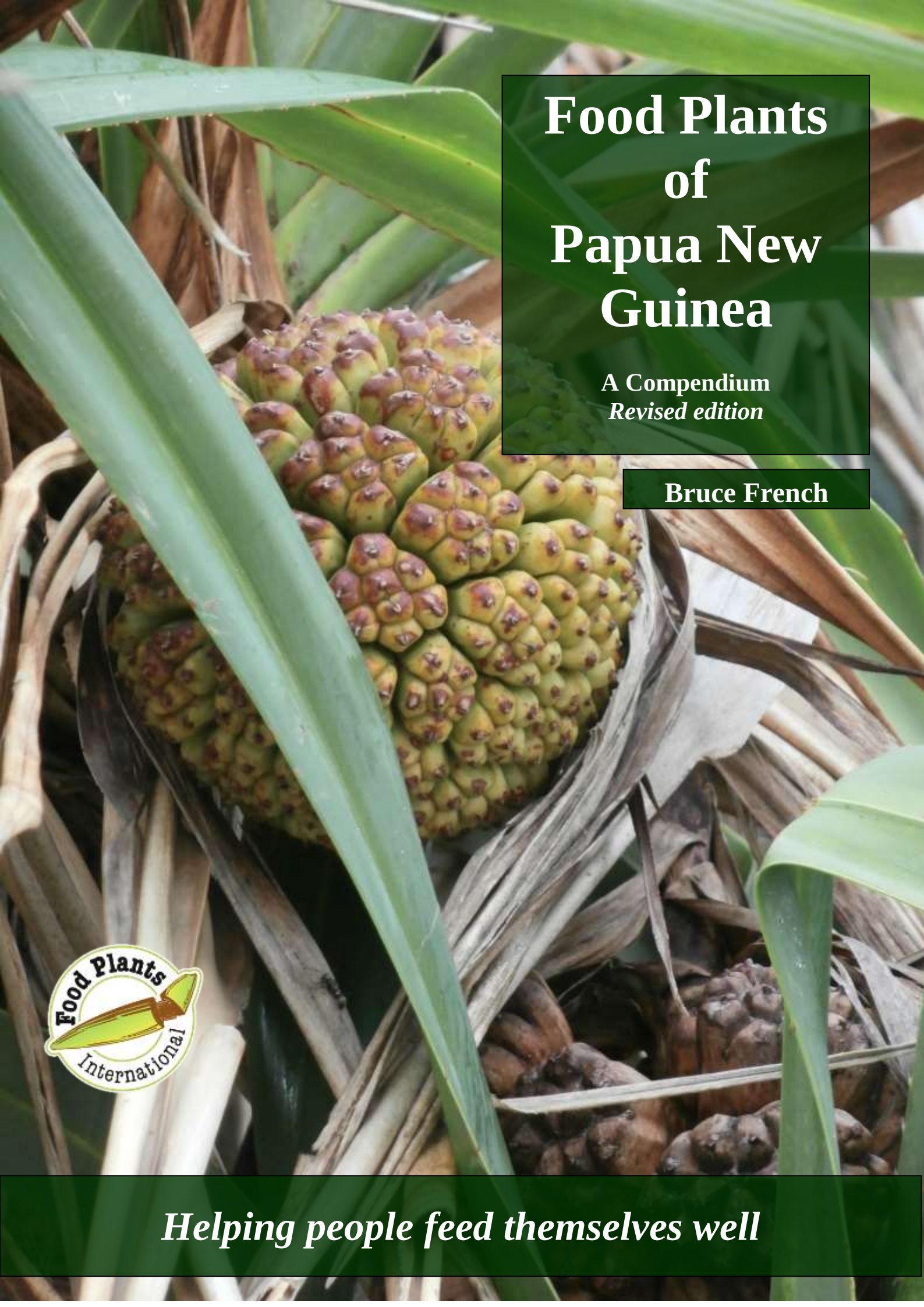

Food Plants of Papua New Guinea

A Compendium
Revised edition

Bruce French

Food Plants International

Helping people feed themselves well

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Food Plants International Inc

Bruce R French 2006

Dedication

This book is dedicated to our Creator
for the amazing provision and fascinating variety
of food plants that he has provided.

It is also dedicated to
the 3 billion
hardworking farmers and families around the world
who cultivate these or other food plants
for their own subsistence
and who help conserve them in their rich diversity
for other people to enjoy.

Publication
This edition of
Food Plants of Papua New Guinea
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This second edition of this book has been compiled
with the support and assistance of
my Christian and supportive friends.

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Using this information
and
finding other information

It remains the author's desire
that the information in this revised edition of this book
be used or copied wherever appropriate
to increase interest in, knowledge of, and pride in
food production in the tropics,
especially Papua New Guinea.

There are another 600 minor edible plants in Papua New Guinea that are not included in this book. For information about them you will need to look at the FPI Food Plants of Papua New Guinea **database**. This database also lists all the alternate scientific names and many other local language names and has coloured photographs and references for where to find other information. For the other thousands of edible plants, many of which are suitable for the tropics, including Papua New Guinea, you will need to look in the FPI Edible Plants of the World database. (FPI is an abbreviation for Food Plants International).

If you want additional information of the insects and diseases mentioned in this book you will need to look at the books, ***Insect Pests of Food Plants of Papua New Guinea*** **and** ***Diseases of Food Plants of Papua New Guinea*****.** These are available as pdf books which can be read on computer. (Or printed out). These will explain how to find out about the insect or disease you want. The Insect Pests of Food Plants of Papua New Guinea **database** has coloured photos.

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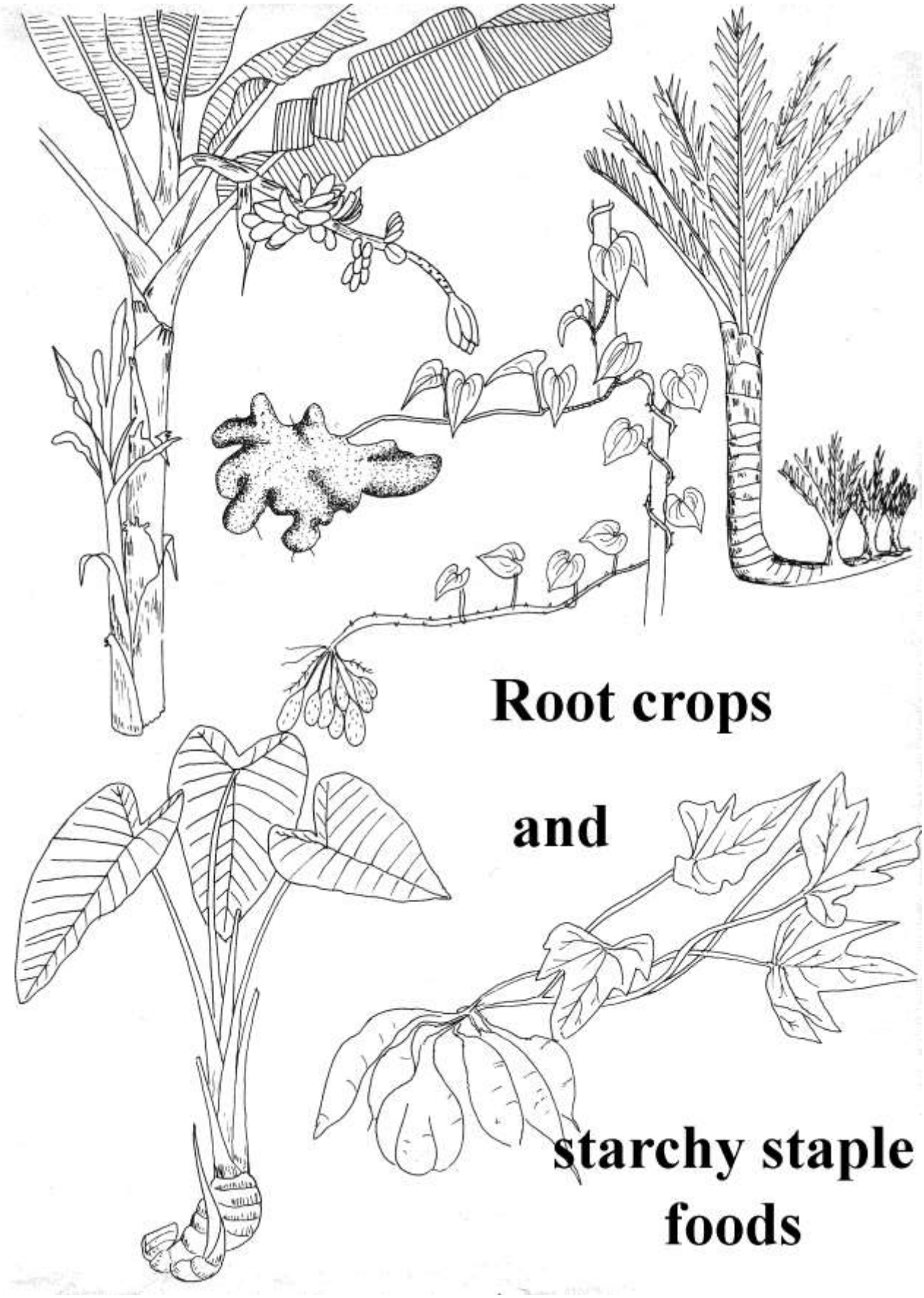
Root crops
and
starchy staple
foods

