GROWING INTRODUCED VEGETABLES IN THE LOWLANDS
2. FRUIT VEGETABLES, CORN, LEGUMES BULB, AND ROOT VEGETABLES

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INTRODUCTION

In the first article in this series of four papers, we discussed the lowland environment (climate) in Papua New Guinea. In this article, we discuss all the introduced vegetables, except for the leafy green vegetables. The green vegetables are discussed in the next article.

Many different types of vegetables are used in Papua New Guinea now. Some like tomato, corn and beans, develop from a flower to the fruit we eat. Other vegetables, like onions, form a bulb at the base of the leaves, just above the ground. With root vegetables, the part we eat grows under the ground. English potato is not included in this article because although it is a recent introduction, it is used as a staple crop like sweet potato and yam.

Most of these vegetables have been introduced into Papua New Guinea in the last 100 years. Cucumber and some legumes have been grown in the country for longer than that.

FRUIT VEGETABLES

Two important plant families produce fruit vegetables. One is the Cucurbitaceae, which includes pumpkin, cucumber, choko, watermelon, rockmelon and marrow. The other is the Solanaceae, which includes tomato, capsicum and eggplant.

All the cucurbits will grow in the lowlands, although some like choko, marrow and some varieties of pumpkin grow better above an altitude of 500 metres. Cucumber is found in many village gardens. Watermelon is a popular cash crop and rockmelon (cantaloupe) is occasionally grown. Watermelon and rockmelon grow best during the dry season. They prefer well drained soils.

Marrow, grown for either the young fruit called courgettes or zucchinis, or the mature fruit, will grow in the lowlands. However they usually become infected with the disease downy mildew. This kills the leaves while the plants are still young. So far we have not found any varieties which are resistant to this disease.

Tomato is now an important vegetable in the lowlands. When the night temperatures are higher than 15-20°C, tomato plants grow well and flower but the fruit does not set very well. (Fruit set is a name for pollination and early fruit growth.) Good varieties have now been bred in Taiwan and

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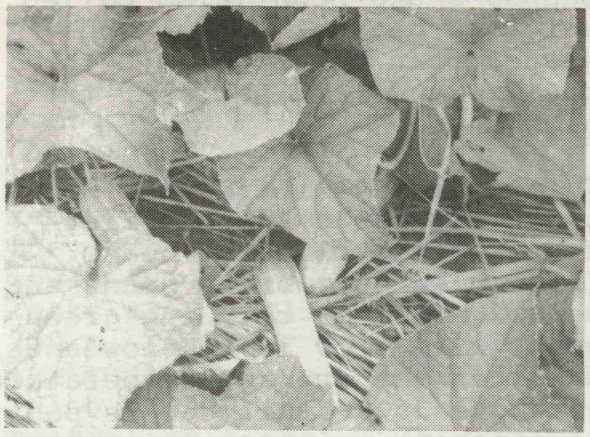
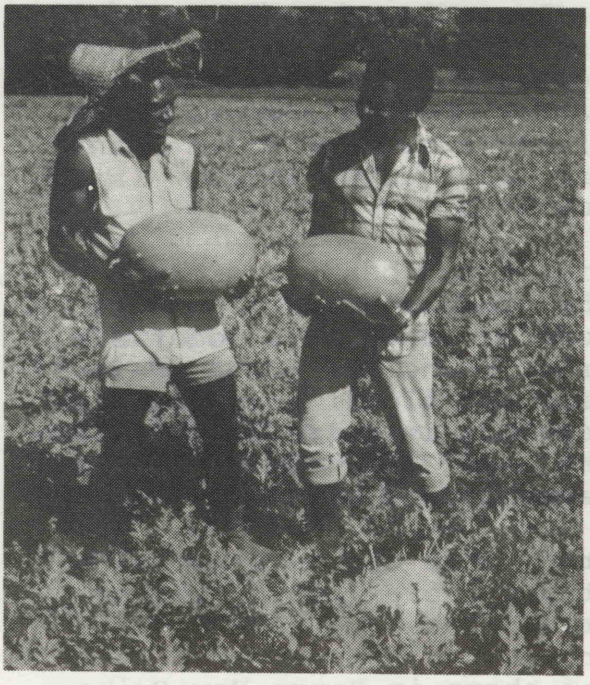


Cucumber growing on a kunai grass mulch



A heavy crop of watermelon

A tomato house for wet season production of good quality fruit

A tomato plant infected with bacterial wilt

other tropical places, which are 'heat tolerant'. This means that they will set fruit even when the night temperatures are above 20°C. Above altitudes of 400-500 m in Papua New Guinea, night temperatures fall below 20°C, so heat tolerant varieties are not required.

