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WAX APPLE

(Bell Fruit)

A Production Guide

by
Ming Zing Lee

A production of the Taiwanese Mission and the Ministry of Agriculture, Forestry and Fisheries, GOSVG

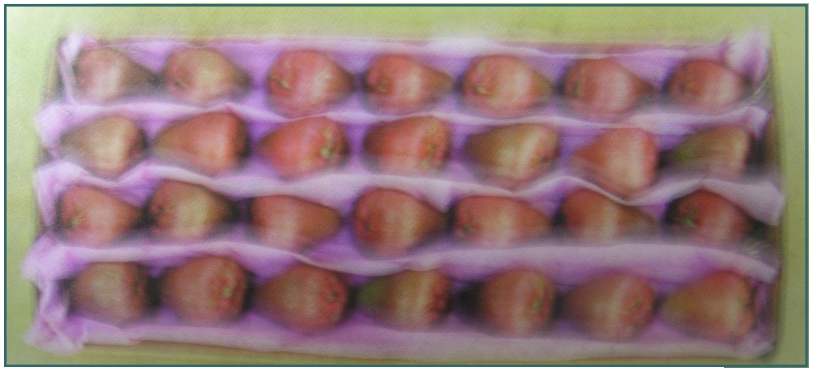

Fig. 22. Grading and packaging of a small box of was apple

Fig. 23. Wax apple require special packaging material to reduce damage to the soft outer skin.

PESTS AND DISEASES CONTROL

Pest/ Disease	Pesticide/ Fungicides	Dosage Gals of water	Remark
Anthracnose	Manzate	1kg/150-300 L	Spay every 7-14 days on disease pressure and rain-fall
Phytophthora Blight	Ridomil		
Pestalotiopsis Fruit rot	Benomyl 50%wp	2 tabs/gallon	Full cover spray tree
Thrips	Malathion Karate	4 tabs/gal 4 tabs/gal	Full cover spray tree
Aphids	Malathion Karate	4 tabs gal 4 tabs/gal	Full cover spray tree

Table 2. Pest and Disease Control

HARVESTING

In St. Vincent and the Grenadines, the wax apple plant starts bearing one year after planting. The natural fruit season is from March to June or July.

When the basal end of the fruit opens and the fruit attains a deep red color it is an indication that the fruit is ready to be harvested.

GRADING AND PACKING

Grading of the wax apple fruit in term of size should take place after it is harvested.

The bottom of the box used for packing and transportation should be coated with shredded paper or sponge so as to avoid damage to the fruit during transportation.

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August 2005

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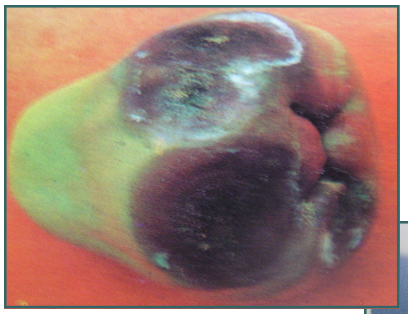
***Phytophtora* blight**

Symptoms: First sign of infection usually emerges as water-soaked spots on fruit which eventually turn to brown. The fruits eventually rot and the skin lesions grow white tissue and have a sour smell.

Fig 19. Damage caused be phy-tophtora on wax apple fruit.

Fruit Rot

Symptoms: Symptom: During early stage water-soaked, small light purple spots are produced on the fruit, and spread in an irregular pattern to the rest of the fruit ' s surface. During the later stage, diseased fruit shrink and dry rot.



◄ *Fig 20. Fruit rot caused by Pestalotiopsis of wax apple during the early*

Fig 21 Fruit rot caused by Pestalotiopsis of wax apple during the later stage. ►

PESTS AND DISEASES

The most common pests of the wax apple plant in the St. Vincent and the Grenadines are thrips and aphids which damage the new shoots and leaves. Birds and Lizards frequently peck and bite the fruits if bagging is not done.

Fig. 17 Damage caused by pecking and biting from lizards and birds.

DISEASES

Anthracnose, fruit rot and *Phytophtora* blight are the main diseases which affect wax apple in SVG especially during the rainy season.

