

## INTRODUCTION

Cassava is the main root crop grown in Guyana. The tubers are a popular domestic food and are the staple food for the hinterland communities. In Guyana, cassava is classified as bitter or sweet. Cassava is widely adopted for cultivation on various ecological zones and it is known to be a drought tolerant, low input crop.

Cassava is used locally for food by boiling. Some amounts are processed in flour, farine, cassava bread, cassareep, and alcoholic beverages. Cassava can also be utilized as an ingredient in animal feed.

The Ministry of Agriculture has recognized the importance of cassava both from a food security standpoint as well as a crop for value-added products. Recently the Ministry has joined the Latin America Consortium for cassava, CLAYUCA, to give impetus to further enhancing the cassava industry in Guyana.

**Varieties:** It is estimated that there are in excess of 30 varieties of cassava grown in Guyana. Some of these are Four Month, Brancha, Butterstick, Uncle Mack, M Mex 59, Mex 52 and Bad Woman. The two most common varieties used for cooking are Uncle Mack and Butterstick.

**Land Preparation and Planting:** Cassava can be grown on a wide range of soils but prefers light deep soils that encourage tuber development. Land preparation should be deep enough to accommodate the tubers. Since the crop cannot withstand waterlogged conditions, there should be adequate drainage. Soils should be ploughed and harrowed and adequate drains made. For lighter soils, flat planting can be done. In heavier soils, however, ridging may be necessary to facilitate drainage.

The planting materials for cassava are the stems of mature plants. The material may be planted immediately after harvest or can be stored for up to six months. If the material is to be stored, it should be placed on bundles and stored in the shade. Alternatively the sticks could be bundled and placed upright under shade.

Before planting, the material should be cut into pieces about 20-30cm (8-12") long. In order to control pests during initial period of growth, planting materials should be soaked in insecticidal solution for approximately 10 minutes. The insecticides recommended are Triazophos (6ml/gal water) or Diazinon (10ml/gal/water). The cuttings should be planted vertically into the soil. The recommended planting distances are 0.9m (35") between rows and 0.9m (35") within rows. This results in about 1,235 plants/ha (5,000 plants/acre).

**Fertilizers:** Most soils in Guyana are acidic but cassava seems tolerant to these soils. As a general rule before applying fertilizers, the soils should be analyzed to determine the types and amounts to be used. If a soils analysis is not done the following rates of fertilizer elements may be applied.

Nitrogen 68 kg/ha  
Phosphorus 100 kg/ha  
Potassium 150 kg/ha

## PEST MANAGEMENT

**Cassava Mealybug:** This pest causes leaf loss and weakens the stem planting material. Infected leaves will exhibit abnormal colour and eventually wilt. The recommended method of control is to use natural enemies such as the ladybirds. Alternatively, controlling ants which help to spread the mealybugs by spraying with Basudin can be practiced.



**Whiteflies:** These pests are generally found on the undersides of leaves. They suck sap from the leaves resulting in leaves becoming mottled, yellow and brown before drying. Chemicals recommended for controlling whiteflies include Admire, Pegasus, Basudin or Vydate L at 10ml to 4500mls of water.



**Aphids:** Aphids are found as clusters on the underside of the young leaves and also on young tender stems and growing point. They suck plant sap causing a general weakness of the plant. Contact stomach insecticides such as Fastac, Decis, Karate, Sevin or Malathion are recommended for controlling aphids.



**Thrips:** The infestation by thrips is most severe during dry periods. Thrips suck saps from leaves which causes them to lose their colour. Application of insecticides such as Regent (Admire), Abamectin and Vydate L at 5 ml to 4500mls water, to both surfaces of leaves is necessary for effective control.



**Mites:** Mites are extremely tiny and appear as dust-like particles on the underside of leaves. These suck sap, resulting in leaves becoming yellow and eventually turning reddish. Chemicals such as Abamectin, Newmectin or Vertimec at 5ml to 4500mls of water are recommended for controlling mites.



**Lace Wing bugs:** These bugs are found on the undersurface of leaves. Their sucking action results in leaf molting. This leads to premature abscission of leaves. Chemicals recommended for control of lace wing bugs are Decis, Karate or Fastac at 6mls to 4500mls water.



**Gall Midge:** This insect causes gall formation on plants. Galls are normally found on leaves, buds and stems. Chemical control can be achieved with the use of Sevin, Trigard, Diazinon, Admire or Malathion at the recommended rate.



Larva and Adult Gall Midge

**Horn Worm:** The larvae of these worms can devour cassava leaves in one to two days. Hand picking and squashing of the worms is a recommended method of control. Alternatively controlling breakout of these and their caterpillars can be achieved by spraying Bt on susceptible plants before caterpillars become a major problem.



