

THE PAPAW OR PAPAYA*

(CARICA PAPAYA)

WITH frequent inquiries being made as to the method of propagation and with an increasing demand for this fruit in the metropolitan markets, it is felt the following notes will be of interest.

It is not the intention of the writer to convey to Gascoyne River settlers that the time is opportune for the establishing of any large commercial areas, but there are sufficient indications to warrant the consideration by settlers of the planting of a few "trees" as a profitable sideline to banana growing. Without entailing much additional time, water or other costs, they could be grown in such positions as along the irrigation drains, on the headlands, between the outside banana rows and the wind breaks, between the young fruit trees or in the pineapple beds. Prices in the past for this fruit have been encouraging despite the fact that little or no attention has been paid by settlers as regards type, quality or condition of fruit being sent to markets. True though it is that the demand is greater than the supply, considerable caution must be taken with the amount of supply owing to the peculiar nature of this and many other tropical fruits, a liking for which is an acquired taste.

The papaw or papaya (erroneously called paw paw by many of this State and which is an entirely different type of plant indigenous to Central U. S. A.) is a typical tropical plant and is a native of tropical America. It has proven itself quite suitable to Gascoyne conditions providing that normal care and attention are paid to cultural methods, and thrives best in a soil rich in organic matter possessing good drainage, in a sunny position free from frosts and boisterous winds.

THE PLANT

This is a fast growing herbaceous plant possessing usually an erect trunk attaining a height of 10 to 25 feet, which is fleshy and hollow. The leaves, which are large, sometimes 2 feet across, are dark green and are produced in clusters at the top of the plant on hollow, smooth stiff stalks. This growth is erect in the early stages of development but later as the leaf stalks grow, they bend outwards and then downwards, giving the plant a palm-like effect. The life of a leaf varies from 4-6 months and at the axils or union of the leaf stalk and trunk the flowers are produced.

THE FLOWERS—MALE AND FEMALE

The papaw is normally dioecious, *i.e.*, with the staminate or male and pistillate or female flowers produced on different plants. In addition to the

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staminate and pistillate forms, intermediate forms have been observed in which flowers of each sex occur in one plant. Staminate flowers may occur with rudimentary stigmas and ovaries which give rise to small worthless fruit and there is a hermaphrodite or bi-sexual type which regularly produces perfect flowers, is self-pollinated and yields excellent fruit. (While fruit of the staminate tree have been described as worthless there are instances of large and good-flavoured fruit having been produced but possessing thin skin and soft flesh which make them unfit for transport to market.) In the dioecious type the staminate or male plant the flowers are white, about an inch long and are borne in clusters on long pendent racemes sometimes 5 or 6 feet long, while the pistillate or female plant produces creamy yellow flowers about two inches long close to the trunk of the plant on short thick stalks from half an inch to two inches in length. Both types of flowers emit a very pleasant scent.

It appears that nature holds the determining of the papaw sex as a close secret for although many and varied are the suggestions that have been expounded concerning the determination of sex in the early stages of growth of the plant, the writer has yet to be convinced that any of the so-called "positive tests" are reliable except that the more vigorous plants in the nursery may possess a greater percentage of female plants. This line of selection is desirable apart from the view-point of sex, in that the most vigorous plants are the quickest to flower, thus maturing an early crop and such crop is usually borne low on the plant which facilitates harvesting.

THE FRUIT

The shape of the fruit varies from oblong to round, depending not only on type or variety. Soil, season, climate and cultural conditions seem to have considerable bearing on shape. The fruit when first developed are creamy white, but quickly take on a dark green colour. The weight varies from 1-10 lb. when mature. When ripe the skin is smooth, thin and usually of a yellow to deep orange colour, while some types are pale green and are not considered very favourably by the trade. The flesh is of firm butter texture and possesses a yellow to orange-yellow colour. In the centre of the fruit is a fairly large cavity where are carried numerous round or oblong-shaped black seeds. The thickness of the meat or flesh varies from half an inch to two inches.

METHODS OF PROPAGATION

The papaw may be propagated from cuttings, by grafts or seed, the latter being the commonest and to date most satisfactory method.

Cuttings are most successfully rooted when small limbs are removed from plants and care is taken to see that the natural swollen growth at the union of the small limb and parent plant is attached to the cutting.

Although this plant can be grafted successfully, there is little to be gained from this method of propagation for it has been observed that the parental qualities are not always retained except that the age of the parent seems to be transmitted in the scion. These facts appear to be present to the same degree in rooted cuttings.

SELECTION

As already mentioned the propagation by seed is the best method. Little attention has been paid in the past on the Gascoyne in the matter of selection, with the result that many worthless strains are in evidence which are not only unremunerative but are a menace to the better types growing in the same vicinity.

Seed should be selected from the fully ripe fruit and from a tree known to be of a healthy, robust, heavy-bearing nature. The fruit should possess a thick leathery highly coloured skin, a flesh of firm texture and good thickness. The shape, if possible, should be oblong, as this appears to be favoured by the trade, and a medium sized fruit is the most popular. Fruit with a very prominent nipple at the calyx end should be avoided as this tends to ripen earlier than the main body of the fruit and is subject to bruising, thus detracting from its value when presented to the buyer.

THE SEED BED

Seed may be raised either in beds or boxes which contain a good rich sandy loam. The seed should be planted soon after being removed from the ripe fruit but seed will retain a high percentage of germination for twelve months if washed after removal from the fruit and kept in an air tight jar in a cool place. The best time for raising seedlings is during the spring months—September–December. The seed should be planted in rows about 12 inches apart with 2–3 inches between seeds and covered with about half an inch of soil. The seedlings should be above ground in 2–3 weeks after planting in the spring. Thinning the seedlings out to 6–8 inches will encourage good sturdy growth. The soil should be kept only moist as excessive watering may cause damping off. If the seed beds are in sunny positions the seedlings should be ready for removal to their permanent positions in two months from planting of seed when the seedlings should be 6–8 inches high.

