HORTICULTURE NOTE NO. 27

PINEAPPLE: CULTIVATION AND EXPORT

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ABSTRACT

The growing of pineapples, their harvesting, storage, yields, pest and disease problems are discussed. The logistic of export of pineapples especially to New Zealand is highlighted.

Common name : **PINEAPPLE**

Botanical name : ***Ananas comosus***

WHAT THE PLANT LOOKS LIKE

Pineapple comes from the family Bromeliaceae and is a perennial herb with a rosette of long and often spiky leaves upto 1 metre long. The plant produces a flower and fruit at the end . Suckers are produced near the base of the plant. On top of the fruit is a small crown of dark green leaves.

WHERE IT GROWS

Pineapple grows well from sea-level and up to 1000 m a.s.l. Although it may be grown beyond 1000 m.a.s.l. the higher it is grown, the higher is the acidity level in the pineapples. Pineapples do not grow very well high in the mountains because they do not tolerate frost. Pineapples grow well between a temperature range of 22 and 28 degree celsius and little growth occurs below 20 degree celsius. A rainfall range between 1000 and 1500 mm per annum is adequate provided it is equally distributed.

CULTIVARS

Two main cultivars, namely the Smooth Cayenne and the Rough Queen are grown in PNG. The characteristics of the two cultivars are given in table 1.

The Rough Queen type are thought to be better flavoured and sweeter compared to those of the Smooth Cayenne. However, the Rough Queen type is very difficult to manage because of its prickly leaf margins. Farmers growing the Rough Queen cultivar need to wear overalls and long sleeve gloves during field work. The Rough Queen type can travel and store better and are less prone to internal disorders. In PNG, the formal market sector prefers the Smooth Cayenne type. This is simply because of its better shape and somewhat bigger size.

Table 1. **A comparison of Smooth Cayenne and Rough Queen pineapple cultivars.**

Smooth Cayenne	Rough Queen
large fruit	small fruit
poor aroma	good aroma
spines only the tip of leaves	spiny leaf margins
high yielding	low yielding
soft flesh	crisp flesh
flat eye	deep intented eyes
whitish flesh colour	yellow flesh colour
high flesh recovery	low flesh recovery
slow sucker growth	prolific sucker growth
high water content	high fibre content
poor storage	stores well

SOIL AND FERTILIZER

Pineapples will thrive on well-drained sandy loam soils with pH level of 5-6.5. It is preferable to plant them on slopes. Pineapples are heavy feeders on plant nutrients in the soil. Small-scale growers around PNG rarely use inorganic fertilizers on pineapples. Most farmers prepare the soil and plant the suckers without any fertilizers added. The natural soil fertility is usually adequate for the first fruiting. However, on ratooning crops, the yield will be reduced and use of mulching and composting of organic material is highly recommended. Pineapples require a high plant nutrition, in particular the elements nitrogen and potassium. Fertilizer application is not recommended where organically grown pineapple is preferred. In small scale farms fertilizer is expensive. It may also have other elements of risks to the environment. Mulches and composting organic material should be used in such a situation. Mulching is a lot cheaper and readily available to the farmer.

HOW IT IS GROWN

Planting material

In PNG, pineapples are mostly grown from vegetative parts though they can be grown from seeds as well. A number of different vegetative parts of pineapple plant can be used for propagation which includes tops (crown), slips, aerial suckers, ground suckers and butts. Aerial suckers are the best type of planting material and are commonly used in PNG as they develop quickly at the end of the fruiting cycle.

Soil preparation

Soil should be cultivated to a fine tilth. Compost or animal manure should be worked in. Beds are raised to a height of 30 cm. Raised beds with drainage canals are absolutely necessary in areas of high rainfall.

Time of planting

The time of planting is normally determined by the availability of planting material which is dependent to some extent on the time of fruit production. Planting can be done at any time of the year provided the weather is not too dry. Suckers are normally planted early in the year when fully developed from mother plants. During dry spells the newly established suckers must be kept watered.