**Acoushi Ants:** These ants cut the plant leaves, resulting in complete defoliation. Baiting is the recommended method of control.



## DISEASE MANAGEMENT

### Cassava Mosaic Disease(CMD)

This disease is caused by a virus which occurs inside cassava leaves and stem. Infected leaves become discoloured with patches of normal green mixed with lighter green, yellow and white areas (chlorosis). Whiteflies are responsible for transmitting this disease to the plants. It is therefore necessary to control whiteflies with the use of Admire, Vydate L, Abamectin or



Symptom of Cassava Mosaic Disease

#### Cassava Bacterial Blight

Initially, damage by cassava bacterial blight appears as water-soaked lesions. Eventually the leaf blades turn brown with the water soaked areas at the leading edge of the brown patch. The disease is spread by planting stem cuttings from infected plants. Some insects are also responsible for transferring pathogens to healthy plants. It is therefore advisable to use disease free planting materials. Additionally, vectors can be controlled using Fastac, Decis or Karate at the recommended rate



Symptom of Cassava Bacterial Blight

#### Cassava Bud Necrosis

This disease is caused by a fungus which occurs on the surface of stems and leaves. This disease appears as patches of brown or grey fungal covering of the stem. The fungal matter covers buds which reduces their sprouting ability. A fungal solution could be sprayed for control. Additionally, farm tools that are used to cut infected cassava plants should be cleaned with a bleach solution often to prevent the fungus from spreading to other plants



Cassava Bud Necrosis

#### Cassava Leaf Diseases

The leaf spot diseases are caused by fungi and appear as lesions on the upper surfaces of leaves. Leaf spot diseases spread to new plants by wind or rain. A fungal solution could be applied to control this disease



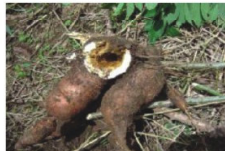
Cassava Brown Leaf Spot



Cassava Leaf Blight

#### Cassava Root Rot

This disease is caused by a fungus living on or in the soil, especially in poorly drained soils. The leaves of cassava plants affected by root rot disease turn brown, wilt and the plant appears scorched.



The storage roots may swell unusually and develop light brown discoloration. The roots may give out a bad smell as they rot. This disease can be controlled by burning plant debris in infected farms and with the use of disease free planting materials. Spraying infected plants with a fungal solution is also recommended

#### Harvesting and Storage

Time after planting is a commonly used index for determining when to harvest cassava. This is dependent also on the variety planted. Generally, roots are typically sufficiently well-developed beginning six to seven months after planting.

In Guyana, harvesting is done by hand and is easier when the soil is moist. To facilitate lifting of the roots out of the ground, the main stem of the plant is usually cut back to a height of 30cm to 50cm (12-20"). The stem is used as a handle to lift the roots out of the ground. While lifting, care should be taken not to break the roots or split the skin.

After the roots have been pulled out of the ground, they are removed from the base of the plant by hand. Care must be taken during the harvesting process to minimize damage to the roots. Mechanical damage incurred by the roots during harvest will result in higher amounts of postharvest moisture loss and secondary decay.

Harvested cassava should be placed in well ventilated field containers for transport out of the field. It is preferable to use wooden crates or strong plastic containers (sacks or bamboo baskets are not recommended).

Roots intended for storage should be properly cured immediately after harvest. Cassava can be cured outdoors if piled in a partially shaded area. Cut grasses or straw can be used as insulating materials and the pile should be covered with canvas, burlap or woven grass mats. Curing requires high temperature and high relative humidity (RH), and this covering will trap self-generated heat and moisture. The stack should be left undisturbed for about four days. Cassava can also be cured inside a protected structure at ambient temperature, provided the (RH) is high. Wetting the floor or using a small electric humidifier can obtain a high RH.

The simplest means of preserving cassava is to delay harvesting and allow the roots to remain in the ground. However, cassava roots will become fibrous and woody with prolonged in-ground storage time and flavour may be impaired. Also, the longer the roots remain in the ground the more risk there is of insect, disease, or rodent attack. Harvested roots can also be stored in the ground buried in trenches or holes filled with a sand/soil mix. Another method of storing cassava is to place them in wooden crates containing damp sawdust. However, if the sawdust is too moist it promotes fungal growth and if it is too dry the roots deteriorate quickly. Lining the crates with perforated plastic prevents dehydration of the sawdust, resulting in a storage life of about one month. Cassava roots treated with the fungicide Thiabendazole can be stored for 3 weeks inside perforated plastic bags at ambient temperatures. Keeping the roots inside plastic bags also reduces the incidence of vascular streaking.

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## GROWING CASSAVA IN GUYANA