PLANTING OUT

Several hours prior to transplanting, the seed beds or boxes should receive a liberal watering, and planting out should be done in the cool of the day. After selecting the most robust and vigorous plants, every care should be taken to avoid destroying the roots or the drying out of roots during transplanting. A thorough watering is advisable as soon after planting as possible, and once the plants show signs of being established, weekly irrigation should be sufficient. If planting out large seedlings, it is advisable to remove the majority of the leaves several days prior to planting, leaving portion of the petiole or leaf stalk attached to the plant.

Owing to the impossibility of determining the sex of the seedlings prior to flowering, it is advisable to adopt close planting and planting in pairs about 18–24 inches apart, allowing 3–4 feet between pairs, is suggested. The thinning out of males, which usually predominate, should be done as soon as detected, and they should be cut up and dug into the soil as they are a valuable manure for the remaining plants. No definite advice can be given

as to how many males should be left as position of the plants has a considerable bearing on the matter, but as a guide 3 or 4 robust males should be satisfactory if well dispersed amongst 20 to 30 females.

While most plants have the tendency to develop the one upright stem, there are some that will develop lateral limbs early in life, which is very desirable as the plant then tends towards a low type growth carrying a larger crop of medium sized fruit low to the ground. To encourage the branching type habit, the growth may be nipped out when the plant is 3-5 feet high, but even this does not always force out the side vegetation. Some growers wait until the first main crop has set before removing the terminal growth when the branching habit can usually be obtained.

While plants may live for 10 or more years, it is usually found that after the second or third year the plant has produced its best commercial crops.

The plant readily responds to soil cultivation and liberal supplies of well-rotted organic matter, and will benefit from an application of Wyndham meat works manure, whenever manuring the bananas, bearing in mind that if the plant is kept producing vegetative growth, there will be a constant cropping of fruit.

HARVESTING AND HANDLING

Like most fruits the papaw attains its best flavour if allowed to remain on the plant until ripe, but this is not practicable if fruit is to arrive at Perth markets in good condition. The stage to harvest to metropolitan markets will vary with the season. During the winter months it is possible to allow the fruit to remain on the trees until a fair amount of colour is showing, but in the summer it is necessary to harvest as soon as the yellow colour commences to show on the fruit.

Harvesting should be done during the cool of the day by holding the fruit firmly and giving it a slight twist, when it should come away with portion of the fruit stalk attached. The fruit should be handled with the greatest of care as it is very easily bruised and marked; even the slightest marking at harvesting becomes very pronounced when the fruit is ripe. If possible, the fruit should be allowed to sweat in a cool place for about 12 hours prior to packing. The fruit may be packed in the standard tropical case (24 $\frac{3}{4}$ by 12 inches by 12 inches, inside measurement), or during times of high prices the $\frac{3}{4}$ flat is more desirable. A layer of wood wool, dry straw or crumpled paper should be placed in the bottom of the case, and each fruit should be liberally wrapped in paper before being placed in the case, making sure that a padding of the paper covers the stem end of the fruit. The fruit may be packed either erect or lengthwise along the case. Never place the fruit across the case, for after lidding the case always travels on its side and fruit so packed are liable to receive damage to the stem or calyx ends. When packed the fruit should be slightly lower than the side of the case, and a liberal layer of wood wool, or crumpled paper should be placed over the fruit before lidding. The use of dead banana leaves as padding material is not to be encouraged for it not only detracts from the "get up" of the

product but produces an unpleasant musty odour to the packed article. Use even grade fruit as far as possible, and upon the end of the case mention the count or number of fruit in the case.

USING THE FRUIT

The most popular method of using the fruit is by cutting halves or slices lengthwise, removing the seed and to suit the taste, sprinkling sugar, salt, pepper, orange or lemon juice over it. Served in this manner it is a very popular breakfast dish. Some people prefer a few of the seeds to be served with the fruit as they have a flavour similar to water cress and are claimed to possess great digestive properties. This fruit is becoming increasingly popular in cafes when served with ice cream. Cut in halves with the seed removed, and port wine added, it makes a delicious sweet for the menu.

Great medical properties are claimed for the fruit and plant from which is produced a milk-like fluid which when dried to a white powder contains "papain" and is used in the manufacturing of special digestive foods and chewing gum. The papain is harvested by making slight incisions in the skin of the fruit and the exuding fluid is collected in small vessels and then dried and ground to a powder. One authority claims that to extract 1½ lb. of papain approximately 1,500 average size fruit are required to be treated.

PESTS AND DISEASES

The plant is comparatively free from pests and diseases in Western Australia. Slight infestations of Red Spider have been recorded. The major loss of fruit appears to be from sun scald and slight fungus attack in the form of a rot which develops at the calyx end and exposed side of the fruit. The orange-piercing moth also does slight damage during drought periods.

REASONS FOR CROP FAILURES

Crop failure, or fruit developing towards maturity and then falling from the plant, may be the result of blossoms being attacked by insects or disease, or unfavourable soil or climatic conditions at fruit setting stage. Excessive watering or manuring at this stage can also cause trouble, but where these conditions do not prevail it is quite possible that pollination is at fault. The shrivelling and dropping of fruit from the male tree is common and, if an inspection is made of the interior of the fruit, it will be found that the seed is undeveloped. Infertile fruit is usually insipid in flavour and the flesh is thin and leathery.