Planting

The suckers are planted 8-10 cm deep. Suckers are planted just as they are removed from the other plants and there is no need to remove old basal leaves.

Spacing

Pineapples can be planted in rows or by themselves. A single row and wide planting space is common as this makes it possible to work between rows for weeding and picking the fruits. Hand weeding can become difficult on ratoon crops as plants multiply and spread out.

Intercropping

Pineapples will tolerate some (but not heavy) shade and perform well under intercropping. Pineapples can be grown under coconuts, bananas, pawpaw, betelnut and other tall crops. Intercropping makes good use of the available land and the need to weed the pineapples is less.

Weeding

Pineapple plants do not cover the ground very well, so weed invasion is easy. Slashing or handweeding is common. Weeds slashed from the pineapple field should be used as mulch to conserve moisture and add organic matter to the soil. Intercropping with tall crop plants that shade out weeds can be a good way to control weeds. This has been tried in many areas in PNG but showed little or no success. Mulching may be used to control weeds.

Crop ratooning

The original pineapple plant produces one fruit and then a number of suckers. All suckers except one are

removed after harvesting. The selected aerial sucker should be near the base of the mother plant (fruited), must be large and strong. The remaining sucker will produce another fruit and some more suckers. The area should be cleaned out after the third cropping (second ratoon crop) and the suckers replanted on a new site.

Time to maturity

The different planting materials differ in the time taken for the fruit setting and maturity. Fruiting is seasonal. Fruiting is less seasonal in the highlands than in the lowlands. Most fruits are harvested between November to February.

HARVESTING, STORAGE AND YIELD

Harvesting would depend on when you are going to sell the fruit. For self consumption and selling in the local market, the fruit should be allowed to fully ripen. Fruits that are to be sold to other markets should be harvested when the fruit has started to turn yellow.

After harvesting, the fruits must be stored under favourable conditions before transporting to the market. The Rough Queen type pineapples travel and store better and are less prone to internal disorders.

Small growers pineapple yield in PNG averages between eight to ten tonnes per hectare. Well managed crops planted at high densities can yield in excess of 40 tonnes per hectare.

USES

The pineapple fruit is eaten fresh or can be used for preparing juice or canning.

PESTS AND DISEASES

Pineapples do not have any major pests and diseases in PNG. A notable pest problem is however, the mealy bug (*Dysmicoccus brevipes*). Heavy infestation of mealy bugs can reduce plant vigour and spoil the fruit skin appearance. After harvesting the fruit, wash off the woolly mealy bugs which accumulate near the fruit base. Planting materials with these types of infestation should not be used for planting.

Another species of the bug is *Dysmicocucus neobrevipes* (Beardsley) which causes heart and root rot. It also causes butt or soft rot. Other pests include: rat, mice, bandicoot, pig, snails and chicken. They can be controlled physically.

Leaf blotch due to fungus *Ceratocystis paradoxa* can sometimes be bad. It can be prevented by keeping the soil well drained. Nematodes sometimes damage pineapple plants. This can be controlled by crop rotation over a period of 2-3 years.

The Smooth Cayenne pineapples grown above 1000 metres a.s.l. can readily develop a black heart (related to heart rot), a disorder which is not uncommon. Black heart develops as the fruit ripens either in the field or at some stage during marketing. The internal core darkens and eventually becomes dark brown or black. Affected fruits cannot be detected as the outter appearance still looks attractive. This disorder is often developed in fruits which ripen during the cooler months because it is thought to be caused by temperatures below 15 degree celsius.

MARKETING

Pineapples are a common and popular fruit. Most fresh fruits are either consumed by the producers or sold at the open markets in urban centres or rural areas. Gate sales along major highways are also becoming popular. Wholesale buyers in the highlands now ship fruit to Port Moresby where fruits are sold to hotels, institutions and retail outlets. Pineapple juicing is also becoming popular and has great potential in PNG.