Root and tuber crops and starchy staple foods

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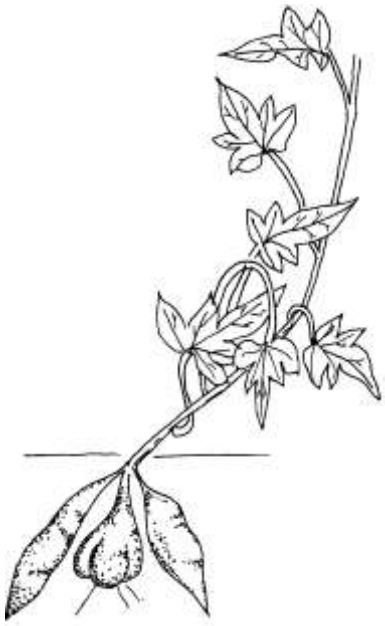
Names

English: Sweet potato
Tok pisin: Kaukau
Tok ples:

Scientific name: *Ipomoea batatas* (Linnaeus) Lam.
Synonyms:
Plant family: Convolvulaceae

Description: This is a root crop that produces long creeping vines. The leaves are carried singly along the vine. Leaves can vary considerably from divided like fingers on a hand to being entire and rounded or heart shaped. At the end of the vine, trumpet shaped flowers grow. They are purple. Under the ground fattened tubers are produced. There are a large number of varieties that vary in leaf shape and colour, tuber shape, colour, texture and in several other ways.



Distribution: They grow in the tropics and subtropics. They grow from sea level up to some of the highest gardens at about 2700 m altitude in the tropics. Plants can grow with a wide range of rainfall patterns and in different soils. Plants are killed by frost and can't stand water-logged soils. Sweet potato cannot tolerate shade. It suits hardiness zones 9-12.

Cultivation: Vine cuttings are used for planting. In grassland soils it is grown in mounds, ridges or other raised beds. In bush fallow, it is mostly planted in undug loose soils. It needs a sunny position. Tubers won't form if the ground is waterlogged when tubers start to develop. Sweet potato is grown using cuttings of the vine. About 33,000 cuttings are required per hectare. These weigh about 500 kg. Vine lengths of about 30 cm are optimum. As long as the vine is adequately inserted in the soil, the length of vine inserted does not significantly affect yield. Fresh sweet potato seeds germinate relatively easily and lead to continuous production of new cultivars under tropical conditions. Excess nitrogen restricts storage root initiation and therefore excess leaves are produced without significant tuber yield. Dry matter percentage increases with increasing age of the crop. Higher dry matter tubers are normally preferred.

Production: Sweet potato tends to be responsive to potassium fertiliser. Cultivars are often selected for yield under low fertility conditions. Under lowland conditions in the tropics sweet potato tubers undergo active tuber enlargement from 6 to 16 weeks. Weed control is essential especially during early stages of growth. The rate of ground coverage by foliage varies greatly with growing conditions and cultivar but once ground coverage has occurred weed control is less of a problem. Sweet potato tuber initiation is subject to aeration in the soil. Either heavy clay soils, waterlogged conditions or other factors reducing aeration can result in poor tuber production. For this reason sweet potatoes are often grown on mounded beds. The time to maturity ranges from 5 months to 12 months depending on the variety planted and the altitude at which it is being grown. Yields range from 6-23 t/ha.

Use: The tubers and leaves are edible cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	86.3	168	3.9		2.9	1700	58	
Tubers	72.0	363	1.1			1705	15	0.3

Insects:

Achaea janata (Linnaeus)	Noctuidae (LEP)	Cacao false looper
Agrius convolvuli (L.)	Sphingidae (LEP)	Sweet potato hornworm
Aphis sacchari Zehntner	Aphididae (HEM)	Sugarcane aphid
Apirocalus cornutus (Pascoe)	Curculionidae (COL)	Horned weevil
Argina cribraria (Clerck)	Arctiidae (LEP.)	
Atractomorpha crenaticeps Blanch	Acrididae (ORTH)	
Aulacophora spp.	Chrysomelidae (COL)	Pumpkin beetles
Bedellia somnulentella (Zeller)	Lyonetiidae (LEP)	Sweet potato leaf miner
Bemisia tabaci (Guen.)	Aleyrodidae (HEM)	Tobacco whitefly
Cylas formicarius elegantulus (Summers)	Curculionidae (COL)	Sweet potato weevil
Ectropis sabulosa Warr.	Geometridae (LEP)	Cacao looper
Epilachna signatipennis Boisd.	Coccinellidae (COL.)	Leaf eating beetle
Halticus tibialis Reut	Miridae (HEM)	Grass bug
Helopeltis clavifer (Walker)	Coreidae (HEM)	Cacao mired
Hippotion celerio (L.)	Sphingidae (LEP)	Taro hawkmoth
Omphisa spp.	Pyralidae (COL.)	Sweet potato stem borer
Phaneroptera brevis Serv	Tettigoniidae (ORTH)	
Solephyma papuana	Galerucidae (COL.)	
Tiracola plagiata Walk	Noctuidae (LEP)	Cacao armyworm

Diseases:

Leaf spot	Fungus	*Ascochyta convolvuli*
Collar rot	Fungus	*Athelia rolfsii*
Leaf spot	Fungus	*Cercospora bataticola*
Black rot	Fungus	*Ceratocystis fimbriata* Ell. & Hallst.
Leaf spot	Fungus	*Didymella sp.*
Scab	Fungus	*Elsinoe batatas* Jenkins & Viegas
Scurf	Fungus	*Moniliochaetes infuscans*
Leaf spot	Fungus	*Phoma sorghina*
Stems with internalbrowning	Fungus	*Phomopsis ipomoea-batatas*
Leaf spot	Fungus	*Phyllosticta sp.*
Leaf spot	Fungus	*Pseudocercospora timorensis* Cooke
Soft rot	Fungus	*Rhizopus stolonifer* (Fr.) Lind.
Tuber rot	Fungus	*Botrydiplodia theobromae*
	Bacteria	*Erwinia sp.*
	Bacteria	*Erwinia chrysanthemi*
	Fungus	*Fusarium sp.*
Fusarium wilt/ tuber rot	Fungus	*Fusarium oxysporium* Schlecht. ex Fries
Storage rot	Fungus	*Aspergillus sp*
	And	*Choanephora sp.*
	And	*Mucor sp.*
Blue mould rot	Fungus	*Penicillium sp.*
Charcoal rot	Fungus	*Macrophomina phaseolina*
Little leaf & vein clearing	Mycoplasma like organism	
Potyvirus leaf curling	Virus	

Pests:
Rats often eat sweet potato in the gardens.