Anthracnose,

Symptom: Black and brown sunken necrotic spot appear on the fruits

Fig. 18 Damage caused by Anthracnose.

Wax Apple
(Bell Fruit)

Scientific name: *Syzgium samarangense*
Family: Myrtaceae
English names: Wax apple, Wax jumbo

IINTRODUCTION

The wax apple originated from the tropical regions of the Malaysian Peninsula. It can be grown in both tropical and subtropical regions. Generally, the Wax Apple fruit may be white, green, pink or of deep red colors depending on the variety. The tree is tall attaining heights of about 16ft to 50 ft (5m-15m) with a short thick trunk (25-30 cm), wide spreading crown, with pinkish gray, flaking bark. The leaves are very aromatic when crushed.

In 1997 the pink color variety was introduced into St. Vincent and the Grenadines by the Taiwanese Technical Mission. The fruits are similar to the local plum rose in shape and color.

CLIMATE AND SOIL

Wax apple is one of the tropical fruit trees that performs best at temperature ranges 25-30°C for vegetative growth and 15 -25°C for fruiting. During the flowering stage, temperatures below 7°C cause fruit-drop and generally damage the fruits.

The wax apple likes moist fertile soils. Poor and dry soils result in small trees with poor fruit quality. The best soil type is the clay loams; in sandy soils, when there is heavy rain, the fruit-drop and splitting occurs.

PROPAGATION

Air-layering and/or the use of **cuttings** are recommended for commercial propagation of Wax Apple. Seedlings propagated from seeds, give uncharacteristic growth and performance and take longer to bear fruits.

Air-layering

1. Select a sturdy side branch on the tree.
2. Girdle this about 3 cm from the main branch.
3. Remove the bark from the girdled area.
4. Wrap damp moss or sea grass around the girdled area.
5. Cover this with a sheet of plastic and tie to secure the area.

Fig 1. A seedling propagated by Air-layering. It is one of the most popular methods used in propagating the Wax Apple plant.

❖ Within 45 - 60 days, callus and root formation will take place.

6. Select the air-layered cutting from the main branch (20 - 25 cm in length).
7. Prune out the lower leaves and the remaining 3 or 4 leave at the top.
8. Give a clean sharp cut at an angle of 45° just below a node.
9. Treat the exposed main branch with a fungicide.
10. Dip the air-layered branch, now the seedling, in a rooting powder and set it out immediately in the propagating bin.

d. **Shelter treatment:** Use the black PVC net to shelter the plants in the field. Do this 45 to 60 days before chemical treatment.

Fig. 15 Covering of the wax apple tree in the off season.

At the Orange Hill Demonstration Farm, the use of methods 1, 2 & 4 or 1,3 & 4 in combination showed that the success rate was higher than when a single method was used.

3. Flower Induction Chemical Treatment

1. Diazinon 60 EC (300-500cc/100L Water).
2. Use 1 kg Urea / 100L Water.
3. Mix 1+2 together.
4. Spray the entire foliage of wax apple tree with the mixture.

If the flower induction treatment is well done, new buds should appear after 3-4 weeks.

b. **Trunk hitting**: use a hammer to hit the wax apple tree at the bottom of the trunk in a circular pattern (1 – 3cm wide). Do this 45-60 days before chemical treatment.

Fig. 13 The outer bark is carefully 'damaged' without injuring the tree system.

c. **Trunk girdling**: use a sharp knife to girdle the bark of the wax apple trunk (about 3cm wide). Do this 45-60 days before chemical treatment.

Fig. 14 Girdling of the wax apple tree trunk.

11. Water daily.

In SVG air-layering can be done all year round with a 90% success rate provided the moisture levels are properly controlled.

Cuttings

1. Choose a sturdy piece of the wax apple stem, 20-25 cm long.
2. Prune out the lower leaves, leaving 3-4 leaves at the top.
3. Give the stem a clean sharp cut at an angle 45° just below a node.
4. Treat with a fungicide and dip in a rooting powder.
5. Set out immediately in the propagation bin and water daily.

