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SEED YAM PRODUCTION BY MINISETT TECHNIQUE+

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ABSTRACT

Yams (Dioscorea spp.) are cultivated in many tropical countries including Papua New Guinea (PNG). Cultivated species of major importance in yam growing areas of PNG are D. alata (Greater yam) and D. esculenta (Lesser yam). In these areas the traditional system of seed yam production involves the use of large planting setts which could have otherwise been used for food. A rapid multiplication technique of producing seed yams using minisetts was adopted and proved successful at Laloki Agricultural Research Station, in the Central Province. The technique in seed yam production using minisetts is discussed.

INTRODUCTION

Yams are an important root crop in many tropical Countries. In Papua New Guinea (PNG) yams are cultivated as major staples in the Sepik, Milne Bay and Central Provinces. In these areas the traditional system of seed yam production involves the use of large planting setts from ware yams (yams meant for food or sale). The system is expensive, results in a low multiplication ratio, and involves high losses of produce meant for food. The improved technique of rapid multiplication of seed yams by the use of minisetts alleviates this problem.

The minisett technique was developed by the National Root Crops Research Institute, Umudike, Nigeria and was modified and successfully tested by the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria.

In PNG the technique was tested using four yam species at Laloki Agricultural Research Station and proved to be a success. The steps carried out are described in this bulletin for farmers, educationists, gardeners and extension officers who would like to try out this technique.

What is a Seed Yam?

A seed yam is a small whole yam tuber weighing between 200 to 500 grams.

What is a Mother Seed Yam?

A seed yam weighing between 500-1000 grams used to obtain minisetts for planting is called mother seed yam. Clean healthy yam tubers should be selected immediately after the tubers have sprouted, usually between 1 and 4 months in storage.

What is a Yam Minisett?

A minisett is a small piece of yam cut from a mother seed yam and grown specifically to produce planting materials.

PREPARING MINISETTS

The mother seed yam is cut into several cylindrical pieces, each about 5 cm long. Further setts can be obtained but this will depend on the size of the first piece. Ensure that each sett has a skin. These cut pieces are the "minisetts" and should weigh between 10 to 100 grams. An average size mother seed yam should give between 20 and 40 minisetts.

TREATMENT OF MINISETTS

Newly cut minisetts are treated with a solution of wood ash. The mixture is prepared by adding 4 to 5 handful of ash to 4 litres of water in a container. This solution is sufficient to treat 5,500 minisetts. Plastic containers with holes at the bottom and sides, or small baskets are useful for holding minisetts in while dipping in the solution.

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After treatment the minisetts are spread out under the shade for two hours to dry the cut surfaces. Avoid placing minisetts under direct sunlight. Plant the minisetts in well prepared nursery beds, baskets, perforated cardboard and wooden boxes. It is important that the boxes have holes for drainage. The size of the boxes is variable but a suggested size is 40 cm wide, 50 cm long and 40 cm high.

SPROUTING IN NURSERY BED

The nursery bed should be about 1 metre wide and the height will vary depending on the location and the quantity of minisetts to be sprouted. Nursery site should have good drainage, otherwise raise beds to a height of 30 cm to improve drainage. Light shade is required (45%).

Once the beds are constructed, spread fresh moist sawdust on the surface to form a 2 to 3 cm layer of sawdust. Then spread the minisetts on top of the moist sawdust layer and cover with the same material. Sufficient water is required to keep the sawdust moist at all times. During periods of frequent rain, the nursery beds can get very wet. It is therefore advisable to have some cover over the beds to keep off excess rain water.

SPROUTING IN BOXES/BASKETS

Minisetts are laid out in the same way as in nursery beds. Unlike beds, three layers of minisetts are arranged in the boxes, each layer separated by moist sawdust. Place minisetts over a layer of moist sawdust, cover with 3 cm of the same material, place the second layer of minisetts, cover with moist sawdust, then the third layer also covered with moist sawdust.

The boxes or baskets should be kept under shade with sufficient watering to keep the sawdust moist.

The minisetts should sprout within 3 to 4 weeks, but may vary between different yam varieties. These should be transplanted immediately to the field.