Importance:
This is the most important food plant in Papua New Guinea. It is particularly important in highland grassland areas.

Names

English:
Tok pisin:
Tok ples: Fongaar

Scientific name: *Ipomoea macrantha* Roemer & Schultes
Synonyms: *Ipomoea tuba* (Schlechtend.) G. Don
Plant family: Convolvulaceae



Description: A tuberous rooted vine with large round leaves. It is a vigorous climber reaching 4-5 m high. The vine is irregular in cross section. The leaves are large and rounded. They are 9-15 cm across. The leaf stalk is 6-12 cm long. The flowers can occur as one or several together. The sepals become large and fleshy in the fruit. The capsule is a large dry one with a fleshy lid and has 4 or less black seeds inside. The seeds are 8 mm long by 12 mm wide.

Distribution: It occurs at low altitudes probably up to 1300 m. It is a plant of the drier open woodland areas. It grows naturally near the beach.

Cultivation: Plants are grown from top pieces of the fleshy root. They need a trellis or tree for the long vines to climb over. The tubers are harvested when the leaves die back.

Production: The tuber is reported to be able to be stored.

Use: The fleshy roots are cooked and eaten like a yam.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tuber								

Insects:

Diseases:
Leaf spot probably due to a fungus

Pests:

Importance:
In Papua New Guinea it is a moderately important root crop grown in yam gardens in the Morehead area.

Names

English: Taro
Tok pisin: Taro tru
Tok ples:

Scientific name: *Colocasia esculenta* (L.) Schott
Synonyms: *Colocasia antiquorum* Schott
Plant family: Araceae

Description: This plant has large flat leaves on the end of upright leaf stalks. It grows up to 1 m high. The leaf stalk or petiole joins the leaf towards the centre of the leaf. The leaves are 20-50 cm long. Near the ground a thickened rounded corm is produced. Around this plant there is normally a ring of small plants called suckers. Many different varieties occur. If left to maturity, a lily type flower is produced in the centre of the plant. It has a spathe 15-30 cm long that is rolled inwards. The flowers are yellow and fused along the stalk.



Distribution: Taro grows from sea level up to about 2300 m altitude in the tropics. It grows well in humid places. It can stand damp soil and grow under light shade. It suits hardiness zones 9-12.

Cultivation: Taro can be planted from cormels or from the top of the central corm. Other sections of the corm could also be used but this is not commonly done. They are normally put into a hole and allowed to grow upwards. Plants are put into a hole 5-7 cm deep or deeper. Setts of about 150 g are optimum. Taro can be grown under flooded conditions but root rots develop if the water becomes stagnant. Taro is sensitive to weed competition throughout most of its growth, but it is more critical during early growth up to 3 - 4 months. About 7-9 weedings are required, to keep the crop clean under tropical lowland conditions, where flooding is not used. A spacing of 60 cm x 60 cm is common.

Production: The general growth pattern is for an increase in top growth, in terms of leaf number, leaf area and petiole length, to continue for about 6 months under tropical lowland conditions then for each of these to decrease and tuber storage to continue to increase. Corm weight increases significantly from 5 to 11 months. Starch content also increases with time but protein content declines over the corm development period. Crops mature in 6-18 months. Yields of 5-15 tonnes per hectare are probably average.

Use: The corm, leaves, and stalks are cooked and eaten.
Caution: Some varieties burn the throat due to oxalate crystals.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Corms	66.8	1231	1.96		0.68	3	5	3.2
Leaves	92.2	100	2.7		1.2	424	35.5	0.2

Insects:

Acrocercops sp.	Gracillariidae (LEP)	Aibika leaf miner
Agrius convolvuli L.	Sphingidae (LEP)	Sweet potato hawkmoth
Aphis gossypii Glover	Aphididae (HEM)	Melon aphid
Astacops flavicollis Walk.	Lygaeidae (HEM.)	
Astacops villicollis (Stal.)	Lygaeidae (HEM.)	
Bemisia tabaci (Guen.)	Aleyrodidae (HEM)	Tobacco whitefly
Dermolepida nigrum (Non f.)	Scarabaeidae (COL)	Dermolepida beetles

Dermolepida noxium Britton	Scarabaeidae (COL)	Dermolepida beetles
Ectropis sabulosa Warr.	Geometridae (LEP)	Cacao looper
Gesonula mundata sanguinolenta Kraus	Acridiidae (ORTH.)	
Heliothis armiger Huebner	Noctuidae (LEP)	Corn earworm
Hippotion celerio (L.)	Sphingidae (LEP)	Taro hawkmoth
Oribius cinereus Mshl.	Curculionidae (COL)	Shot hole weevils
Oribius cruciatus Fst.	Curculionidae (COL)	Shot hole weevils
Oribius destructor Mshl.	Curculionidae (COL)	Shot hole weevils
Oribius inimicus Mshl	Curculionidae (COL)	Shot hole weevils
Papuana biroi End.	Scarabaeidae (COL)	Taro beetles
Papuana huebneri Fairm.	Scarabaeidae (COL)	Taro beetles
Papuana japenensis Arrow	Scarabaeidae (COL)	Taro beetles
Papuana laevipennis	Scarabaeidae (COL)	Taro beetles
Papuana semistriata	Scarabaeidae (COL)	Taro beetles
Papuana trinodosa Prell.	Scarabaeidae (COL)	Taro beetles
Papuana woodlarkiana (Montr.)	Scarabaeidae (COL)	Taro beetles
Pentalonia nigronervosa Coq	Aphididae (HEM)	Banana aphid
Spodoptera litura (Fab)	Noctuidae (LEP)	Cluster caterpillar
Tarophagus colocasiae	Delphacidae (HEM)	Taro leafhopper
Tarophagus persephone	Delphacidae (HEM)	Taro leafhopper
Tarophagus proserpina (Kirk)	Delphacidae (HEM)	Taro leafhopper
Tiracola plagiata Walk	Noctuidae (LEP)	Cacao armyworm

Diseases:

Leaf spot	Fungus	*Cercospora sp.*
Blossom blight	Fungus	*Choanephora cucurbitarum* (Berk. & Rav.) Th.
Brown leaf spot	Fungus	*Cladosporium colocasiae* Sawada
Leaf spot	Fungus	*Colletotrichum sp.*
Mitimiti disease ?		*Hirschmanniella miticausa*
Leaf spot	Fungus	*Leptosphaerulina trifolii*
Leaf spot	Fungus	*Neojohnstonia colocasiae*
Shot hole	Fungus	*Phyllosticta colocassicola*
Blight	Fungus	*Phytophthora colocasiae* Racib
Diffuse yellow leaf spot	Fungus	*Scolecobasidium sp.*
Leaf blight	Fungus	*Thanatephorus cucumeri*
Root rot	Fungus	*Pythium spp.*
Mosaic	Virus	Dasheen mosaic virus
Dwarfed wrinkled plants	Viruses	Alomae & Bobone viruses
Root rot	Fungus	*Fusarium solani*
	and	*Periconia sp.*
Root knot	Nematode	*Meloidogyne sp.*
With corm rot	Fungus	*Botrydiplodia theobromae*
	And	*Chaetophoma sp*
	And	*Rhizoctonia sp.*
	and	*Athelia rolfsii*
Corm and stem rot	Bacteria	*Erwinia carotovora* subsp. *carotovora*
Bacterial leaf blight	Bacteria	*Xanthomonas campestris* pv. *aracearum*

Pests:

Importance:
It has been a very important food plant in Papua New Guinea. In some areas it is still important but in other areas it has declined because of insect and disease problems.