PLANTING

In SVG, planting should be done in the rainy season. Dig holes 60cm deep by 25cm wide. Add 10 kg well-rotted pen manure in the hole before planting. After planting, establish a shallow bank and mulch with grass to preserve moisture.

The wax apple plant is an evergreen tree, growing fast with a life span of about 40 years. The planting space is about 23ft x 23ft (7m x 7m). The inter-space can be economically used to plant short term crops.

TRAINING AND PRUNNING

Training

In Taiwan, training of the wax apple starts from the young seedling. The trained was apple tree is shaped like a vase with an open center. Remove the main stem when the seedling is about 40cm-60cm tall and keep 6-8 main limbs radiat-

ing from the center. Laterals from these limbs carry most of the fruits. This system is to allow light penetration to all parts of the tree and promote good fruit color and initiation.

Prunning

Fig 2. A pruned well -trained seedling grows to give this vase-like shape.

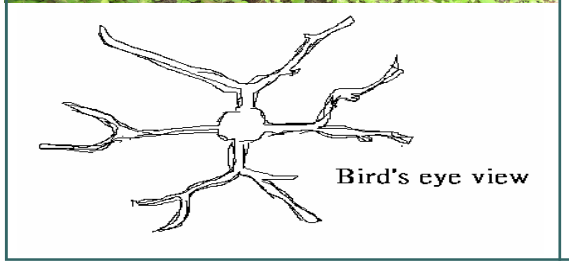


Fig 3. Vase shaped tree. (bird's eye vies)

Pruning the limbs and branches should be done as close as possible to the main trunk or underlying branches. The angled cut encourages buds to develop on the underside of the stub. This will produce better angle branches than the buds from the topside of the stub, which will produce vigorous, upright shoots. Smaller cuts should be made close to, but not through the bud, as shown in the following. (fig.4)

Prune all bearing was apple trees twice a year. The first

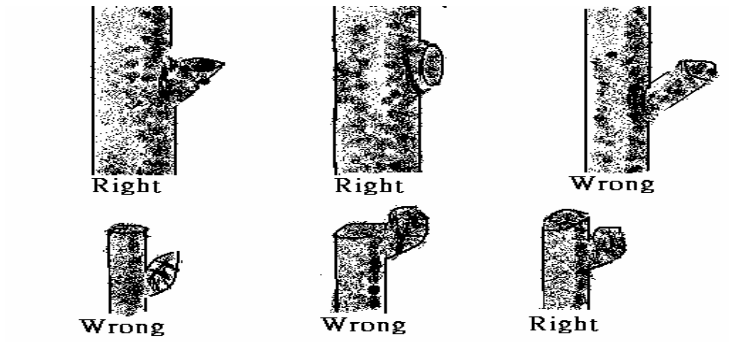


Fig. 4 Correct and incorrect ways to prune

2. Allow 5 to 7 flowers or fruits per bunch.
3. Maintain a space of about 15cm between each flower and fruit bunch

COVERING

Bagging (paper bag) of the wax apple fruits has three functions:

1. Prevents birds and lizards from picking or biting the fruits.
2. Prevents direct contact with insecticide and fungicide.
3. Improves the fruit quality.

FLOWER INDUCTION TREATMENTS

In Taiwan, farmers use flower induction treatment to take full advantage of the high price during the off season.

Cultural Control (in the field)

a. reduce of stop the use of nitrogen during the off season period.

b. After harvest, allow the plants to go through a period of dormancy. Apply phosphorus and potassium to aid in the accumulation of carbohydrate to turn vegetative growth into reproductive development. Do not prune at this time.

2. Cultural Practice Methods (off-season)

a. **Root pruning:** at a distance of 2-3 ft from the tree trunk, dig a circular trench 1-1½ft deep. Do this 2 to 3 weeks before chemical treatment.

Fig. 12. Pruning the roots of the wax apple tree.

are sprayed directly onto the leaves to help the fruit attain a deep red color and increase the sugar content.

