



# THE PAPAYA

***Carica papaya*** Family: **Caricaceae**

Papaya originates from tropical Central and South America, ranging from Mexico to Bolivia. This fruit, however, is now found year-round throughout tropical and equatorial regions.



**Christian DIDIER**

# Introduction to Papaya



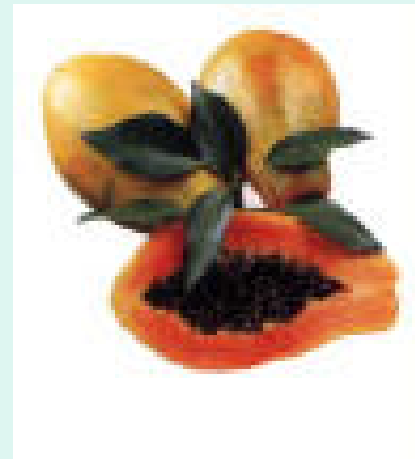
# USAGES

- **Ripe papayas**
- **Papaya juice and nectar**
- **Unripe papaya** Green papaya is frequently boiled and served as a vegetable
- **Young leaves** are cooked and eaten like spinach in the East Indies
- In India, **papaya seeds** are sometimes found as an adulterant of whole black pepper

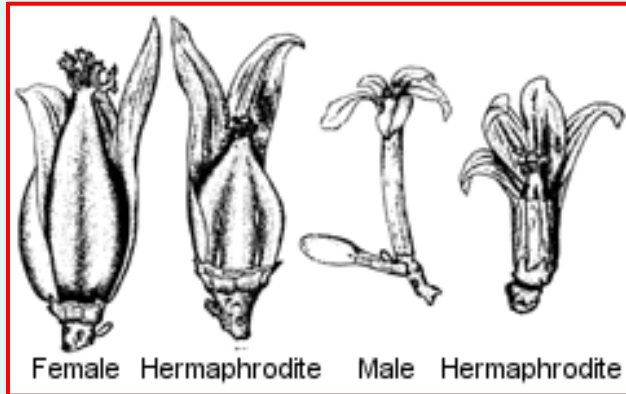
# Nutritional facts

Calories	23.1-25.8
Moisture	85.9-92.6 g
Protein	.081-.34 g
Fat	.05-.96 g
Carbohydrates	6.17-6.75 g
Crude Fiber	0.5-1.3 g
Ash	.31-.66 g
Calcium	12.9-40.8 mg
Phosphorus	5.3-22.0 mg
Iron	0.25-0.78 mg
Carotene	.0045-.676 mg
Thiamine	.021-.036 mg
Riboflavin	.024-058 mg
Niacin	.227-555 mg
Ascorbic Acid	35.5-71.3 mg
Tryptophan	4-5 mg
Methionine	1 mg
Lysine	15-16 mg

## Food Value Per 100 g of Edible Portion



# Botanical description



**Hermaphrodite flower**



# FRUITS

- There are different types of papayas,

Hawaiian



Mexican.



Malaysian



# WORLD MAJOR PAPAYA IMPORTER

Papaya	Year			
	2000	2001	2002	2003
Import (1,000 t)				
Nafta	74.8	89.9	94.2	107.9
Asia	54.3	62.4	64.4	68.5
Europe	16.7	18.7	26.7	38.8

## MARKET SHARE OF BRAZILIAN PAPAYA

Papaya	2003
Import (t)	% Brasil
Europe	72
Nafta	6
Asia	0

Source: FAO

# WORLD MAJOR PAPAYA EXPORTER

Export (1,000 t)	2000	2001	2002	2003
Mexico	59.8	74.0	68.6	74.8
Malaysia	44.1	54.0	60.9	68.7
Brazil	21.5	22.8	28.5	39.5

US\$/Kg	2000	2001	2002	2003
Brazil	0.82	0.81	0.76	0.74
Mexico	0.40	0.41	0.40	0.59
Malaysia	0.41	0.46	0.43	0.39