Names

English: Chinese taro
Tok pisin: Taro kongkong, Singapo
Tok ples:

Scientific name: *Xanthosoma sagittifolium* (L.) Schott
Synonyms:
Plant family: Araceae

Description: A herb up to 2 m tall. It has a short stem. At the top of the stem it produces large leaves. A corm is produced at the base of the plant. It produces about 10 cormels on the underground corm. These are about 15-25 cm long and flask shaped. They get wider towards the tip. Leaves are large and the stalk joins to the edge of the leaf. The leaves stand erect on stout petioles. There is a vein around the edge of the leaf. The leaf stalks can be 1 m long. The leaf blade is oval and 50-75 cm long. The leaf has triangular lobes at the bottom. The flower is produced below the leaves. The large bract around the flower is pale green and about 20 cm long. The base of this bract overlaps. The closely arranged spike of flowers is about 15 cm long. The smaller female section is at the bottom and the male section is larger and towards the top.



Distribution: It suits tropical rainforest regions. It can stand high rainfall. It can tolerate light shade. It grows from sea level up to about 2000 m. Soils need to be well drained but should be moist.

Cultivation: Xanthosoma taro is normally planted by using the top piece of the main central corm or stem. Pieces weighing 1.5 kg are often used. It can also be grown by using the small side corms that may weigh 0.3 kg; or pieces of the corm can be used as long as they have some buds on them. These are often presprouted before planting. To multiply large amounts of planting material and still achieve acceptable yields, the latter method of using sections of the main corm works well. In crop growth, an axillary bud is produced in the axil of each leaf but only some of these develop into cormels. Often 10 or more cormels develop per plant into cormels 15-25 cm long.

Production: The crop duration is about 9 months although crops are often left for 12 months before harvesting. Plants are often planted to make the maximum benefit of natural rainfall. They can be planted at any time of the year but in dry areas the middle of the dry season should be avoided. Plants are spaced at varying distances but there is often about 0.9m x 1.5m between plants. If soils are hard and compact, yields are low. The water table needs to be 45 cm below the soil surface. It can grow in light shade and in poorer soils.

Use: The small side corms are eaten roasted or boiled.
Young leaves can be eaten after cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Corms	67.1	559	1.6		0.4	5	13.6	0.5
Leaves	90.6	143	2.5		2.0	3300	37	

Main corms are often fed to pigs.

Insects:

Aspidiotus destructor Signoret	Diaspididae (HEM)	Coconut scale
Chrysomphalus dictyospermi (Morgan)	Diaspididae (HEM)	Armoured scale
Hemiberlesia palmae (Cockerell)	Diaspididae (HEM)	Armoured scale
Icerya seychellarum (Westwood)	Margarodidae (HEM)	Soft scales
Papuana spp.	Scarabaeidae (COL)	Taro beetles
Planococcus dioscoreae Williams	Pseudococcidae (HEM)	Tam mealy bug
Planococcus pacificus Cox	Pseudococcidae (HEM)	Mealy bug
Pseudococcus longispinus (Targioni)	Pseudococcidae (HEM)	Longtailed mealybug

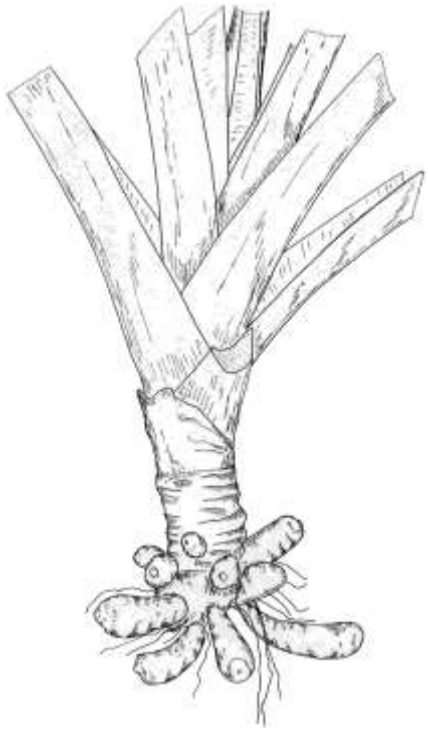
Diseases:

Root rot	Fungi	*Phytophthora citricola*
	and	*Phytophthora nicotianae*
	and	*Pythium arrhenomanes*
	and	*Pythium vexans*
	and	*Rhizoctonia solani*
	Nematodes	? *Aphelenchoides sp.*
	and	? *Bursaphalenchus sp.*
Leaf spot	Fungus	*Glomerella cingulata*
Leaf wrinkle	Virus	Bobone
Leaf speckle	Virus	Dasheen mosaic

Pests:

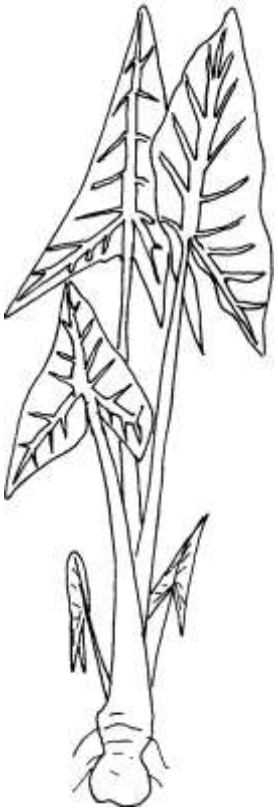
Importance:

It is of considerable importance in many coastal and mid altitude areas of Papua New Guinea especially in wetter areas. A major root crop in the humid tropics.



Names

English: Swamp taro
Tok pisin:
Tok ples:
Scientific name: *Cyrtosperma merkusii* (Hassk.) Schott.
Synonyms: *Cyrtosperma chamissonis* (Schott) Merr.
Plant family: Araceae



Description: A large perennial taro family plant up to 2-3 m high, with the pointy ends to the leaf lobes. The leaves are very large, upright and with points on the bottom lobes. The leaf stalks are up to 2.5 m long and 10 cm across. The leaves are 1.5 m long. Other aspects of the plant can vary such as kinds that are more spiny on the leaf stalks than others. The plants can grow up to 4 metres tall. Under the ground there is a large fattened rhizome or corm. This is shaped liked a cylinder and can be up to 70 kg in size. The plant produces a large purple lily type flower that then produces a group of seeds that are orange in colour. The plant produces suckers. The number of suckers varies with varieties

Distribution: It is a tropical plant and grows from 18°N to 20°S. It grows in fresh or brackish swamps up to 150 m altitude. Water 0.6-0.9 m deep and rich in humus is the environment used. It can stand shade. It can withstand flooding. It occurs in Papua New Guinea, the Solomons and the Philippines as well as in other countries. In Papua New Guinea it becomes important in Bougainville. It grows in fresh or brackish swamps up to 150 m altitude. It occurs on atoll islands.

Cultivation: Plants are normally put in swamps or ditches. Parts of the main corm, or suckers can be used for planting. It can be intercropped with Colocasia taro. A spacing of 1.2 x 1.2 m is suitable. It normally receives little management. It is known to respond to organic matter.

Production: Yields of 10-15 tons/year/ha have been recorded. It takes 2-6 years to mature. Tubers become more fibrous with time so that 2 years is a suitable harvesting time. Individual corms can weigh 2-50 kg.

Use: The corms are peeled and boiled or roasted. They are also used to make flour.
Leaves and young flowers can be eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Corm	72.4	343	1.1		1.3	5	15.7	0.11
Leaves								

Insects:

Diseases:

Pests:

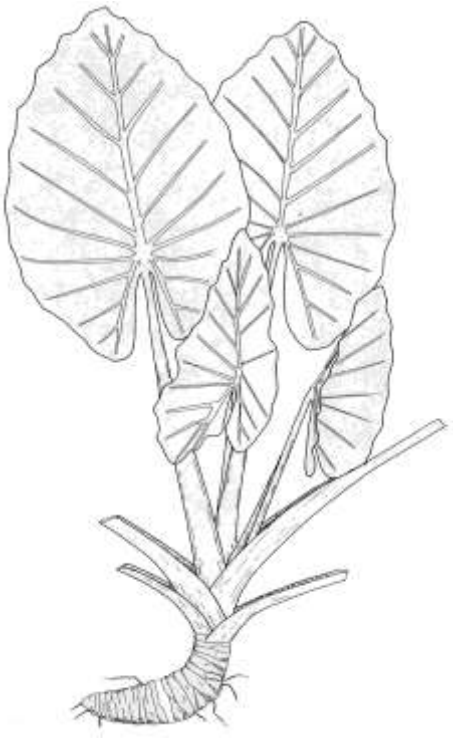
Importance: This taro is seen in some coastal areas of Papua New Guinea but only becomes important in some of the coral atoll islands. It is a major crop in Atoll Islands in the Pacific.