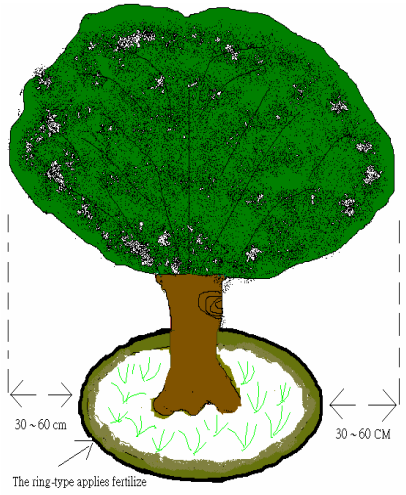


Fig. 10. Ring model of fertilizer application

THINNING

Wax Apple is thinned out both at the fruiting and flowering stages. Use the following as a guide:

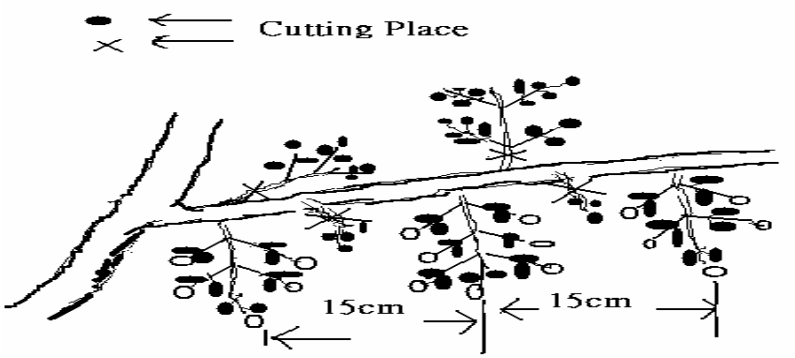


Fig. 11. Flower pruning in Wax apple

1. Cut off the end of the branch and any flower stalk that grows vertically.

pruning is done after harvest and the second pruning after flowers appear (match head size. This helps to maintain the height of the tree at 8 ft.

The pruning is to remove branches that are cross, weak, crowed, water sprouts, vertically growing, diseased, internal, overlapping and dried. Avoid heavy pruning in the period just before flowering - as after pruning, the new shoots and water sprouts will come up - and, the nutrition used by these new shoots will delay the flowering time.

