

▲ Papaya (Pawpaw)

Production Guide

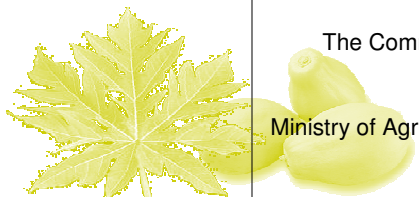
For St. Vincent and the Grenadines



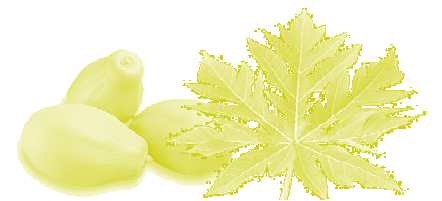
Produced by

The Communications, Information &
Training Unit

Ministry of Agriculture, Forestry and Fisheries



March 2009



Harvesting

- Harvest fruits early in the morning or late in the evening.
- Most farmers pick, dip and pack in the field to reduce damage.
- When trees are too tall for hand picking, use a plumbers plunger on a rod about six to eight inches tall.
- Ladders may be used but this increases the chance of the tree trunk becoming affected by bacterial diseases.
- Latex gloves should be worn to avoid finger nail damage to fruits.
- Harvest with a sharp knife that has been dipped in a bleach solution.
- Allow latex to drain, or, wipe off the latex on a cushioned surface to prevent fruit from being stained.

Post Harvest Handling

- Carry out all post harvest handling operation in a shady area on a raised surface (eg. on a table) and away from direct sunlight.
- Wipe the fruits with a moist cloth and 0.1% bleach solution.
- If there were incidences of diseases in the field, dip the fruits in a Bellis fungicide solution instead.
- Pack in crates with the stem-end downwards in dried grass, straw or sponge to reduce bruising. Avoid newspaper since it discolors the fruit.
- Avoid stacking fruits on top of one another to reduce staining and deterioration in fruit quality.
- Fruits can be ripened at a temperature range of 21 °- 27°C (70 - 80°F).
- Green fruits cannot be stored below 13°C (55°F) (while ripened fruits cannot be stored at temperatures below 10°C (50°F).

Uses of Papaya

For Food: used in drinks, fruit salads, sauce for cakes, ice cream sundae, pies, pickles, marmalade or jam.

Nutritional facts: 1 cup contained 55 calories; high in fiber and nutrients. It's a good source of Vitamins A & C, minerals such as potassium, calcium and magnesium.

A Pawpaw Production Guide

For St.Vincent and the Grenadines



Introduction

Papaya (*Carica papaya*) also known as Pawpaw, originated in tropical America. It is now produced commercially in several Caribbean countries and is in high demand in the tourism industry and the local market. It also has tremendous potential as an export crop.

The pawpaw fruit is rich in vitamin A and C, iron, calcium, protein, carbohydrates and phosphorus.

Varieties

The choice of variety depends on the market which the grower is targeting. Table 1 below outlines the characteristics of some varieties.

Table 1: Characteristics of some Papaya varieties.					
Variety	Average size	Colour of flesh	Colour of skin	Productivity	Durability (For shipping)
Solo	454 to 909 grams	Orange or Red	Yellow	-	Good (Hard outer shell)
Red Lady	1.5 to 2.6 kg	Deep red	Yellow-Orange	-	Thick skin
Solo Sunrise	400-565 grams	Red/Pink	-	100 fruits per year	Hard outer shell
KnowYou #1 F1 Hybrid	1.6 to 3.0 kg	Yellow	-	-	-
Tainung #1	1.1 kg	Red	Green-Orange	-	Very sturdy outer shell
Tainung #2	1.1 kg	Orange/Red	Green-Orange	-	Soft outer shell (Local shipping only)
EXP 15					

Source: CARICOM Regional Transformation Program for Agriculture Papaya market Intelligence Report.

