

# Fruits and Vegetables

1. Broccoli
2. Cabbage
3. Cantaloupe
4. Carrot
5. Cauliflower
6. Celery
7. Corn
8. Cucumber
9. Hot Pepper
10. Lettuce
11. Parsley
12. Passion fruit
13. Pineapple
14. Pumpkin
15. Salad Beans
16. Sweet Peppers
17. Tomato
18. Watermelon

# TECHNOLOGY PACKS



## PASSION FRUIT



November 2015

# Background

Production decisions concerning how much effort and resources to invest and which farming practices to follow, have consequences and create opportunities for the farm affecting production levels, input costs, time constraints, and the potentially size of the operation. They also may have implications for resource use and environmental quality.

Numerous information exist on the various aspects of production and handling/ marketing of crops and livestock, the majority of which are outdated, not easily understood and lacking the where with all for addressing present day challenges such as good agricultural practices (GAPs) and food safety and climate change that impact on the environment and rural livelihoods. These issues are also closely related to the importance of the role of primary producers in increasing the earnings of all actors along the value chain in supporting the development of a commercially viable and sustainable agricultural industry.

The production of high quality and easily understood information packages is critical as this forms a basis for farmers to obtain financing from lending institutions and to efficiently increase their production through the availability of modern technology. This will also result in a reduction of rural unemployment and will greatly help in alleviating poverty and other associated social ills.

# TECHNOLOGY PACKS

## **PASSION FRUIT**



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# Introduction

This Technological Package (Tech Pack) deals with the production and postharvest aspects of passion fruit.

Also included in the Tech Pack are appendices:

- Template for cost of production
- List of recommended pesticides and application rates
- Good Agricultural Practices data record sheet.

Notwithstanding the identification of any specific pesticide for the control of pests and diseases, this decision is for the discretion of the Ministry of Agriculture Area Extension Officer and the farmer. However, the mention of any pesticides and other products used in the Tech Pack should strictly comply with local regulations and all instructions provided by the manufacturer. Also, the use of trade names in the Tech Pack is for the purpose of citing examples and is not meant to either endorse or discredit any particular product.

The passion fruit is believed to have originated in Brazil. The passion fruit is a vigorous, woody climber. Fragrant, showy flowers are usually borne singly at the leaf axils. The fruit is usually round with a thin, hard skin. The fruit contains black seeds surrounded by yellow, aromatic, juicy pulp.

# Botanical Description

There are two types of passion fruit—a yellow and a purple variety. Many hybrid mixtures of the yellow and the purple can now be found. There are a few sweet types especially of the yellow variety that can be used as fresh fruits, whereas fruits of the yellow variety are used mainly to make juices. The two principal varieties of passion fruit are shown in Plates 1 and 2.



Plate 1 Purple passion fruit (*Passiflora edulis* forma *edulis*)  
Source: [https://upload.wikimedia.org/wikipedia/commons/0/0e/Passionfruit\\_and\\_cross\\_section.jpg](https://upload.wikimedia.org/wikipedia/commons/0/0e/Passionfruit_and_cross_section.jpg)



Plate 2 Yellow passion fruit (*Passiflora edulis* forma *flavicarpa*). Source: <http://images.wisegeek.com/golden-passion-fruit.jpg>  
Source: [https://upload.wikimedia.org/wikipedia/commons/0/0e/Passionfruit\\_and\\_cross\\_section.jpg](https://upload.wikimedia.org/wikipedia/commons/0/0e/Passionfruit_and_cross_section.jpg)



The yellow passion fruit is more suited than the purple type to St Lucia conditions. It is a more vigorous prolific vine, bears larger fruit and produces higher yields; is also more tolerant than the purple to many soil borne pests and diseases than the purple. The yellow fruit produces more juice, with a higher acid content than the purple fruit.

