

# A CROP PRODUCTION TECHNICAL GUIDE



## SWEET POTATO

*(Ipomoea batatas (L) Lam)*

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## **INTRODUCTION**

Sweet potato (*Ipomoea batatas* (L) Lam) belongs to the convulaceae (morning glory) family. It is believed to have originated in Central America and the North Western part of South America. It is also reported to have been cultivated in that region for several centuries before it was introduced to Europe in the 16th century and is thought to have moved to Africa from Europe.

In the Caribbean, sweet potato is grown on every island but Jamaica, Barbados and St Vincent and the Grenadines are the largest producers.

Today, sweet potato is grown in most parts of the tropical world and even in the warmer temperate regions. Asia is the world's largest producer with China producing more than 80% of total world production. Other large producers include Vietnam.

## **USES**

Sweet potato is mainly used in its primary state boiled, fried or baked. There is however, some processing into starch, flour, alcohol, confectionery

In China 60% of the quantity produced is used as animal feed.

## **COMPOSITION**

Water	60-70%
Protein	1.5 - 2.0% (Lysine 4.2%)
Fat	0.2%
Carbohydrates	27%
Fibre	1.0%
Starch	15-25%
Sugars	1-2%

Other minerals include calcium, iron, vitamins A, Vitamin C, potassium and B complex vitamins

## **SOIL REQUIREMENT**

Sweet potato requires soils with a ph of 5.6 - 6.6. High quality tubers are best produced on fertile, well drained, sandy loams. Crops grown in heavy clay loams produce irregular shaped tubers. The crop is sensitive to drought at tuber initiation stage (50-60 days after planting). It is also not tolerant to water logging which can cause tuber rot.

## **LAND PREPARATION**

In the Caribbean, different conditions exist. Land could be sloping e.g. in St Vincent and the Grenadines and Dominica or flat e.g. St Kitts and Barbados, Jamaica.

On sloping land, ridges or banks are made along the contour after the land is cleared of all weeds.



**Figure 1 & 2 Ridges on sloping land**



**Figure 3 & 4 Cultivation on flat land**

If the land is flat, then mechanical preparation is possible and ploughing, rotovating and ridging is done.

## **PLANTING MATERIAL**

The crop is propagated vegetatively by stem cuttings called slips. Cuttings should be 20 - 45cm long and selected from mature, insect free plants. It is recommended to plant the apical cuttings which give better growth than middle or basal portions. Apical cuttings are also less likely to have pests than the older stem cuttings.

The use of planting material produced by tissue culture is increasing. This is a source of clean, disease free material and yields are reported to be higher with this method. The cuttings obtained from rooted tubers can also be used to establish the crop.



**Figure 5 Tuber with sprouted slips**

## **PLANTING**

Planting is usually done at the top of the ridge. Ridges should be 75-90 cm apart and 30-40 cm high. The stem cutting is placed at an angle with half of its length placed in the ground.

Between ridges            90 cm  
Between plants           30 cm  
37,000 plants/hectare

## **TIME OF PLANTING**

Sweet potato can be grown all year round. The crop requires adequate moisture for establishment and July and December are considered the best time for planting. Irrigation has been reported to lead to increased yields.

## **VARIETIES**

Skin colours can range from white, cream, yellow, orange, pink, red to purple. Flesh colours may be white or various shade of cream, yellow, orange or even purple.

Commercially important varieties as reported by the international market are red skinned, white fleshed. The preferred shape is elongated.



**Figure 6&7: Examples of two export varieties of sweet potato**

## **FERTILIZATION**

Addition of fertilizer is usually necessary for best production of high quality tubers. The best suited soils are sandy, which are normally of low or moderate fertility.

High nitrogen levels can lead to excessive vine growth and poor tuber development. High levels of potash have been reported to give good results, which aid in tuber development and shape.

It is recommended to supply 250 – 500 kg/ha of 12:8:16 at planting (incorporated into the soil). Fertilizer application is usually split into two. The first is at planting and the other at 5 or 6 weeks after planting.

## **WEED CONTROL**

The sweet potato vines grow rapidly and effectively compete with weeds. As result, weed control measures are only necessary for the first two months after planting.

## **PESTS AND DISEASES**

The most important pests of sweet potato are the weevils, *Cylas formicarius* and *Eucepes postfasciatus*. The white grub, *Phyllophaga* sp is also a pest of economic importance in some islands.

### ***Cylas Formicarius***

The female weevil lays eggs at the base of the stem and in the tuber. In the tropics the eggs hatch in about 8 days. The larvae then tunnel through the tuber, feed on it and depositing frass with it. This causes the tuber to rot. Deep rooted tubers are less likely to be attacked by the weevil.

Control measures include:

- Pheromone lures
- Resistant cultivars
- Harvesting as soon as tubers mature
- Crop rotation
- Plant clean slips



**Figure 7: Weevil damage on sweet potato**

***Phyllophaga sp***

The June Beetle is the adult which lays eggs 1-8" (2.5 - 20 cm) in the ground. After 3 weeks the eggs hatch and the larvae emerge and feed on the outer skin of the sweet potato. This is when most damage is done. The tunnels formed render the tubers unmarketable. Successful control has been effected with Actara and Pronto



**Figure 8: Grub damage on sweet potato**

***Eucepes postfasciatus***

Females lay eggs singly in cavity excavated in either root or stems within first 2cm of soil surface.

Newly hatched larvae are in contact with their food and go deeper as they feed. Internal damage leads to discoloration and foul smell. It is difficult to harvest damaged root and also difficult to control the pest.

***Megastes Grandalis***

*Megastes grandalis* is important in Trinidad and Tobago and is of lesser importance in the other Caribbean islands. The larvae first feed externally on the plant then bore into the stem. Larval period may last for up to 9 weeks. Major damage results from larvae boring into main stem leading to sweet potato roots.

Tunneling may be so severe that vine and root developmental control be affected. Leaf shredding and stunting of the plants are symptoms that the larvae is present.



**Figure 9 Eucepes damage on sweet potato**

**HARVESTING**

From time planted to harvesting varies for 3-6 months. Maturity is also determined by examining the latex exuded from a cut tuber. Immature tubers give a black exudate, while that of a mature tuber is white.

Harvesting is usually done manually using a fork to lift the tubers from the soil. Care should be taken not to damage the tubers during the process. Avoid transporting in bags since this can also damage the tubers.

## **POST HARVEST**

After harvesting, tubers must be washed in a 100 ppm bleach solution and allowed to air dry. Curing is also recommended. This involves storing the tubers at room temperature for 3-5 days. It allows the wounds to heal and toughens the skin. This is especially important for sweet potato that is to be exported.

The pest is usually found in planting material, apical tip region least infested, basal sections most. It is important as a storage pest. Tolerant varieties are one means of control. Soil applied systemic insecticide is necessary.

## **BIBLIOGRAPHY**

Onwueme I. C and T. D. Sinha

Field Crop Production in Tropical Africa, CTA, The Netherlands 1991

Jansson, K and Kandukuri V. Raman

Sweet potato pest management, A Global Perspective, Westview Press 1991

Integrated Pest Management of the Sweet Potato Weevil, CARDI Factsheet

CARDI Research Activities 2002-2007