Names

English: Giant taro
Tok pisin:
Tok ples:

Scientific name: *Alocasia macrorrhiza* (L.) Schott
Synonyms: *Alocasia indica* (Lour.) Spach
Plant family: Araceae

Description: A very large herb. A taro family plant. It has a stout erect trunk up to 4 m tall. This has upright leaves which are arrow shaped. Leaves have round lobes at the bottom. The leaves are leathery and are often wavy around the edge. The secondary veins are not prominent. The leaf blade can be 1-1.2 m long. The leafy structure around the flower is yellow in the upper section. It forms a hood and drops off as the flower opens. The fruit are bright red berries. The corm is large, often curved and above the ground. It often has small cormels at the side. Brown trailing fibres of the leaf bases often hang from the stem. The leaves and petioles contain stinging crystals



Distribution: It is widely distributed in open wetlands and along streams and in some types of humid forest. The plant grows wild from sea level up to 2600 m altitude in the tropics. Giant taro is a tropical plant and will not grow well below 10°C. It requires a well distributed rainfall and does not tolerate drought. Even though it grows along creek banks it cannot tolerate waterlogged soil. It is only used as food in a few coastal areas. Wild forms commonly seen growing are bitter and not used. It suits hardiness zones 11-12.

Cultivation: The top of the main corm is planted. The small round cormels can be planted, but are slow to mature. A spacing of 1.2 x 1.2 m is suitable. Because the giant taro takes more than a year to be ready to harvest, it often ends up left growing in an old garden site without much care or weeding, until the owner wants to harvest it.

Production: Corms of 8.5 to 40 kg have been harvested from individual plants of unknown age. The time to maturity is about 12 months but plants are often left for 2-3 years.

Use: The stems and corms are eaten after roasting or boiling.
The main corm is cooked and eaten after being carefully peeled.
The young leaves are edible.

Caution: The mouth can be irritated by chewing improperly cooked plant parts due to chemicals called oxalates.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Corm	84.0	256	0.6		1.0	0	5	1.5
Leaves								

Insects:

Aspidiella sacchari (Cockerell)	Diaspididae	Armoured scale
Chaetanaphothrips orchidii F.	Thripidae (THYS)	Banana rust thrips
Dysmicoccus nesophilus Williams	Pseudococcidae (HEM)	
Eucalymnatus tessellatus (Signoret)	Coccidae (HEM)	
Icerya seychellarum (Westwood)	Margarodidae (HEM)	
Lepidosaphes gloverii (Packard)	Diaspididae (HEM)	
Papuana spp.	Scarabaeidae (COL)	Taro beetles
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Pseudococcus longispinus (Targioni)	Pseudococcidae (HEM)	Long tailed mealybug
Pulvinaria ubicola (Cockerell)	Coccidae (HEM)	

Diseases:

Leaf spot	Fungus	*Mycosphaerella alocasiae* Sydow
Rust	Fungus	*Uredo alocasiae* P. Henn
Collar rot	Fungus	*Athelia rolfsii*
Yellow spot	Alga	*Phyllosiphon sp.*

Pests:

Importance:
This taro is of local importance only in some coastal areas and islands of Papua New Guinea e.g. Rabaul, Namatanai. It is important in several Pacific Islands.

Names

English: Elephant foot yam

Scientific name: *Amorphophallus paeonifolius* var. *campanulatus* (Decne.) Sivadasan

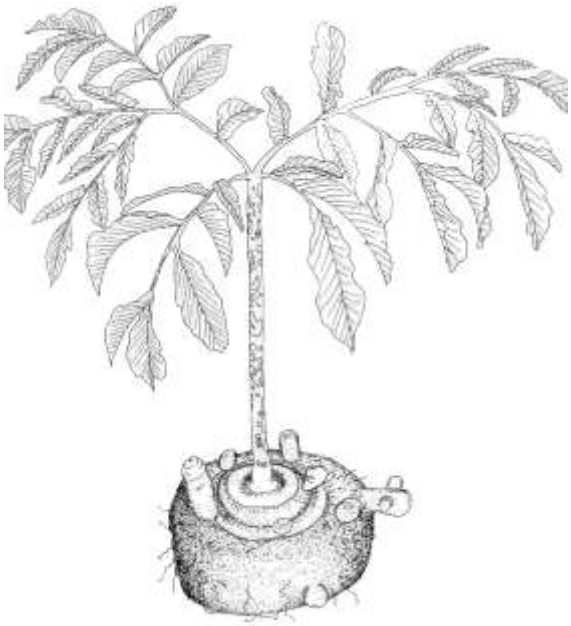
Tok pisin:

Synonyms: *Amorphophallus campanulatus* (Decne);

Tok ples:

Plant family: Araceae

Description: A taro family plant but with a very divided leaf. It grows to 0.75-1 m high. It is a herbaceous plant with rough and mottled leaf stalks. It has a straight stem and the leaf is divided into leaflets. The leaves can be 1 m in width. The leaves usually come singly from the ground. The leaf blades are divided into many lobes. The leaflets can be 3-35 cm long and 2-13 cm wide. The flower stalk can be 3-20 cm long. The bract around the flower is bell shaped and fluted. It can be 60 cm across. The edge is curved back and wavy. The flower is dull purple and up to 30 cm across. It can be 70 cm long. The flower gives of a bad smell like rotting meat and this attracts flies. The flower only develops after the leaves have died off. The leaves and corms especially in the wild varieties contain many stinging crystals. Edible kinds have a smooth petiole. It has a large round tuber up to 25 cm across. The large round underground corm produces small corms around the side. These can be 10 cm long. These are usually used for planting.



Distribution: It occurs mainly in seasonally dry areas and grassland up to 800 m altitude in equatorial zones. It requires an average temperature of 25-35°C and rainfall of 1000-1500 mm during the growing season. Soils need to be well drained as it cannot stand waterlogging. It occurs widely around the Philippines in low altitude places especially where people have cleared the forest. It is common in Indonesia and Vietnam.

Cultivation: The cormels are planted. Seeds will grow but flowers need hand pollination. Small corms from around the side are the normal part planted. If a very small corm is planted, the plant may need to grow for several seasons to produce a large yield. Setts or small cormels of 200 g are suitable for use planted at 30 cm x 30 cm spacing and produce seed corms of about 500 g. Larger corms take 3-4 years to produce. This is achieved by digging up corms and replanting next season. Each crop takes about 8 months to mature. Corms are planted 15 cm deep. Spacing is increased between plants in successive years of growth. After harvest, the corm needs to be kept for a few months before it is ready to produce a new shoot and regrow.

Production: The stalk dies back when the plant is mature. The corm will keep for several months. An individual corm can finally weigh 8 kg. When it is planted a single leaf stalk is produced and the irregular shaped leaf is produced at the top of the stalk. Eventually the corm under the ground increases in size then the leaf dies back. The corm could be harvested and stored, or eaten at this stage. If it is just left, a very large flower is produced. This type of growth pattern where vegetative growth is followed by a storage organ that becomes dormant, is the type of growth that suits areas with a distinct wet and dry season. It has the advantage that the corm will store well after harvest and can be eaten in the dry season when food is short.

Use: The corm is cooked and eaten.
The leaves are edible.
The young petioles or leaf stalks are eaten cooked.