During the wet season tomato fruit split as they ripen. Good quality fruit can be obtained if the tomatoes are grown under a polythene roof. For wet season crops at Laloki, we use an open sided house with a polythene roof. A gap in the roof allows the release of hot air.

The other problem with tomatoes is the disease bacterial wilt. This disease lives in the soil. It causes the plants to wilt then die. Bacterial wilt mainly occurs where the soil temperatures are above 21°C. The only way to prevent this disease is to use resistant varieties. To grow tomatoes successfully in the lowlands, heat tolerant, bacterial wilt resistant varieties must be used.

Eggplant is not a very popular vegetable in Papua New Guinea, but it grows well in the lowlands. Both sweet bell, and long hot capsicums are grown in the lowlands. Bell capsicums sometimes get sunburn which is followed by fruit rot. This can be prevented by regular application of nitrogen to make the leaves grow well, or by growing the capsicums under some shade. Both eggplant and capsicum sometimes get bacterial wilt. There is a resistant variety of eggplant, but not of capsicum available in Papua New Guinea.

Because the flower bud of globe artichoke is used it can also be considered a fruit vegetable. Globe artichokes will only grow at average day temperatures up to 25°C and night temperatures up to 20°C. So this crop cannot be grown in the lowlands.

CORN

There are good tropical varieties of field corn or maize for growing in the lowlands. However most sweet corn varieties have been developed for temperate climates. In the lowlands these sweet corn varieties will grow, but they are usually quite badly damaged by insects, diseases and rats. It is better to grow field corn which has better disease resistance than sweet corn, and the long tight husks prevent rat and insect damage. Some tropical varieties of corn, like Suwan, are quite sweet especially when they are harvested young.

LEGUMES

The legumes include all types of peas and beans. Several legumes like cowpeas, mung bean and chickpeas are very important elsewhere in the tropics. In Papua New Guinea, winged beans, snake bean (also called yardlong bean or sitao) and peanut, can be grown in both the lowlands and parts of the highlands.

In temperate climates the best known vegetable legumes are dwarf beans, climbing beans (French beans), broad beans and peas. Dwarf or climbing green beans will grow in the lowlands. But when the average temperature is above 26°C fruit set is poor. If you want to grow these beans in the lowlands they should be planted between May and August. However at altitudes above 400 m, green beans can be grown at any time of the year. Snake beans, which have a much longer harvest period and produce a bigger crop than green beans, are much easier to grow in the lowlands.

With broad beans and green peas, the young seeds and not the pods are used as a vegetable. Broad beans and green peas will grow and flower when the temperature is above 18-20°C, but the seed will not set at these temperatures.

Green peas can be grown at altitudes above 1100 m, whilst broad beans are usually only grown at altitudes of 2000 m and above in Papua New Guinea.

The young seed of lablab bean, a tropical crop, which grows well in the lowlands, can be used as a substitute for broad beans. The seeds taste very similar.

BULB AND ROOT VEGETABLES

There are several important bulb and root vegetables. Leeks and spring onions are grown for the thick fleshy lower stem and leaves. Onions and garlic are grown for their bulb. Several vegetables from the Cruciferae or cabbage family are grown for

the roots. These are radish, kohlrabi, turnips and parsnips. Two other important root vegetables are carrots and beetroot.

Leeks grow very poorly when the temperature is above 24°C, so they are not recommended for lowlands. In Papua New Guinea leeks are usually grown above 750 m. Another vegetable similar to leeks, is Chinese leeks (also called Chinese chives or multiplier leeks). Chinese leeks grow very well in the lowlands. They are a perennial vegetable which grow in a big clump. They have long flat green leaves with a thickened white stem. Chinese leeks can be grown either from seed or divisions of older plants. Cooked in stews they have a similar although stronger flavour than leeks.

Spring onions (also called bunching green or Welsh onions) are quite often grown in lowland gardens. They can be grown either from seed or divisions of the older plants. The leaves and thickened stems can be used either in salads, or cooked.