Fig. 5 A well established Wax Apple Orchard

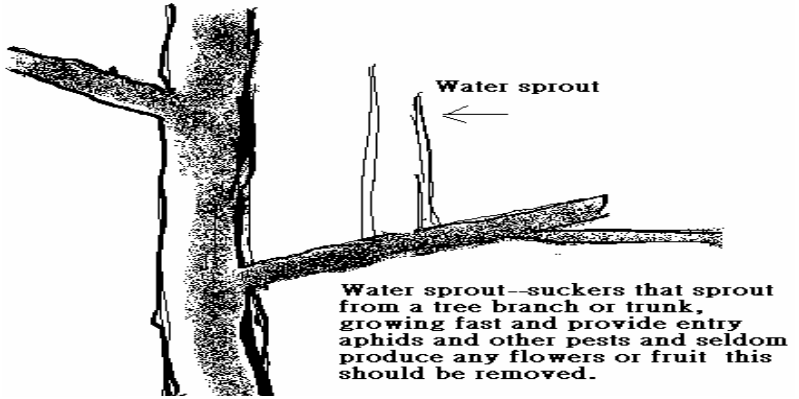


Fig. 6. Water sprouts on the was apple tree

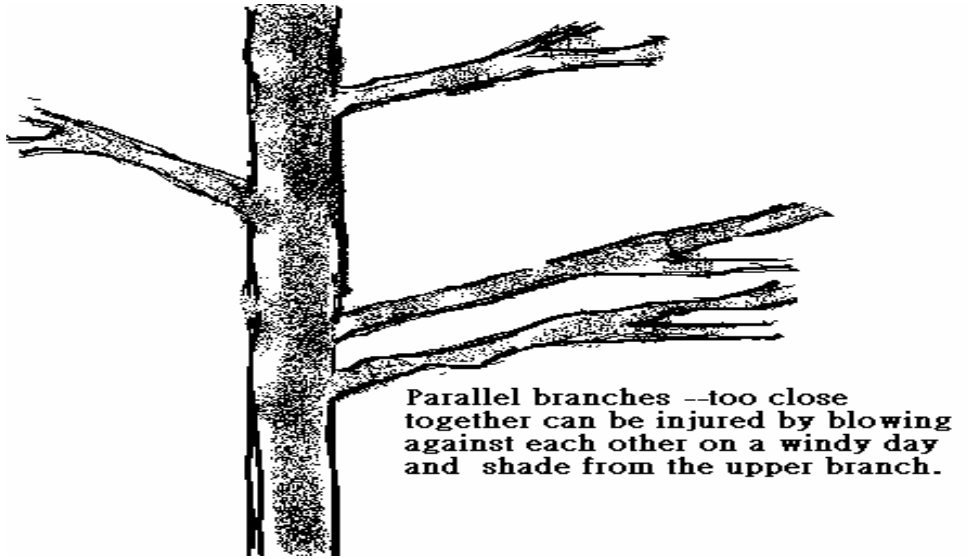


Fig. 7. Parallel branches on the wax apple tree

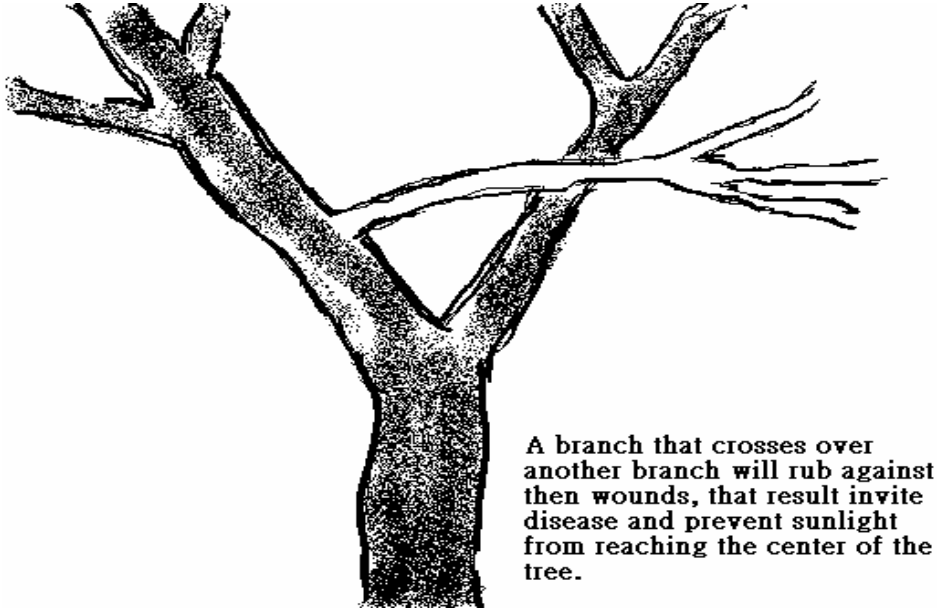


Fig. 8. Cross branches on the wax apple tree

FERTILIZATION

The recommended ratio of N, P and K for wax apple is as follows:

Age of plant	N	P	K	Compost
1 year	400-600 g	400-600 g	400-600 g	10-30 kg
2-4 years	700-900 g	700-900 g	700-900 g	10-30 kg
5-6 years	1,000-1,200 g	1,000-1,200 g	1,000-1,200 g	10-30 kg
7-8 years	1,200 g	1,200 g	1,200 g	10-30 kg
9-10 years	1,200 g	1,200 g	1,200 g	10-30 kg
over 11 years	1,200 g	1,200 g	1,200 g	10-30 kg

Table 1. Fertilizer regime for wax apple (Source: Taiwan Agriculture

Important stages to note:

1. From the flower stage to the bell fruit stage, the plant requires more nitrogen.

Fig. 9. Wax apple bell fruit stage

2. As the young developing fruit starts changing color to red (red head stage) the plant requires more potassium.
3. Apply phosphate during the dormant stage.
4. Micronutrients are best applied by foliar fertilizers; these