Pest/Diseases	Symptoms / Damage	Management
Phytophthora	Milky exudates appears from green and ripened fruits. Mature plants appear yellow, starting from the lower leaves then moving upwards. The roots of mature trees become black to brown in colour, resulting in toppling of trees.	A soil drench after transplanting followed by monthly foliar application with one of the following fungicides is an effective solution to this disease. <u>For Drench</u> Banrot® at 2 tsp. per gallon of water. <u>For Foliar Application</u> Acrobat® 69Mz at 4tsp per gal of water Ridomil at 2tbsp/gal.
Weed Control	Weeds in general may directly affect the crop by competition for valuable nutrients and may be host to other pests of papaya	Round up® or Touchdown® combined with a spreader such as Break Thru can be used up to when the plants are 4 months. Beyond 4 months, Round up combined with a pre-emergent herbicide can be used.

Yield

Hybrid varieties of papaya such as Tainung #2, Red Lady and Known You #1, when given adequate care and nurturing average from 60-125,000lbs/acre. Most "low input" plots in the region are likely to give an average yield of 20,000 to 40,000lbs/acre.

Harvesting and Post Harvest Handling

Papaya generally starts to flower after 5 months from transplanting. First harvest usually follows in another 4-5 months. Fruits are harvested when the peel colour change from dark green to light green and one yellow streak develops from the base upwards. Fruit harvested before this stage do not ripen completely. Cut stems about 3cm.

Pest/Diseases	Symptoms / Damage	Management
Mites	Under high infestation the leaves curl downwards. Younger leaves, especially in young plantations, may appear malformed and bronzed on the lower side. Leaves become thickened and brittle. The skin of the fruits become rusted and corky.	Apply a suitable insecticide. Pirate® at 1 tsp/gal water or Admire® at 2 tsp/gal Pronto® at 2 tsp/gal
Bunchy Top (most important disease in SVG)	There is faint mottling of the upper leaves. Growth of leaves and petioles are reduced and they become rigid. Internodes shorten and petioles assume a horizontal position. Apical growth or branching stops and subsequently the top leaves appear bunchy and the oldest leaves fall off. Oily spots appear in the upper part of the stems and petioles. If the fruits set, the flavor may be bitter	There is no effective cure but the suspected vector (hopper) can be managed by frequent spraying using a 7-day spray program applying insecticides such as Fastac® , Pirate® or Azadirect® . Remove and burn infected plant as soon as oil streaks appear.
Bacterial Canker	Water-soaked lesions appear along the margins and mid-veins. Leaves soon hang pendant from the petiole, then later fall. Stem cankers with bacterial ooze are observed at the nodes and internodes. If fruits are present, they exude latex and quickly rot	The “Solo Kapoho” and Sunrise cultivars are fairly susceptible to this problem. Once the disease is present, roguing or removal of the affected tree(s) from the field is necessary.
Anthracnose	Causes large sunken spots on the ripening fruit with orange to brown spores in the spots. The lower leaves develop small yellow areas which enlarge into circular water soaked areas with black spores.	This is the major cause of fruit loss after harvesting. A good spraying program, well fertilized and maintained fields eliminates this problem. A post harvest dip with Bellis® 38mg at ½ tsp per gal of water may be used.



Seedling Production

1. Select suitable sterilized media - example promix; or media prepared either by the Ministry of Agriculture Forestry and Fisheries or the Taiwan Technical Mission. If sterilized media is not available, treat with suitable fungicide and insecticide at recommended rate.
2. Plant in 5 x 5 inch plastic bags or in 12 oz. styrofoam cups with holes in the bottom to allow for drainage. Shallow containers would prevent proper root development.
3. Sow 1-2 seeds per container (for hybrid variety); 3-4 seeds per container if uncertified. Seeds germinate 2-3weeks after sowing.
4. Place bags/cups under 40% shade away from direct sunlight and rain.
5. Two (2) weeks after germination, apply foliar fertilizer weekly at the recommended rate.
6. Seedling should be ready for transplanting 6-8 weeks after germination.
7. Two weeks before transplanting seedlings should be hardened in full sunlight.

Land Preparation

Site selection

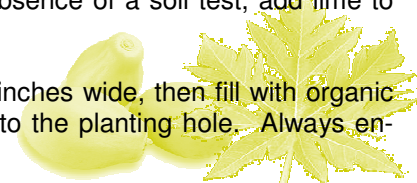
Choose an open field with ample sunlight, protected from strong winds, and with well drained soils (pH range 5.8 to 6.5) Pawpaw does not do well on extremely steep slopes in excess of 25° or in water-logged areas.