Food Value: Per 100 g edible portion

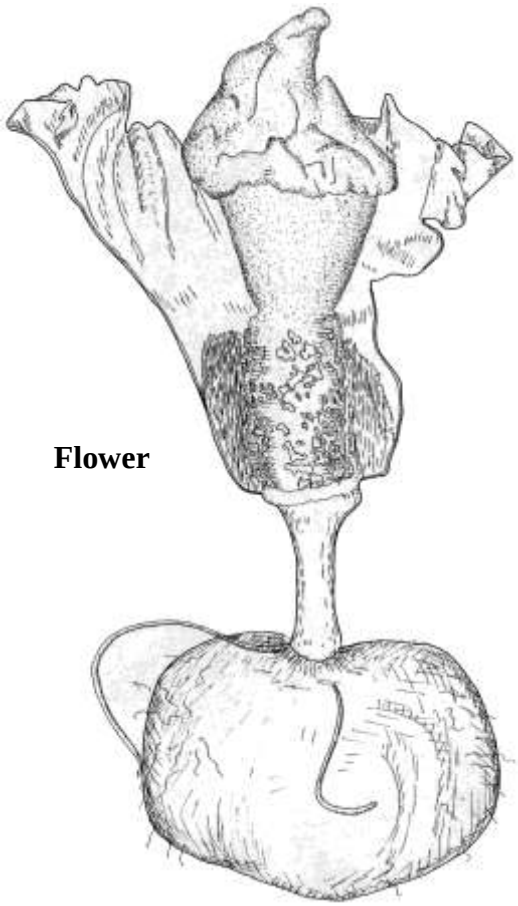
Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Corm	78.0	340	2.0		2.4	0	6	1.1
Stalks								

Insects:

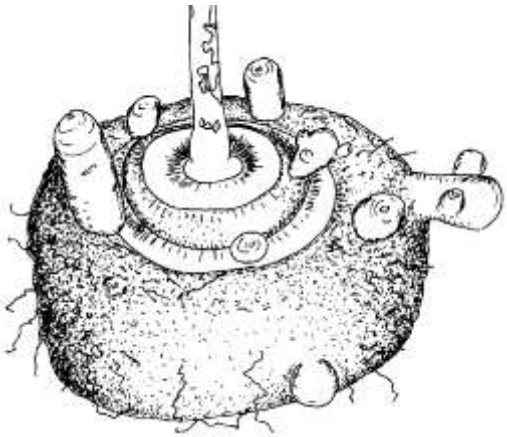
Diseases:

Pests:

Importance: In Papua New Guinea this plant is only grown and used by people in a few locations. It is more important in some other countries such as Indonesia, Vietnam and India.



Flower

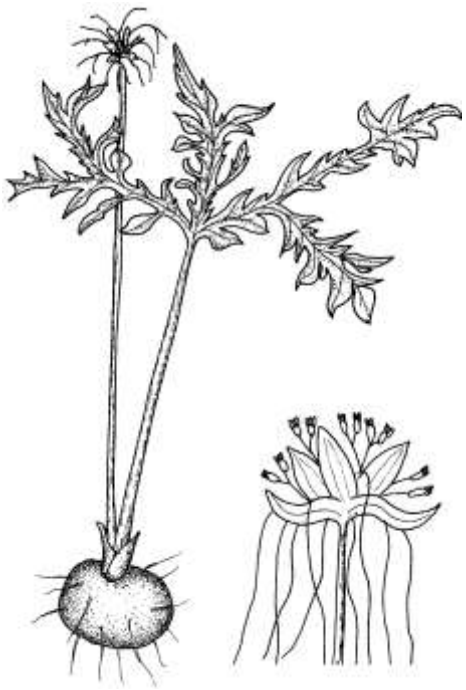


Names

English: Polynesian arrowroot
Tok pisin:
Tok ples:

Scientific name: *Tacca leontopetaloides* (L.) O.Kuntze
Synonyms: *Tacca pinnatifida* J. R. Forst. & G. Forst.
Plant family: Taccaceae

Description: A perennial herb with no stem but leaves up to 1 metre long and divided into 3 segments. The leaf stalks are 1.5 to 2 cm across and about 1 m long. The leaves are 1 to 1.5 m across and divided into 3 parts that are again divided. A single flower stem grows up beside the leaf stem. The flowers are green and purplish on top of a 1 m long flower stalk. There can be 30-40 small flowers and several long spreading and drooping coloured bracts or long thin threads hang from the flower. The leaf and flower stalks are hollow and ribbed which helps distinguish it from the somewhat similar looking leaf of elephant foot yam (where it is smooth and solid). The fruits are yellowish green, long shaped and with 6 raised lines along the side. They can be 4 cm long and 2 cm wide and have several seeds inside. Under the ground there is a round swollen root or tuber. It can be 30 cm across and weigh 1kg. Some varieties produce several smaller tubers.



Distribution: It grows on the coast in the equatorial tropics and up to 200 m altitude and is mostly seen on sandy beaches, under coconuts and in grassland. It suits drier areas. It is grown on some of the coral atoll islands. It needs a neutral to acid pH. It needs fertile, humus-rich, well-drained soil. It can grow in light shade. This is a crop mainly grown in tropical Asia and Polynesia. It is also grown in East Africa. They occur throughout the Philippines near the seashores. It suits hardiness zones 10-12

Cultivation: Plants are grown from division of the small tubers. A spacing 0.6 x 0.6 m is suitable. Polynesian arrowroot is a plant that grows during the wet season and dies during the dry season. When the leaves turn yellow and the plant dies back, the tubers are harvested. Small tubers are kept for replanting. Often plants just regrow naturally from these small tubers that are left in the ground after harvesting. The plant takes between 8 and 10 months to reach maturity. Plants can be grown from seed. The small tubers produced from seeds are then replanted or left to grow for another year.

Production: Plants take 8-10 months to maturity. The tubers are scraped and mashed in cold water for 4-5 days. It is then prepared like sago. A tuber can weigh 1 kg.

Use: The starchy tuber is eaten. The tubers are scraped and mashed in cold water for 4-5 days. It is then prepared like sago. That is, normally the tuber is scraped into small shreds and then washed in water. The starch is filtered out and allowed to settle. The starch is washed several times to get rid of bitterness that is common with this plant. To get clean white starch, the tuber needs to be carefully peeled.
The starch can be hung in a cloth to allow the water to drain and then it can be sun dried. Once dry, the fine powdered arrowroot starch will store well in a sealed jar. The arrowroot starch is tasteless. The leaves have been recorded as eaten in Africa. The yellow fruit is also eaten by children in some places. The seeds are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tuber	71.3	512	2.3		1.4		47	0.8
Seeds	85.1		2.3					

Insects:

Icerya seychellarum (Westwood)	Margarodidae (HEM)	Soft scale

Diseases:

Leaf spot	Fungus	*Cercospora taccae* (Sydow) Chupp

Pests:

Importance:
A minor root crop in Papua New Guinea. Of local importance in islands off North Solomons and in Milne Bay Province.

Names

English: Greater yam
Tok pisin: Yam tru
Tok ples:

Scientific name: *Dioscorea alata* L.
Synonyms:
Plant family: Dioscoreaceae



Description: A long angular vine. The stems are square and twine to the right around support sticks. The stem does not have spines. It is often coloured green or purple. The leaves are heart shaped and borne in pairs along the vine. The leaves vary is shape, size and colour with different varieties. Leaves can be 10-30 cm long by 5-20 cm wide. The leaf stalk is 6-12 cm long. The flowers occur in the axils of the upper leaves. The male flowers are in small heads along branched stalks. These can be 25 cm long and green. The female flowers are in shorter spikes. Many cultivated varieties do not produce fertile seed. The fruit are 3-winged and 2.5 cm long by 3.5 cm wide. The seeds when they occur have wings right around them. One large but often irregular shaped tuber occurs under the ground. A very large number of different varieties occur. The tubers can vary in shape, size, colour, texture and other ways. Some varieties produce bulbils along the vine.