EXPORT OF PINEAPPLES

In order to further encourage the pineapple industry in PNG there is the need to consider the export of pineapples to overseas countries especially during their off-season. PNG is actually looking at processing pineapple but developments in this area will take sometime.

Pineapples can easily be exported to countries such as New Zealand and Japan.The export of organically grown pineapple juice to Europe is highly promising. Pineapples intended for export have to meet certain conditions under an agreement reached between the PNG Department of Agriculture and Livestock and NZ Ministry of Agriculture and Fisheries. In the export of pineapples to NZ, the following conditions shall apply:

a. The pineapples shall be harvested at the green to colour break stage. Pineapples outside this specification are rejected for export purposes.

b. The pineapple must have 55% or more Smooth Cayenne percentage. The Rough Queen pineapple are not allowed in the NZ market.

c. The pineapple must be free from any pests, contaminants, seeds or soil.

d. Any damage or cracked fruit or fruits with one or more holes must be excluded from the export consignment.

e. Pineapples must be held under fruitfly proof conditions from the time of harvest until the time of inspection on arrival in NZ.

DAL inspectors shall examine 100% of pineapples intended for export to NZ. The inspection would commence at the growers farms and the inspectors shall accompany the consignments to the packhouse. In the packhouse the inspectors would make notes in respect to the following:

a. The pineapples are washed and brushed to exclude any mealy bug as well as other contaminants. The intention is to see that only very clean pineapples are selected for export purposes.

b. To determine whether there is any mixing of ripe or half ripe pineapples. Any pineapples not following the export conditions would be rejected.

c. Whether the approved pineapples are packed in fruitfly proof polythene sacks before transporting them to the warehouse.

At the warehouse the pineapples shall be examined once again to make sure that the above criteria have been strictly observed. DAL inspectors are advised not to issue phytosanitary certification if they are in any way dissatisfied that the above criteria have not been fully followed. The detection of fruitfly or any other pests or contaminants in NZ will lead to DAL not issuing phytosanitary for any pineapple export until the systems have been carefully checked and NZ Ministry of Agriculture and Fisheries is satisfied.

DAL will register all packhouses who intend to pack pineapples for export to NZ. Only the registered packhouses will be allowed to pack pineapples intended for export. Each packhouse is required to maintain records of total quantities graded and the number of rejections on a daily basis. Supervision by DAL inspectors during packing stages ensures against possible substitution and fruitfly attack.

Keen exporters should try to increase their pineapple production and at the same time avoid attack by vertebrate pests. Inspectors may have to go on to considerable lengths to ensure that the green to colour break specification is strictly followed. It is the responsibility of the exporter to ensure that the produce are treated in accordance with the guidelines specified above.

ACKNOWLEDGEMENT

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FURTHER READING

BOURKE, R. MICHAEL (1976 a). Pineapples. *Rural Development Series, Handbook* No. 10, Department of Primary Industry, Konedobu.

BOURKE, R. MICHAEL (1976 b). Making Pineapples Fruit. *Harvest* 3(4): 122-126.

BOURKE, R. MICHAEL (1977). Pineapples. *Farming Notes Series* No. 8. Department of Primary Industry, Port Moresby.

FRENCH, R. BRUCE (1986). Food Plants of Papua New Guinea, a compendum. (No publisher or publication place on the book).

HUNTER, M.A and SICKEY, B. (1972). Pineapple Production in the Markham Valley. *Harvest* 2(1): 5-8.

ROGERS, F. ASHLEY (1994). How to Grow Pineapple? *Fresh Produce News* 87: 10-15.

ROGERS, F. ASHLEY and MALCOLM P. LEVETT (1994). Why Grow Pineapples. *Fresh Produce News* 86: 1-5.

FURTHER INFORMATION

For further information and advice on pineapple growing, contact the Area Horticulturist in your region. The regions and addresses of interest are as follows:-

Southern Region

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New Guinea Islands Region

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Momase Region

Erap Agricultural Experimental Station
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Highlands Region

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