Source: FAO

**Brazil: Europe, Canada & USA**

**Mexico: USA**

**Malaysia: Singapore & Hong Kong - China**



# VARIETIES

**GOLDEN**



**TAINUNG 01**



**MARADOL**



**SOLO 8**



**EXOTICA**



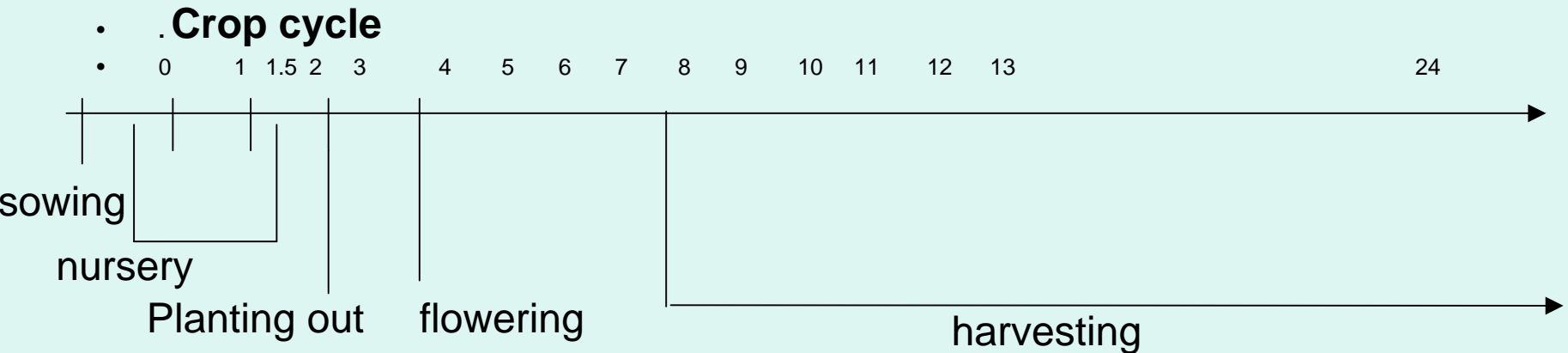
**MORIB**

**CIBINONG**

**GOLDEN BEAUTY  
CAIRNS**



# Growing Papaya



## Choice the seeds

- The seed should come from hermaphrodite
- 1-select the best trees in the plantation (colour, yield, fruit shape—hermaphrodite)
  - 2-cover the flowers with a bag once they form to ensure self-pollination
  - 3-mark these flowers
  - 4-collect them at maturity.



# Planting density

Papaya stands can range from 2 000 to 2 500 plants per hectare depending on the cropping technique used. A triangular 2 x 2 planting design can be adopted for non mechanised cultivation, and 2 x 2 x 4 in double rows for mechanised cultivation.

The following plant spacing can be used:

2.0 m x 2 m	☪ 2500 plants/ha,
2.5 m x 1.60m	☪ 2500 plants/ha,
2.5 m x 1.8 m	☪ 2222 plants/ha,
2.7 m x 1.8 in rows	☪ 2060 plants/ha,
2.7 m in rows x 3m	☪ 1230 plants/ha



# GRAFTING



0



10



30



120

# SOWING



# SINGLING



**F**



**H**

**H**

05 12 15

# Solo Golden – single row



1,80m

3,60m



4,00m

2,50m

4,00m

Tainung 01: single row



# Irrigation



**Chemical fertilizers is applied almost every day via irrigation system.**





# Phytosanitary treatments

# MAIN PROCEDURES REQUIRED IN THE PRE-HARVEST



# Traps for fruit fly monitoring

Mc Phail  
*Anastrepha spp.*



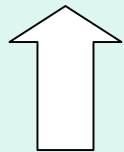
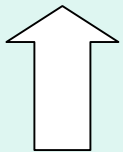
Jackson  
*Ceratitis capitata*



The monitoring must be done in the proportion of 1 trap/ha being 50% with Mc Phail (hydrolised protein 5%) and 50% Jackson (Trimedlure) traps.