Distribution: It grows from sea level up to about 1800 m in the tropics. Yams are most important in seasonally dry areas. They need a well-drained soil and it has to have reasonable fertility. The temperature maximum is >30°C while the minimum is 20°C. The optimum temperature range is 25-30°C. Rainfall is often seasonal in yam areas and the maximum needs to be 14-20 weeks rain with an optimum of 1,150 mm during the growing season. Yams can tolerate drought but give maximum yields with high rainfall. The critical rain period is during the first 5 months. They cannot tolerate water logging. Light influences tuber growth. A continuous exposure of tubers to light significantly reduces tuber yields. Yams are influenced by daylength. Short days (less than 10-11 hours of sunlight) favour tuber development. It suits hardiness zones 10-12.

Cultivation: Ceremonial yams have very specialised production techniques. For general food production, use top pieces of the tuber after they have sprouted, use a branched stick for support of the vine, space plants about 1 m apart and choose a smooth round cultivar. In most places the yam growth and maturity fits in with seasonal rainfall patterns. They are mostly planted just before the first rains where a 8-10 month rainy season exists and give better yields in 6-8 month rainy season areas when planted 3 months before the rains. Earlier planting requires larger sett size to withstand drying out. Because yam tubers have a period of dormancy, tubers do not normally commence regrowth for up to 5-6 months. A planting depth of 15 cm is suitable.

Production: The time to maturity ranges from 5 months on the coast to 9 or 10 months at higher altitudes. Yams will store well for over 6 months if given a dry, dark, well ventilated shed.

Use: The tubers are boiled, baked or mumued.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tuber	76.6	323	2.0		0.8	18	10	0.39

Insects:

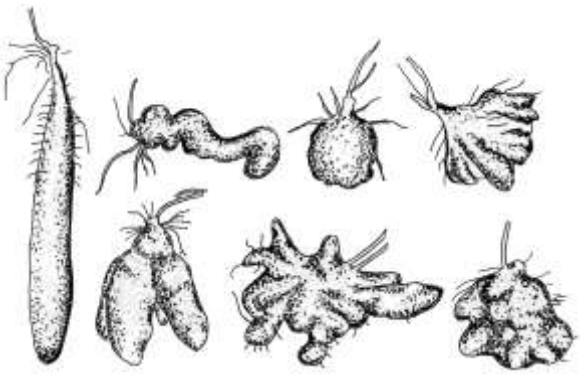
Abgrallaspis cyanophylli (Signoret)	Diaspididae (HEM)	Armoured scales
Alcidodes australis Boisduval	Curculionidae (COL)	
Aphis gossypii Glover	Aphididae (HEM)	Cotton aphid
Aspidiella hartii (Cockerell)	Diaspididae (HEM)	Armoured scales
Aspidiotus destructor Signoret	Diaspididae (HEM)	Armoured scales
Chrysodeixis chalcites Esp.	Plusiinae (LEP)	
Coccus hesperidium Linnaeus	Coccidae (HEM)	Soft scales
Eupholus nickerli Hll.	Curculionidae (COL)	Weevils
Gymnopholus weiskei Hllr.	Curculionidae (COL)	Weevils
Harpedona plana Poppius	Miridae (HEM)	
Hypolixus mastersi Pascoe	Curculionidae (COL)	
Hyposidra talaca	Geometridae (LEP)	
Icerya seychellarum (Westwood)	Margarodidae (HEM)	Soft scales
Leptoglossus australis (Fab.)	Coreidae (HEM)	Passion vine bug
Liliocerus sp nr. *bakewelli* Baly	Crioceridae (COL)	
Liliocerus papuana (Jac.)	Crioceridae (COL.)	A small beetle
Papuana spp.	Scarabaeidae (COL)	Taro beetles
Planococcus dioscoreae Williams	Pseudococcidae (HEM)	Yam mealy bug
Planococcus pacificus Cox	Pseudococcidae (HEM)	Mealybug
Platypeltocoris similis Popp	Miridae (HEM.)	Yam mirid sap sucker
Senoclidia purpurata (F.Sm.)	Tenthredinide (HYM)	Yam sawfly
Tagiades obscurus tindali Rbb	Hesperiidae (LEP.)	
Tagiades tregellius Hopf.	Hesperiidae (LEP.)	
Tagiades tregellius canonicus	Hesperiidae (LEP.)	
Theretra nessus Dry.	Sphingidae(LEP.)	Yam hawkmoth

Diseases:

Leaf spots	Fungi	*Gloeosporium pestis* Massee
	and	*Phyllosticta dioscoreae* Cooke
Leaf blotch	Bacterium	*Xanthomonas sp.*
Rust	Fungi	*Goplana dioscoreae* Cummins
	and	*Goplana australis*
	and	*Uredo dioscoreae-sativae* Sydow
	and	*Uredo hiulca* Cummins
Anthracnose	Fungus	*Glomerella cingulata* (Stonem) Spauld & Schr.
Mosaic	Probably Virus	

Pests:

Importance:
In Papua New Guinea it is a very important ceremonial crop in some areas and a staple food in many seasonally dry areas.



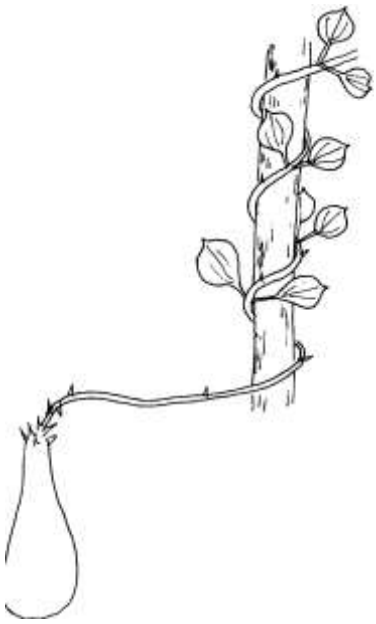


Names

English: Nummularia yam
Tok pisin: Yam tru
Tok ples:

Scientific name: *Dioscorea nummularia* Lamarck
Synonyms:
Plant family: Dioscoreaceae

Description: A vine plant with long spiny stems. The stems are nearly round in cross section. The leaves are oval to heart shaped. They end abruptly in a pointed tip. Often they are alternate lower on the vine then opposite each other higher up the plant. The vines twine to the right. The stems are spiny near the base. The flowers are slender. The flower spikes occur on leafless branches produced in the axils of leaves and these are longer than the leaf near where they are produced. The flower spikes remain of equal size along the length of this flowering branch. Tubers are often deep in the soil and with several lobes



Distribution: Mostly they occur in coastal areas. Outside Papua New Guinea it occurs in Fiji, Indonesia, Malaysia and the Solomon Islands.

Cultivation: It can be grown from pieces of the tuber. It can also be grown from aerial tubers. Plants are often planted near trees so that the vine can climb the tree and the tuber is left growing in the same spot for several years with tubers being harvested annually.

Production: The leaves die off and regrow each year. The tuber does not store well.

Use: The tuber is cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tuber	71.9	443	2.04		0.38	17		0.5

Insects:
Probably similar to yam tru.

Diseases:
Probably similar to yam tru.

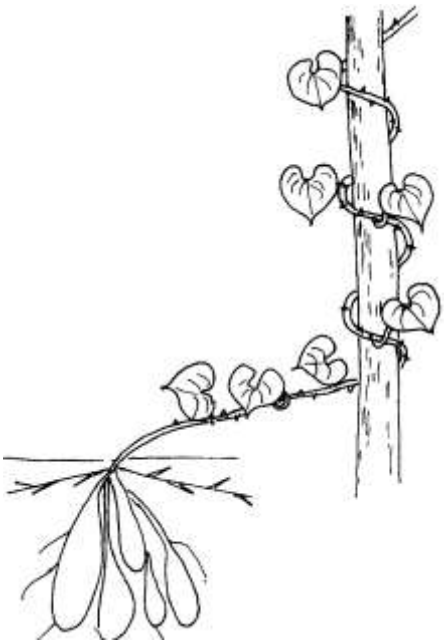
Pests:

Importance: There is still some confusion about this yam. It is like yam tru but with round stems.
A significant edible yam.

