FRuiTROP Supplement to number 67 — March 2000

Research and Methods

Papaya cultivation

This technical sheet is drawn from the technical guide entitled *Choix d'espèces et variétés fruitières en fonction des zones agroclimatiques des 10 pays du Réseau Africain pour le Développement de l'Horticulture* (RADHORT) published by FAO.

Requirements

Climate

Papaya needs heat and moisture. Too low a temperature delays fruit ripening and may hinder pollination.

Rainfall

Abundant, well-distributed rainfall of 1 800 to 2 000 mm per year is necessary. Irrigation is used in the dry season months to achieve a total of 150 to 200 mm per month.

Soils

The soil should be humus bearing, aerated and perfectly drained. Do not plant papaya in heavy soil that remains wet.

Manure well (50 to 100 tonnes/ha).

Plant on ridges.

Wind-Breaks

Papaya is very sensitive to wind and plantations must be well-protected to prevent breakage and contamination by pests.

Establishment of orchards

Planting density

Density can range from 2 000 to 2 500 plants per hectare depending on the type of cultivation. Staggered rows can be planted with a 2 x 2 m layout for non-mechanised cultivation and a double row layout of 2 x 2 x 4 m for mechanised cultivation.

Soil preparation

Mechanised cultivation

Deep sub-soiling (60-70 cm) is necessary in compact soils. Then, according to availability, apply 50 to 100 tonnes/ha of cattle manure and plough, forming ridges.

Non-mechanised cultivation

Dig a 50 x 50 x 50 cm planting hole for each plant and mix the dug earth with 20 kg well-rotted manure, 500 g superphosphate and 200 g potassium sulphate. Fill in the hole forming a mound.

Planting

Planting layout

Set out the field carefully ensuring the good alignment of rows and diagonals and the perpendicularity of the rows. So as not to lose the benefit of a good layout, replace the stake marking the position of each tree by two other stakes, using a planting rule. This makes it possible to plant the tree in the precise position planned in the layout.

Supply of plants

Before planting, it is essential to obtain information about seedling availability from a competent nurseryman. Indeed, the plants must be grown from registered seed from self-pollinated flowers bagged for protection from unwanted pollination. The use of non-selected seed leads to varietal drift.

Planting

The beginning of the rainy season is the best planting period since establishment and growth are best at this time. Under these conditions, production will begin about 6 to 8 months after planting, depending on the zone.

Remove the polybag and place the plant in its block in a slight cavity dug at the top of the ridge after mechanical preparation

Varieties

Solo No. 8	The most commonly cultivated papaya with orange-yellow flesh, weight 300-400 g, oblong from hermaphroditic plants and round from female plants.
Sunrise	Red flesh — characteristics like those of Solo.
Sunset	Red flesh — characteristics like those of Solo.
Colombo	Pink flesh, large fruit weighing 700 g to 1 kg, rounder shape.
Waimanalo	Yellow flesh, fruit weighing 300 to 600 g.

or at the top of the mound after manual preparation.

Earth up with soil from between the rows but without going above the level of the plant soil block. Tamp the added earth moderately throughout the operation. Water well after planting.

Plantation maintenance

Irrigation

Papaya requires some 150 to 200 mm water per month. It is essential to water during the dry season to maintain flower-fruit potential. Microjet or trickle irrigation—with care taken to wet neither the trunk nor the foliage—avoids the development of pests. In some zones, sprinkler irrigation on the foliage gives good results with dry air conditions and reduces mite attacks.

Weeding

Papaya is susceptible to herbicides while the plants are young. Weed by hand in a broad area around the plants and use protective shielding when applying herbicides. Gramoxone can be used at first and then when the plants are six months old glyphosate (Round Up) at 8 to 10 ml/10 l water.

Spray in calm, windless weather.

Fertilisation

Fertilise as follows around the foot of the plant every month:

- ❑ from month 1 to month 6: 50 g of 15-5-30 S,
- ❑ from month 7 onwards: 100 g of 15-5-30 S.

Harvest - Yield

The fruits are harvested when they turn yellow. The harvest begins approximately 8 to 10 months after planting and continues without stopping until month 20-22.

One plant can yield 35-40 kg fruits, that is to say a yield of some 60 to 80 tonnes/ha over 22 months.

