

## SOME LITTLE-KNOWN FOOD CROPS FROM PAPUA NEW GUINEA

By

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### ABSTRACT

*A number of food crops which are grown in Papua New Guinea are not eaten elsewhere in the world or are used only in the Southeast Asia and Pacific region. Information on 18 of these crops is given in this article. Where there are data available, brief notes are given on (a) the part of the plant consumed (b) where the crop was domesticated and where it is used as a food, (c) ecology in Papua New Guinea, (d) time to maturity, (e) yield, (f) seasonality and (g) potential for use in other parts of the world.*

### INTRODUCTION

The objective of this article is to give some brief notes on some of the little-known food crops from Papua New Guinea. In particular the article is aimed at educational institutions as it is often difficult for teachers to obtain information easily on the traditional Papua New Guinean crops. A list of possible projects for schools is suggested at the end of the paper in the Appendix. Some of the species are also cultivated in Southeast Asia and other island groups of the Pacific. Others are only known from Papua New Guinea. Some of the species have good potential for cultivation in other parts of the world and deserve to be grown more widely.

The article is by no means a comprehensive review. There are very many other little-known species cultivated or collected for food in Papua New Guinea, especially amongst the leafy greens and nut-bearing trees. In fact on almost any major field trip it is possible to encounter a species used for food that has not been reported in the literature. In a major review Powell (1976) listed the species recorded as food crops. She noted 251 species (in 150 genera, 81 families), most of which are traditional pre-contact foods. As well as these, many introduced species are now used. Further information can be found in a series of papers presented at the Second Papua New Guinea Food Crops Conference in 1980 (see papers by Aburu; Bourke; Henty; Lolo; Powell; Rose; Tarepe and Bourke). Another useful publication is the book by French and Bridle (1979). This book contains many excellent illustrations which can be used to identify crops. It can be obtained from Vudal Agricultural College. For many of the lesser-known crops there has been very little recorded on their usage, yields, ecology, seasonality or pest and disease problems.

Because of lack of information, the number of cultivars of each species will not be discussed. It can be presumed, however, that cultivars are very numerous for most species, as they are for most crops in Papua New Guinea. For example, I estimate that there are approximately 5000 cultivars of sweet potato (*Ipomoea batatas*) and some 300-500 cultivars of bananas grown in Papua New Guinea. The number of cultivars of taro (*Colocasia esculenta*) is extremely large as one small group of people alone may maintain as many as 200 discrete cultivars (Bourke, in press).

## VEGETABLES

There is a very large number of leafy green vegetables used as food in Papua New Guinea. Notes on some of the more important ones are given here. Most of these (*Rungia*, *Oenanthe*, aibika, tulip, *Rorippa*, *Hemigraphis* and the figs) have medium to dark green leaves. Hence they would be reasonably good sources of protein, iron, vitamin A and folic acid.

### *Rungia* (*Rungia klossii*; fam. Acanthaceae)

This small herb grows to a height of 30-50cm and has dark green and yellow leaves. The young leaves and stems are used as a vegetable, and sometimes for medicinal purposes. *Rungia* was almost certainly domesticated in New Guinea as it has not been recorded elsewhere as a food crop. It is widely cultivated in the highlands usually between altitudes of 1200m and 2000m, but occasionally down to 700m and up to 2700m. It can be harvested from 3-4 months after planting and yields for up to two years. Recorded yields have been 4-5 t/ha/year (Powell, in press; W. Akus, pers. comm.). *Rungia* has a very agreeable taste when eaten raw or steamed.

### *Oenanthe* (*Oenanthe javanica*; fam. Apiaceae)

*Oenanthe* is another low growing herb. The leaves resemble the tops of carrots. The young green leaves and stems are used as a green vegetable and for medicinal purposes. It is grown in Indo-China, Malaysia and Indonesia as well as in Papua New Guinea. Powell (in press) suggested that it is one of a number of tropical herbs which have probably been domesticated in more than one area. It is widely grown in the Papua New Guinea highlands between 700m and 2600m, but it is now being successfully cultivated on the coast such as on the oil-palm blocks in West New Britain. It is occasionally found growing wild as high as 3400m. It is very common in highland food markets. Both cultivated and wild plants are used as food. *Oenanthe* prefers moist locations and does quite well in waterlogged soils. It can be harvested from about two months after planting and yields for up to two years. It yields well under both good and poor soil fertility conditions. In one trial at Aiyura a crop yielded 13 t/ha/year. No pest or disease problems have been noted and it deserves to be tried elsewhere in the tropics.