USE OF SOIL AS MEDIUM FOR SPROUTING MINISETTS

Moist sawdust has been used effectively as a medium for sprouting minisetts. However, it is not always available especially in areas where there are no sawmills. Therefore it is necessary to find substitutes for sawdust. Sandy loam soils are good for sprouting minisetts. Dry grass mulch can be used to cover the nursery beds to retain soil moisture. If boxes are used keep them under shade and water regularly. It is important to use sterilized soil in nursery propagation work.

WHY PRE-SPROUT MINISETTS

Pre-sprouted minisetts give good plant establishment in the field after transplanting. Plant canopy establishes early and helps to suppress weeds. Minisetts which fail to establish can be replaced with reserve minisetts from the nursery. The cropping period is shortened and uniform tubers are harvested if minisetts are used. Pre-sprouting is useful especially in areas where rainy season is short or where rain terminates earlier than expected.

LAND PREPARATION AND TRANSPLANTING

The minisetts give good field establishment if they are transplanted just after sprouting - at this stage setts should have short vines without leaves or with unopened leaves and sprouts should be about 20 cm long.

Over-grown setts with long vines and many fully opened leaves usually do not establish well after transplanting. However, these can be pruned or cut-back to about 3 or 4 nodes with leaves and transplanted at the onset of rain, but will produce more microtubers (less than 200 g) than seed yams (200 to 500 g) and ware yams (more than 500 g).

The field should be fertile, with good drainage and free from nematodes. To plant on ridges, these should be spaced 1 metre apart with planting holes every 25 cm. The planting holes should be 5 to 7 cm deep.

FIELD MANAGEMENT

The crop should be kept free from weeds for the first three months during the growing season. Good canopy forms after 3 months and helps to suppress weeds. Good weed control is the most important management practice that should be observed when planting is done without mulch.

a) Pre-emergence herbicides at recommended rates can be used to control weeds if minisetts are transplanted immediately after sprouting, using the normal spacing of 1 m x 25 cm. Supplementary hoeing or

weeding will be needed later. Small but durable stakes such as bamboo or sticks about 1 m high should be used to support the yam plants, training about 2 - 4 plants to a stake. Dry grass or lawn clippings can be used as mulch.

b) Sprouted minisetts can also be planted at high densities in the field using beds similar to the nursery beds. Setts can be planted at a spacing of 20 cm x 20 cm to obtain population of 166,667 plants per hectare. Sufficient canopy cover is achieved at 4 to 5 weeks after planting. Therefore weeds are suppressed early.

Other advantages under this planting density are:

(1) Large quantities of seed yams are produced on a small area of land.

(2) Since the land area required is small, farmers have good control over their seed yam production.

(3) The cost of production is low because large quantities of seeds are produced from a given area. Also staking is eliminated, weeding is reduced and there is no need to apply mulch.

(4) Harvesting is made easier and faster

(5) More small tubers can be obtained especially from *Dioscorea esculenta* (mami/maho) and they store better than large tubers.

HARVESTING

Yams are ready for harvesting at 6 to 10 months after planting. They can, however, be left in the ground for a little longer (one to two months) and harvested, before the tubers start sprouting in the field.

Maximum care should be taken during harvesting and handling tubers for storage. Tubers which are damaged or attacked by nematodes (infected tubers have small lumps) should be separated from healthy ones and should not be used as seed yams.

STORAGE

In places where long dry season prevails people have several methods of storing yam tubers after harvest. Carefully dug, undamaged tubers will store for at least 6-8 months. Storage life of yams depend on the length of tuber dormancy.

Informal studies were carried out on the natural sprouting of six yam species at Laloki. Observations indicated that yam species *D. nammularia* sprouted after 1 month in storage, *D. alata*, *D. esculenta*, *D. bulbifera* and *D. pentaphylla* after 2 - 3 months and *D. rotundata* after 3 - 6 months in storage.

USE OF SEED YAMS

Good quality seed yams can be produced by the minisett technique if good mother seed yams are planted on fertile soils. This method is not costly to use and it increases the availability of planting materials at any one time. A wide range of seed yam sizes is used as mother seed yams to provide minisetts. An important application for this minisett technique is rapid multiplication and distribution of improved yam varieties.

Further information may be obtained from:

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