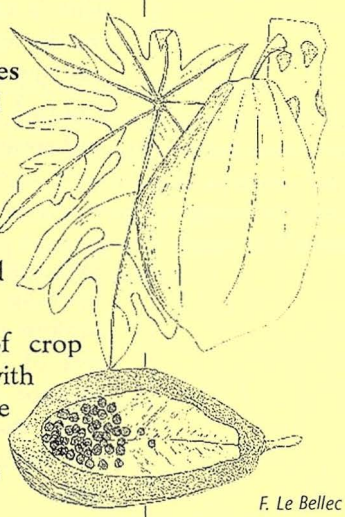
Phytosanitary protection

Pests

Nematodes
Meloidogyne Goeldi
Rotylenchulus reniformis

This pest is recognised by the appearance of local tissue proliferation resembling a knot or a gall. Plant growth slows and production decreases strongly.

Control. Treatment consists of crop rotations and soil disinfection with Vapam two months before planting and application of nematicides during the vegetative period.



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Fertiliser in grams per tree

Age	Urea	Potassium sulphate	Magnesian lime	Tricalcium phosphate
1 month	50			
2 months	75	40		
4 months	100	40		
6 months	100	70		
8 months	100	70		
10 months	125	80		125
12 months			1000	
14 months	150	100		125
16 months	150	100		
18 months	150	100		125

Note. This fertilisation can be adapted in the light of the results of soil analyses.

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Mites
Polyphagotarsonemus latus, Tetranychus sp

These tiny wind-borne pests settle on the young leaves at the top of the plant. They destroy the terminal bud and can cause the death of the tree. Deformed, discoloured parasitised leaves are the most marked symptoms.

Control. Effective protection from wind. As soon as the first signs of deformation appear, spray at 2-day intervals with the products specified in the table.

FUNGAL DISEASES

Powdery mildew
Oidium caricae

This is caused by a fungus that develops on the undersides of the leaves, forming patches of white mould.

Control by removing old, infected leaves and spray every two weeks (see table).

Anthracnose
Colletotrichum gloeosporioides

The fruits are spotted, generally during ripening. The spots are round, slightly sunken and are a darker green than the rest of the fruit; they become large and acquire a bowl-shaped appearance. The fungi that cause anthracnose also attack the petioles of the leaves that are about to wilt.

Treatment (see table below).

Root, neck and trunk rot caused by *Phytophthora* and *Pythium*

These serious diseases often cause the death of trees. The symptoms are as follows:

- ❑ yellowing and premature death of leaves,
- ❑ leaf petioles remain short,
- ❑ difficult fruit setting,
- ❑ formed fruits remain small and do not ripen. At a more advanced stage, only a small cluster of leaves remains at the stem apex.

The base of the trunk is soft and rotten at ground level and diseased trees topple easily.

Control. Grow papaya on clean, non-floodable land.

Grub up and burn all the trees whose trunks or roots are infected. Spraying using 'Aliette' can eradicate leaf attacks.

VIRUS DISEASES

Papaya is susceptible to a large number of virus diseases. The most frequent are:

- ❑ Bunchy top spread by *Empoasca papaya*,
- ❑ Yellow crinkle or Yellow erinotole spread by *Orosius argentatus*,
- ❑ Mosaic and Papaya ringspot spread by aphids (*Aphis gossypii*), etc.
- ❑ TSWV spread by thrips ●

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The main treatments used on papaya

Pests Diseases	Organs attacked	Active substance	Commercial product	Dose per hectolitre	Period of use	Observations
Polyphago-tarsonemus	Young leaves	endosulfan sulphur	Techn'ufan Microthiol	170 cc 800 g	15 days 2 days	alternate and spray in the evening
Tetranychus	Leaves	benzoximate	Artaban	200 cc	15 days	in case of severe attacks
Powdery mildew	Leaves	bupirimate fenarimol chinomethionat	Nimrod Rubigan Morestan	300 cc 150 cc 30 g	7 days 7 days 2 days	do not use on flowers
Anthracnose	Fruits	benomyl	Benlate	60 g	2 days	
Pythium	Base of trunk	phosethyl-Al	Aliette	250 g	2 days	
Phytophthora	Leaves	phosethyl-Al	Aliette	250 g	2 days	