**Aibika** (*Abelmoschus manihot*; fam. Malvaceae)

Aibika is a woody plant that grows to a height of 1-3m. An illustration can be found in French and Bridle (1979). The young mucilagenous leaves and stems are eaten. It is a native of China and is widely cultivated throughout Melanesia. Barrau (1958) called it "truly the traditional vegetable for all of Melanesia". In Papua New Guinea, it is widely grown from sea level up to about 1600m altitude and occasionally as high as 2000m. Yields of 6-7t/ha have been achieved in cultivar trials at the University of Papua New Guinea and up to 15-20t/ha/year at the lowlands Agricultural Experiment Station on New Britain (V. Kesavan and M. Lolo, pers.comm.).

Aibika suffers from many pest and disease problems and appears unsuited to intensive cultivation, at least under humid lowland conditions. The slimy nature of the cooked leaves is not always acceptable to the taste of people who are not accustomed to it.

**Tulip** (*Gnetum gnemon*; fam. Gnetaceae)

Tulip is a tree that provides edible young leaves and nuts. The pidgin name is derived from the English "two leaf" as the leaves are located in pairs on the stem. It is illustrated in French and Bridle (1979). It is widely distributed as a food and fibre plant throughout Southeast Asia and Melanesia. In Papua it is especially common on the north coast of New Guinea where it grows up to an altitude of 1150m.

**Highlands pitpit** (*Setaria palmifolia*; fam. Poaceae)

Highland pitpit is a grass that grows to a height of about 80cm. Illustrations of highland and lowland pitpit can be found in French and Bridle (1979). The stem is eaten. *Setaria palmifolia* grows in Southeast Asia and the Pacific, but appears to be used for food only in Papua New Guinea. Powell (in press) suggested that it was probably first domesticated in Papua New Guinea. It is very commonly cultivated in the Papua New Guinea highlands between 700m and 2700m, but is now being grown on the coast as well, such as in the Kiunga area. It is more common above 2000m. The shoots can be harvested from about five months after planting up to two years. Powell (in press) recorded yields of edible portions of 1-5t/ha.

**Lowland pitpit** (*Saccharum edule*; fam. Poaceae)

The immature flower of this tall cane grass is eaten. The crop resembles sugar cane in appearance, but can be distinguished by the more slender stems. It is eaten in Malaysia and Indonesia as well as in Papua New Guinea. It was almost certainly domesticated in Papua New Guinea (Powell, in press). It is widely grown in the Papua New Guinea lowlands and intermediate altitude areas up to 1700m, and occasionally to 1900m. The crop is quite seasonal with production in the lowlands concentrated in

January-February, but extending from December to May.

**Rorippa** (*Rorippa* sp. or *Nasturtium schlecteri*; fam. Brassicaceae)

*Rorippa* is a small quick-growing herb that grows as high as 20cm. The leaf has characteristic lobes on it. The leaves, stems and roots of the young plant are eaten. It is widely grown in the highlands between 1000m and 2700m, but as low as 600m and as high as 2850m. In contrast with all of the vegetables mentioned above, it is seed propagated. It is harvested from a month after planting.

**Hemigraphis** (*Hemigraphis* sp. or *Dicliptera papuana*; fam. Acanthaceae)

The young leaves and stems of this herb are eaten. The plant resembles *Rungia* but it is taller and the leaves are coarser. It is occasionally grown in the highlands above 700m. The crop produces well, but the taste of the leaves is nowhere as good as the taste of the other green leafy vegetables.

**Figs** (*Ficus copiosa*, *F. dammaropsis*, *F. pungens*; fam. Moraceae)

The leaves and fruit of about 9 species of *Ficus* are eaten in Papua New Guinea. "Kumu musong" (*F. copiosa*) is the most important of these. It can be distinguished by the coarse hairs on the leaves. The young leaves are used as a vegetable and the fruit are also eaten. It is widely grown from the coast to 2000 m altitude. Highland "kapiak" (*F. dammaropsis*) is grown for its young leaves and fruit from about 900m to 2700m. *Ficus pungens* grows from the lowlands up to 1800m. The young leaves are occasionally eaten. Other species used are *F. botryocarpa* var *sub-albidoramea* (fruit), *F. iodotricha* (leaves), *F. itoana* (fruit), *F. nodosa* (leaves), *F. pachyrachis* (leaves), *F. warsa* (leaves, fruit) (Powell, 1976).

