranged into bundles of desirable quantities and packed directly on a vehicle without packing in sacks.
- iii. Do not overfill the sacks to avoid damaging the vines.
- iv. The distance which the planting material will travel, or the estimated time before the material will be planted, can influence the type of packing materials used.
- v. Clearly label each variety whether distributed in sacks or bundles. The label should contain the variety name, name and contact details of the multiplier and date of harvest.



- vi. If possible, include details of the characteristics of the variety on the back of the label. A separate information leaflet on the varietal characteristics and good agronomic practices for root production can be distributed with the planting material, if resources allow.

#### L. TRANSPORTATION

- i. Take care when loading sacks or bundles onto trucks to avoid squashing and damaging the vines.
- ii. Use open medium-sized (6 - 8 tons) trucks for transporting vines to reduce damage. If large trucks

are used, the vines are more likely to get squashed and overheated during transport.

- iii. Transport the vines during the cool part of the day to minimize rotting or drying out of the vines. Tarpaulins should be used to cover the vines when it rains during transportation, otherwise they will deteriorate and become unusable.
- iv. Make sure you transport the vines as soon after harvesting as possible, as there can often be unexpected delays during transport and distribution.

#### FURTHER REFERENCE RESOURCES

1. Stathers, T.; McEwan, M.; Gibson, R.; Mwangi, R.O.M.; Carey, E.E.; Namanda, S.; Low, J.W.; Ogero, K.; Rajendran, S.; Abidin, P.E.; Malinga, J.; Agili, S.; Andrade, M.I.; Mkumbira, J. 2018. Everything you ever wanted to know about sweetpotato. Topic 5: Sweetpotato seed systems. Reaching agents of change ToT manual. International Potato Center, Lima, Perú. 118 p. <https://hdl.handle.net/10568/98337>.

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#### CITATION

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