Bulb onions and garlic can both be grown in Papua New Guinea.

Chinese leeks

Once the leaves have grown, bulbing (the stage when the bulb starts to grow) is influenced by day length. In temperate countries, onion and garlic start growing bulbs in early summer, when the days are 14-16 hours long. These are long day varieties. In Papua New Guinea we are near the equator and our days are only 11½-12½ hours long all year round. Varieties which will form bulbs with short days must be grown. These are called short day varieties. In the tropics long day varieties of onion and garlic will only grow leaves, not bulbs.

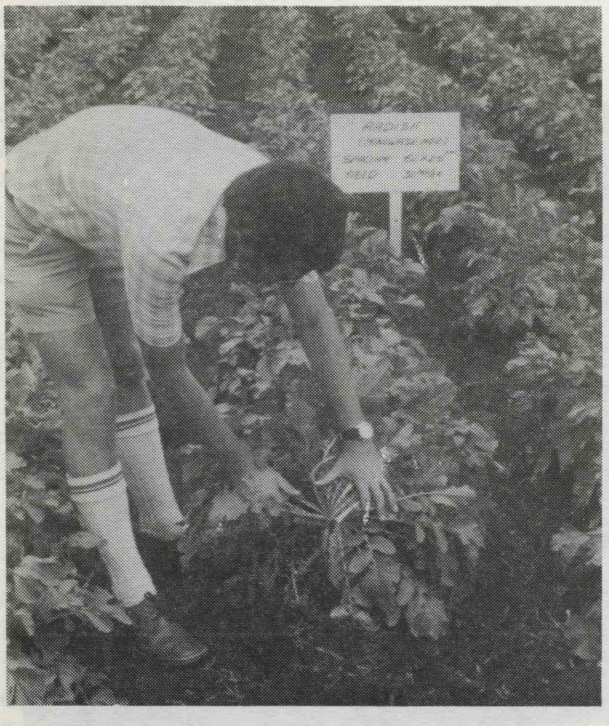
Provided we choose short day varieties of onions and garlic they can be grown at any time of the year. However the onions keep better if they dry off well before harvest. They should be planted to mature during the dry season in your area. At Laloki we sow onions from February to June, to mature during the dry season, July to November. There are good short day onion varieties available in Papua New Guinea now, but short day garlic varieties have not been introduced yet.

Bulb onions growing at Laloki

All the root vegetables grow best in light sandy, loam or pumice soils and at cooler temperatures than are found in the lowlands. However kohlrabi and radish can be grown successfully in the lowlands.

Kohlrabi is a popular vegetable in Europe. The root is really a swollen stem that grows just above the ground. The plant should be grown with frequent irrigation. The root should be eaten when it is young, tender and crisp. Kohlrabi grows better in the highlands but it can be grown in the lowlands, particularly during the cooler months.

There are two types of radish, and both can be grown in the lowlands. The European radish produces small red or white roots. The Japanese radish produces large long or round white roots and grows better than the European radish in the lowlands. Radishes need frequent watering during dry weather, or they will be tough to eat.



Japanese radish

The best quality carrots, with long orange roots, are produced when the maximum soil temperature is less than 24°C. When the maximum soil temperature is between 24 and 30°C carrots still grow, but the roots are short, and pale yellow in colour. Carrots grow better above an altitude of 700 m in Papua New Guinea. Because carrot seed is very small, it germinates best when sown very shallow in moist sandy soils. Carrots do not grow well in silty or heavy soils which form a crust over the germinating seedlings.

Like carrots, beetroot will grow in the lowlands, but with soil temperatures above 24°C the roots have very poor red colour. In the lowlands turnips and parsnips will not grow at all. Turnips can be grown at altitudes above 700 m in Papua New Guinea.

Some beans produce edible tubers. One, yam bean, is a minor vegetable in Papua New Guinea. It grows well in the lowlands. It is popular with the Chinese community.

VARIETY RECOMMENDATIONS

Trials on many of these crops have been carried out at Laloki during the last ten years. From these trials, good varieties for growing in the dry Papuan lowlands have been found. We know that most of these varieties will also grow in other lowland areas of Papua New Guinea. In the fourth article in this series, the recommended varieties are listed for each crop.

FURTHER READING

Blackburn, K.J. (1976). Observations on the selection and

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