Control (chemical) when the population reach 7 individuals of *Ceratitis capitata* or *Anastrepha fraterculus* / trap / week and and do not export from the area if the population surpass 14.

# Monitoring and control of ringspot virus and stick disease in papaya



**Fruit with  
stick  
disease**

**Healthy  
Fruit**





✓ Remove from the orchard rejected fruits.

✓ Field must be kept in good phytosanitary conditions.

# Pests

## ⇒ Spider mite

Scientific name: *Tetranychus urticae*

## ⇒ Broad mite

Scientific name: *Polyphagotarsonemus latus* (Banks) *Tarsonemus latus* (Banks), *Hemitarsonemus latus* (Ewing) and *Neotarsonemus latus* (Smiley)

## ⇒ Whitefly

Scientific name: *Aleurodicus dispersus* and *Bemisa tabaci*

## ⇒ Mediterranean fruit fly

Scientific name: *Ceratitis capitata*

## ⇒ Gall nematodes

Scientific name: *Meloidogyne* sp. & *Rotylenchulus* spp



# DISEASES and VIRUS

## ➔ Papaya anthracnose

Scientific name: *Colletotrichum gloeosporioides*

## ➔ Root, collar, trunk and fruit rot

Scientific name: *Phytophthora Palmivora* (E.J. Butler) and *Pythium* (Trow)

## ➔ Papaya powdery mildew

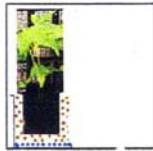
Scientific name: *Oidium caricae*

## ➔ Papaya ringspot

Scientific name: *Papaya ringspot* (Jensen)

# Pest and Diseases

## (PAPAYA PRODUCTION)



Papaya planting method



Leaf burns from fertilizer



Leaf ringspot virus or broad mite



Rust mite *Yersinia*



Female papaya flower



Hermaphrodite papaya flower



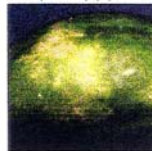
Fruit fly (*D. zanthodes*)



*Phytophthora* canker



Leaf Powdery mildew



Fruit Powdery mildew



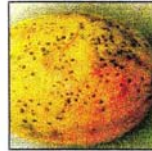
Nutrient deficiencies in leaves



White *Phytophthora* fruit rot



Leaf black spot (underside)



Fruit black spot



Severe nutrient deficiency



Pink fruit anthracnose



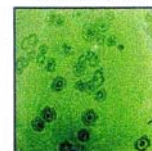
White fly on a leaf



Rubbing or spider damage



Carpel... during cold time



Papaya fruit ringspot virus



**Keep the orchard with fruit with degree of ripeness 3.**

# HARVESTING





# Degree of ripeness at harvest time

**< 15 % of yellow skin**

**< 25 % of yellow skin**

**< 50 % yellow skin**

**51 – 75% of yellow skin**

**76 – 100% of yellow skin**

**DR1**



**DR2**



**DR3**



**DR4**



**DR5**





# MAIN PROCEDURES REQUIRED IN THE POSTHARVEST







**100% netted to protect from birds and insects**



**FRUIT CLEANING**

# POTENTIAL SOURCE OF CONTAMINATION



## Water:

Carrier of Microorganisms: *E. coli*, *Salmonella*, *Vibrio*, *Shigella*, *Cryptosporidium*, *Cyclospora*, *Giardia*.

Quality must be adequate for intended use. If quality cannot be controlled, GAP's can minimize risks.



Outbreaks: *Salmonella* in Tomato



**Tank: 2.000 liters**

**Chlorine: 2 ppm**

# FRUIT SORTING





**HOT WATER DIPPING TREATMENT**

# HOT WATER DIPPING TREATMENT

- **HOT:**

- **Temperature: Min. 48,5C Max. 49,0C**
- **Dipping time: 20 minutes**
- **Water: 2 ppm chlorine**

- **COLD:**

- **Temperature: Min. 12,0C e Max. 15,0C**
- **Time: 10 minutes**
- **Water: 2ppm chlorine**



# PELLETS FORMATION





# PELLETS FORMED





Thank you