Currently seven types of passion fruit are commercially cultivated in St. Lucia:

- CARDI Large Yellow
- CARDI Small Yellow
- CARDI Pink
- Columbian CV
- Brazil x Surinam Cross
- St. Vincent Pink/Purple
- Local Yellow.

## Propagation

Although plants can be propagated from seeds, cuttings and grafting, the use of seeds is the preferred option as it produces the stronger plants.

- Choose fruits from high yielding, large fruited and disease-free vines
- Extract seeds from fruits, remove pulp and sterilize in a mild bleach solution for 10 minutes
- Allow seeds to air dry for a few days
- Sow seeds in plastic bags 7 inches x 7 inches (17 cm x 17 cm) containing a potting mixture with the ratio three parts sand, two parts soil and one part compost or pen manure (Plate 3). Seeds germinate within 14 days
- Water seedlings frequently
- Apply one teaspoon (5 g) NPK fertilizer when seedlings are 3 inches (7 cm) tall. Take care to prevent fertilizer from coming in contact with the stem of plant.



Plate 3 Passion fruit plants in potting bags



# Site Selection

Land is prepared by total or partial clearing. Partial clearing involves leaving intermittent trees to help with trellis support. Where necessary, drains should also be constructed to control water runoff. The land may be ploughed and ridged. In the absence of ploughing, dig individual holes with a garden fork.

# Land Preparation

To get the best performance, vines are grown on supports called trellises. Trellises should last for at least 3 years to cover the economic life of the crop.

The four basic designs of trellises used are the “T” shape, the fence or “I” shape, the “inverted U” and the complete canopy. Different systems have advantages in cost, tolerance to wind and management implications. The advantages of using the different systems should be discussed with an Extension Officer.

In St. Lucia, the fence or “I” shape design is the preferred and most popular (Plate 4). Construction of this design involves placing trellis posts 10 feet (3m) apart and 10 feet (3 m) in the row; each post should be 8 feet (2.5 m) long and about 3 - 6 inches (7.5 – 15 cm) in diameter. Posts should be planted 2 feet (60 cm) into the ground and the base of the post should be treated with some form of wood preservative. The first wire should be placed about 4 feet (1.2 m) from the ground and the second wire placed near the top of the pole. The end post, which should be the largest and strongest, should be attached to a “dead man”. The “dead man” is a short 3 foot (1 m) post, planted behind the end post to which the wires are attached.

The following construction materials are recommended for trellis construction.

- Walaba
- Treated hardwood
- Gliricidia
- Hot creosote treated wood



Plate 4 Back yard parsley production

## Spacing

Space plants 10 feet (3 m) apart, i.e. directly in between the rows of the trellis posts.

## Planting and Training

Seedlings are ready for planting in the field when the first tendril appears. Holes are dug one and a half times the size of the bag. In each hole mix soil with small amounts of pen manure and a tablespoon (15 g) of 16:8:24 +2 NPK fertilizer. The plant is then removed from the bag and placed in the hole at the same depth as in the bag. Press soil firmly around the base of the plant. Mounds should be created around the base of the plant and posts to prevent water logging and rotting.

Once the vines begin to grow, allow only one or two leaders to climb towards the wires. Train plants to reach the wire with a stick or piece of twine.

# Fertilization

Apply fertilizer in a circle about 2 feet (0.5 m) away from the stem of the plant. Bury fertilizer about 2 inches (5 cm) below the soil surface so as to reduce run-off and growth of weeds. Apply NPK fertilizer (16:8:24 + 2) in incremental amounts during the first year as follows:

- At 3 months, ½ lb (225 g)
- At 6 months, 1 lb (450 g)
- At 9 months, 1 lb (450 g)
- At 12 months, 1 lb (450 g)

After one year apply at the rate of 1½ lb (675 g) per plant 3 times per year.




# Weed Control

This is important since weeds encourage pests and diseases and remove moisture. Weeding can be done manually or by the use of herbicides. Care needs to be taken to avoid spray drift when using herbicides.