#### FRUIT

"Marita" or oil pandanus (*Pandanus conoideus*; fam. Pandanaceae)

This tree grows to a height of 3-4m and produces a long cylindrical fruit. After cooking, the pulp and seed are removed from the stalk and mashed with water to produce a thick, rich, red sauce. This is eaten with starch foods such as sweet potato. It is grown from the lowlands up to 1650m, and occasionally to 1950m. It is especially important in the intermediate altitude zone (500-1400m), presumably because it substitutes for coconut oil in the diet of people who live in places where coconuts grow poorly or not at all. It was most likely domesticated in Papua New Guinea. The crop prefers moist locations and will tolerate waterlogged soil. Seasonality of production depends on the altitude. In the highlands at 1400-1650m, it is quite seasonal with most fruit ripening in February-March, but it is less seasonal at lower altitudes, and virtually non-seasonal in the lowlands (Tarepe and Bourke, in press). The taste of the sauce

is an acquired one but it is a rich source of energy and probably vitamin A, so it deserves to be tried elsewhere.

## NUTS

**"Karuka"** or nut pandanus (*Pandanus julianetti*, *P. brosimos* and *P. foveolatus*; fam. Pandanaceae)

At high altitudes, cultivated and wild *Pandanus* trees provide nuts a few centimetres long which are part of a cephalium. *P. julianetti* is the usual cultivated species and is usually grown between 1800m and 2500m but occasionally down to 1650m and up to 2700m. *P. brosimos* is a wild species that usually grows between 2500m and 3100m but occasionally down to 2300m and up to 3300m. Use of *P. foveolatus* has been reported from one area only (Powell, 1976). The pandanus nuts were almost certainly domesticated in Papua New Guinea. They are very widely grown above 1800m and provide an important seasonal food supply. The nuts contain 13-15% crude protein on a dry-weight basis, and only slightly less on a fresh-weight basis (Rose, in press), so they are a good protein source in diets noted for very low-protein intakes. The effort in extracting the nuts is well worth it for the nuts are delicious when eaten fresh or smoked. Production is seasonal but seasons are irregular. The season is usually centred on February, but sometimes on July.

**"Okari"** (*Terminalia kaernbachij*; fam. Combretaceae)

**"Okari"** is a large tree with characteristic horizontal branches. It produces a nut up to 12cm long and 8cm wide. The kernel weighs up to 10g. It is grown from sea level to 1100m, and is especially common on the south coast of New Guinea. Self-sown trees are preserved when gardens are made in the forest and are planted in villages. It was probably domesticated in Papua New Guinea. The nuts have a very good flavour and are much sought after. The flavour is improved by light roasting with salt. Henty (in press) suggested that the nuts certainly could be sold overseas, but at present production is barely sufficient for local needs.

**"Galip"** (*Canarium indicum*; fam. Burseraceae)

**"Galip"** is a tree that grows up to 40m tall. Nuts are up to 6cm long, 2cm across and have a kernel weight of about 3g (Henty, in press). It is only grown at low elevations. The species is native to an area extending from the Moluccas to the New Hebrides (Henty, in press). The nuts are of good quality and are very popular. As with **"okari"**, **"galip"** nut could be exported and should be cultivated much more widely overseas.

***Castanopsis*** (*Castanopsis acuminatissima*; fam. Fagaceae)

*Castanopsis* is a tree that grows to 35m tall. The nut is small and the kernel weighs less than 0.5g. It occurs from India to China through Melesia to New Britain (Henty, in press). It

occurs in natural stands in Papua new Guinea usually between 1100m and 2300m. The nut is not of especially good flavour and it is too small for convenient consumption, although people do eat them. Domesticated pigs eat the nuts in large quantities.

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**APPENDIX. Some possible food crop projects for schools.**

1. Grow as many traditional food crops as possible in the school gardens. Select ones that grow well in the area. After growing the crop the students and teachers should cook and eat it. As well as teaching students about the crops, this may serve to show that Papua New Guinea's traditional food crops are to be valued and not to be scorned by educated people.

2. Visit some nearby village gardens. Identify the scientific name of as many of the crops as possible. Send any unknown crops to the Division of Botany in Lae to obtain the correct scientific and common name for them.

Find out how many types of gardens there are at the village. Are some gardens managed differently with different crop species and fallow types or is there only the one type of garden?

3. Do a survey of a local market. Count the number of bundles on sale of all of the produce in the market. Send off specimens of any unidentified crop to the Division of Botany in Lae to obtain the correct scientific name.

If the survey is done several times during the course of a year, it will give an indication of the seasonality of some of the crops.

4. In this article the usual altitudinal limits for the crops are given. Work out the altitude of the school from the 1:100,000 topographic maps. From this you can work out which crops you would expect to find growing in local food gardens. Visit the gardens to see if you can find these crops. Are there crops growing outside of the altitudinal limits given in the paper?