Method of Cultivation

Minimum tillage of the soil is recommended. Clear the land of all vegetative material. Determine the layout of the field with respect to wind direction. On sloping lands, place the holes along the contour.

Ensure that a soil test is done before planting to determine if the application of agricultural lime is required and how much. If lime is required, it must be added to the soil before planting. In the absence of a soil test, add lime to the soil at rate 1000lbs per acre.

Make planting holes 12inches deep X 12 inches wide, then fill with organic matter. Add ¼ lb triple super phosphate to the planting hole. Always ensure that the area is properly drained



Transplanting

Seedlings are ready for transplanting into the field about 6-8 weeks after germination. Transport the seedlings to the field 3-4 days before the proposed planting date to reduce stress at planting. When transporting to the field, protect them from the winds especially if the journey is long.. Avoid holding the seedlings by the stem when they are in the plastic bags or the Styrofoam cups. This can cause severe stem and root damage and the plants do not establish easily in the field.

Planting

Spacing:

Pure Stand - 7 x 8 ft (800 plants per acre)

Intercropped - 10ft x 10ft (435 plants per acre)

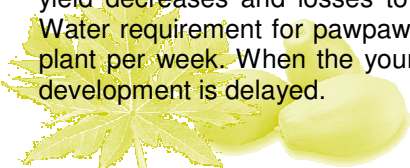
Avoid excessive watering of the plants just prior to transplanting. This may cause the media to loosen from the plant's roots when it is removed from the container. Carefully remove the plant with the media attached to its roots from the bag or cup. Place it in the hole at a 45° angle to the wind direction and fill with soil. Ensure the stem is above the soil at the same level it was while in the plastic bag or styrofoam cup. Water generously immediately after planting.

Planting at a 45° angle to the soil with the trunk pointing towards the normal wind direction, increases wind resistance and makes harvesting easier. There are several layouts and spacing that can be adopted; however 7ftx 8ft (800 plants per acre) is considered most appropriate for St. Vincent and the Grenadines.

Crop Management

Irrigation (water management)

During long periods of dry weather or drought, pawpaw will not set new fruits and the size of the maturing fruits will be reduced. Without irrigation, yield decreases and losses to Bunchy Top and other diseases increase. Water requirement for pawpaw is about 1inch per day or about 5 gals per plant per week. When the young plants are not given enough water, their development is delayed.



Fertilization:

The following recommendation, in the absence of testing for soil nutrient of the fields will ensure optimum growth and development of the plant under local conditions. Apply foliar fertilizer at monthly intervals, and apply granular fertilizer as follows:

0-3 Months	4-7 Months Old	8-11 Months
1 month: 1oz 12-12-17 + 2 MgO applied to planting holes plus ¼ lb triple super phosphate at 1 month after transplanting	4 months after transplanting apply 4oz of 13-7-23+4MgO & 2oz of calcium nitrate.	8 months. Apply 8ozs 13.7.23+ 4MgO
2 months after transplanting apply 2oz of 12-12-17 + 2 MgO per plant.	5 months. apply 5oz of 13.7-23+4MgO per plant	9 months apply 9ozs of 13.723
3 months after transplanting apply 3oz of 12-12-17 + 2 MgO	6 months. apply 6 oz per plant	11 months apply 10ozs per plant.
	7 months , apply 7 oz per plant	

Pest Management

Scouting of the plot for pests and diseases as often as possible ensures that a good management and control program can be implemented. Usually the earlier a problem is detected the more effective and easier it is to control. In wetter areas routine spraying may be necessary to manage Anthracnose after fruit-set begins.

The most prevalent pest and diseases that affect pawpaw in SVG are listed below:

Pest/Disease	Symptoms /Damage	Management
Thrips	The Leaf crinkles and the lower leaf surface turns brown near the veins	Apply a suitable insecticide. Pirate® at 1 tsp/gal water or Admire® at 2 tsp/gal Pronto® at 2 tsp/gal
Leaf miners	Tunneling appears as a riddled network leaving trails through the leaves due to the removal of chlorophyll	