# Pests and Diseases

The major pests and diseases, symptoms and control/management affecting passion fruit are indicated in Table 1. Good Agricultural Practice (GAP) related to the use of pesticides, requires farmers to maintain up to date records on the application of pesticides to the crop. These records should include trade names, application rates and dates of application.

Table 1 Symptoms and control of pests and diseases of passion fruit

Pest & Diseases	Symptoms	Control/ Management
 <p>Plate 5 Caterpillars of Agraulis vanilla butterfly</p>	Chewed leaves.	Apply insecticides such as Malathion or Bacillus Thurengensis.
 <p>Plate 5 Collar Rot (Rhizoctonia solani)</p>	Wilting of plants.	Avoid planting in water-logged areas. Plant on mounds or cambered beds in areas with heavy soils.
 <p>Plate 7 Anthracnose (Colletotrichum loeosporioides)</p>	Brown spots on leaves and fruits.	Avoid planting in water-logged areas. Plant on mounds or cambered beds in areas with heavy soils.
Rats	Eat fruits.	Clean surroundings, use

Good Agricultural Practice (GAP) related to the use of pesticides, requires farmers to maintain up to date records on the application of pesticides to the crop. These records should include trade names, application rates and dates of application. During the harvesting period use pesticides with a very short harvest interval.

# Hand Pollination

Hand pollination can increase fruit set by 300%. Pollen is collected by removing (with a pair of forceps) and placing the male part (anther) of the flowers in a receptacle like a saucer. Pollen from a mixture of anthers is applied to the female part (stigma) of the flower with a small brush (Plate 8). The practice is best done on days that are cloudy or have rainfall after 12.00 noon. Wait at least 2 hours after rainfall to pollinate.



Plate 8 Hand pollinating passion fruit

Source: <http://www.smallcheese.net/wp-content/uploads/2010/04/Pollinate-Passion-Fruit-Flower-01.jpg>

# Harvesting

Fruits are normally collected after they fall to the ground. Fruits picked from the vine tend to be very acid and lacking in flavour. The fruit matures on the vine 72 days after flowering. Although plants bear fruit almost continuously, there are two peak periods of bearing (April–June) and (October–December).

# Post Harvest

Place harvested fruits in buckets or field crates and keep in shade. Avoid placing fruits in bags as they can then be easily damaged while being transported. Keep fruits dry. Fruits store well for about 4 days at room temperature.

# Yields

The life of a passion fruit orchard is 3 years. Yields vary according to the age of the orchard and the level of management (Table 2). Multiply the numbers in the Table by approximately 1.1 to obtain kg/ha.\

Table 2: The yield of passion fruit by level of management

Level of Management	Yield (lb/acre)		
	Year 1	Year 2	Year 3
Minimum level of management	1,600	5,000	5,000
Medium level of management	6,000	10,000	8,000
High level of management	7,000	15,000	10,000





# APPENDICES



## APPENDIX I: TEMPLATE FOR COST OF PRODUCTION ANALYSIS: PASSION FRUIT

	Input	Quantity	Units	Unit Cost	Total Cost
<b>1.</b>	<b>Propagation/planting</b>				
	Seeds				
	Bleach				
	Plastic bags				
	Fertilizer (specify types used)				
	<b>Total cost for propagation/planting</b>				
<b>2.</b>	<b>Land preparation</b>				
	Trellis material (posts, wire)				
	Wood preservative				
	Other land preparation costs (e.g. equipment rental)				
	<b>Total cost for land preparation</b>				
<b>3.</b>	<b>Crop maintenance</b>				
	Water/irrigation				
	Fertilizer (specify types used)				
	Weed control (specify chemicals etc used)				
	Pest and disease control (specify chemicals etc. used)				
	<b>Total cost for crop maintenance</b>				
<b>4.</b>	<b>Harvest/storage</b>				
	Buckets/crates				
	Transport to market				
	<b>Total cost for harvest/storage</b>				
<b>5.</b>	<b>Labour</b>				
	Propagation/planting				
	Land preparation				
	Crop maintenance				
	Harvest/storage				
	<b>Total cost for labour</b>				
<b>6.</b>	<b>Rent/insurance</b>				
<b>7.</b>	<b>Miscellaneous costs</b>				
	<b>Total cost of production</b>				

**Notes**

1. It is recommended that the above data be completed on a per crop basis.
2. The revenue obtained from sale of the crop should be compared with the cost of production to determine the profit/loss on the operation.

**APPENDIX II: LIST OF RECOMMENDED PESTICIDES AND APPLICATION RATES**

<b>INSECTICIDES</b>	<b>APPLICATION RATE</b>
Pronto 35 SC	3 - 5 teaspoons/gallon of water
Target	1 - 2 teaspoons/gallon of water
Pirate	½ - 1 teaspoons/gallon of water
Fastac	1 - 2 teaspoons/gallon of water
Caprid	½ - 1 teaspoon/gallon of water
Diazinon (Basudin)	¾ - 1½ pints/acre
Admiral	¼ teaspoon/gallon of water
Dipel	1½ - 2 teaspoons/gallon of water
Aza-direct	1 - 2 teaspoons/gallon of water
Cure	½ - 1 teaspoon/gallon of water
Danitol	1 - 2 teaspoons/gallon of water
Cypro	½ tablespoon/gallon of water
Dimethoate (Perfection, Rogor 40)	1 pint/acre
Phosvel	1¼ - 2 pints/acre
Orthene	3.2 ounces/acre
Permethrin (Ambush)	½ teaspoon/gallon of water
Padan 50 WSP	2 - 3 teaspoons/gallon of water
Lannate	1 teaspoon/gallon of water
Decis	½ teaspoon/gallon of water
Kelthane 42%	1¼ lb/acre
Orthene 75S	1 lb/acre
Malathion	½ - 1 pint/acre
Sevin	1½ lb/acre
BT ( <i>Bacillus thuringiensis</i> )	Label rates
Rotenone	1 - 2 teaspoons/gallon of water
Neem X.	8 - 10 oz/gallon of water
<b>FUNGICIDES</b>	<b>APPLICATION RATE</b>
Bellis	2 teaspoon/gallon of water
Acrobat	2 - 4 teaspoon/gallon of water
Mancozeb (Dithane M45)	1.5 lb/acre
Cabendazim	2 teaspoon/gallon of water
Daconil	1½ - 2 pints/acre
Benomyl (Benlate)	6 oz/acre
Captan	2 - 3 teaspoons/gallon of water
Peltar	3 teaspoons/gallon of water
Manzate DF	2 - 4 teaspoons/gallon of water
Bravo	1½ - 2 pints/acre
Tri-Miltox-Forte	3 teaspoons/gallon of water
Botrilex	5 - 200 lb/acre
Kocide 101	2 - 4 teaspoons/gallon of water
Cupravit	2½ lb/acre

**APPENDIX II: LIST OF RECOMMENDED PESTICIDES AND APPLICATION RATES**

<b>WEEDICIDES</b>	<b>APPLICATION RATE</b>
DCPA (Dacthal W-75)	10 lb/acre
Diphenamide	4 - 10 lb/acre
Paraquat (Gramoxone)	1 - 2 pints/acre
Dymid 80W	5 lb/acre
Atrazine 80 (Gesaprim).	1¼ - 1½ lb/acre
Linuron (Lorox)	1 pint/acre
Prometryn (Caparol)	0.8 - 1.6 lb/acre
Sethoxydim (Poast)	1¼ - 3½ lb/acre
Clethodim (Select)	0.094 - 0.25 lb/acre
Prometryn 50WP (Geagard)	2 - 3 lb/acre
Herbicide Oil (Stoddard Solvent, Kerosene oil)	40 - 80 gallons/acre