Names

English: Lesser yam
Tok pisin: Mami
Tok ples:
Scientific name: *Dioscorea esculenta* (Loureiro) Burkill
Synonyms:
Plant family: Dioscoreaceae

Description: A yam that has a spiny vine. It is a prickly climber. It can climb 1.2-2.4 m high and spread 1.8 m across. The vine twines to the left. The leaves are round with a gap where the leaf stalk joins. They are almost heart shaped. The leaf is about 12 cm long. This yam produces a cluster (5-20) of tubers under the ground. In many varieties there are sharp thorns just under the ground. In China forms occur without these spines. Often the tubers are sticky when cut. Many kinds occur. The flowers are green, 4 mm across and borne on long slender spikes. These are singly in the axils of leaves.



Distribution: It grows from sea level up to about 1500 m but is mostly below 800 m. It cannot tolerate water-logging. It needs a reasonably long rainy season. It needs a loose fertile soil. It does poorly on sandy soils and becomes misshapen in heavy clay soils. High levels of organic matter promote growth. It suits hardiness zones 9-12.

Cultivation: Normally small tubers are planted (50 - 75 g) but cut portions of a tuber can be used. Using either the top section or the bottom section of a tuber gives better establishment and yield than middle portions. Using larger tubers gives larger individual tubers and higher yields for individual plants. Using a plant spacing of 30 cm between plants and 100 cm between rows about 2,000 kg of planting material are used if 70 g tubers are used. Tubers are planted 8-12 cm below the ground.
Planting in mounds makes harvesting easier. It also assists drainage and improves aeration. A spacing of 80 - 100 cm between plants is suitable.
Planting is normally adjusted to fit in with the beginning of the rainy season. The growing season of 9-10 months is long and an extended wet season is therefore desirable. Stakes are required. Stakes 2 m long are sufficient. Lesser yams compete poorly with living plants used as shade.
Weed control is probably most crucial during the first 3 months. As early growth of the plant is sustained from the tuber, fertilisers can be applied slightly after planting. Added nitrogen fertiliser is more effectively used when plants are staked. Nitrogen is of more benefit for leaf growth in the early stages of plant development. Potassium is beneficial but often phosphorus applications do not give significant responses as lesser yams are efficient at extracting it from the soil. High yields can be obtained.

Production: High yields can be obtained. Plants take about 9 months to reach maturity. In some varieties and under some conditions leaves do not die off and tubers must be harvested to avoid tubers deteriorating as new growth commences. Tubers need to be harvested and handled carefully. They must often be cut from the vine and can be washed and dried. Tubers will store for about 3 months. They need to be stored under ventilated conditions. Fungal growth and rots easily occur on cut or damaged surfaces under damp conditions. Storage probably needs to be at temperatures above 15 °C. Tubers need to be peeled either before or after cooking.

Use: The tubers are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tuber	74.2	470	2.06		0.75	84	20	0.5

Insects:

Aspidiella hartii (Cockerell)	Diaspididae (HEM)	
Chrysodeixis chalcites (Esp.)	Noctuidae(LEP)	Green looper

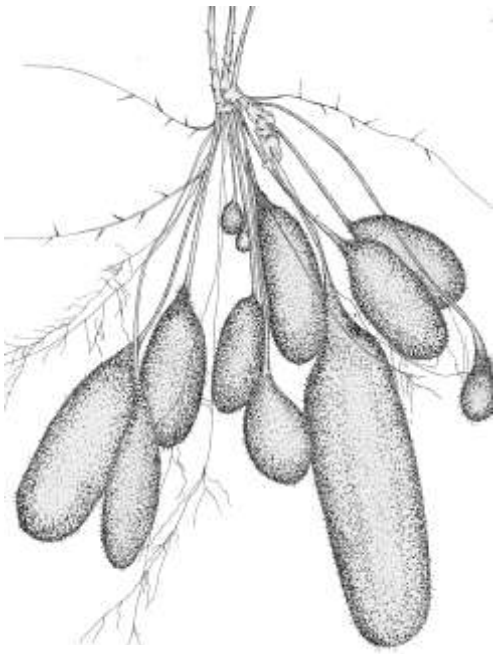
and others See list under Greater yam.

Diseases:

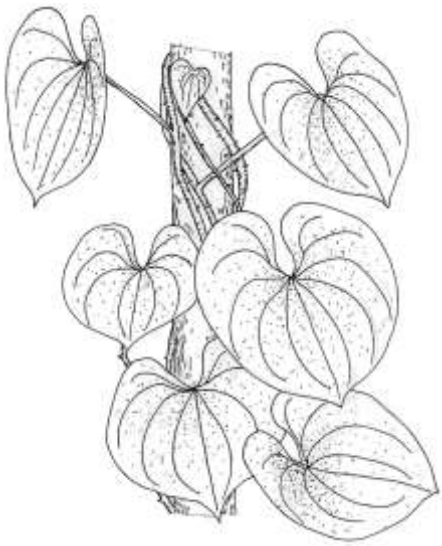
Leaf spot	Fungus	*Cylindrosporium dioscoreae* Miy & Ito
Leaf spot	Fungus	*Guignardia dioscoreae*
Leaf spot	Fungus	*Phyllosticta dioscoreae* Cooke
Dark brown leaf blotch	Bacterium	*Xanthomonas sp.*
Mosaic leaf pattern	Probably due to a virus.	

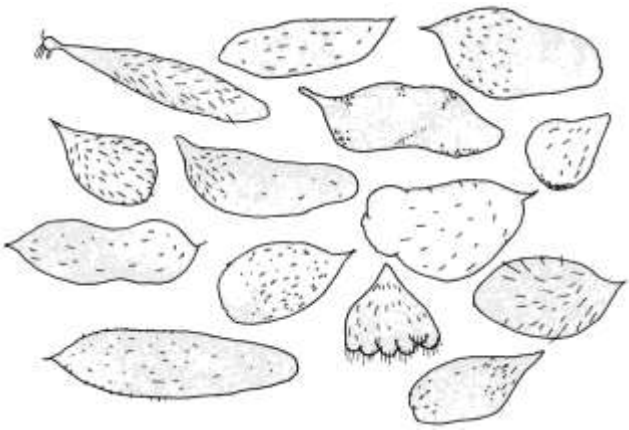
Pests: Rats are a problem with yams in storage.

Importance:
The most important of the yams in Papua New Guinea for efficient food production. Papua New Guinea has the best varieties in the world.



Cluster of tubers



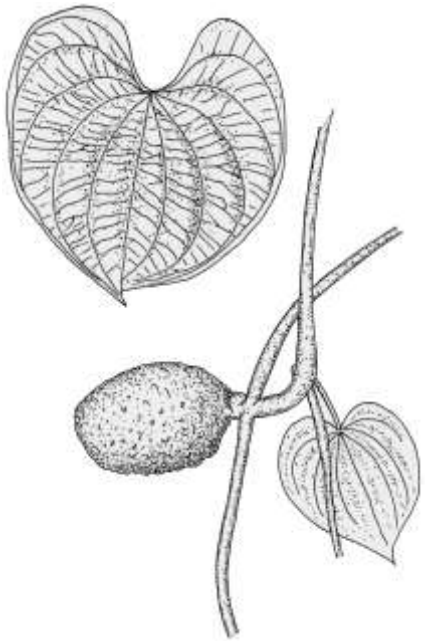


Tuber shapes

Names

English: Potato yam
Tok pisin:
Tok ples:

Scientific name: *Dioscorea bulbifera* L.
Synonyms:
Plant family: Dioscoreaceae



Description: A yam with a long smooth stemmed vine, round in cross section. It winds to the left. It does not have spines. The vine can climb up into trees and grow to long lengths. The leaves are large and round. They are pointed at the tip and round at the base. About 7 veins arise from the tip of the leaf stalk. Leaves can be 14-30 cm across and slightly longer than wide. This yam produces bulbils (potatoes) in the angles of the leaves along the vine. These are often flattened and can be grey brown or purple. Under the ground it has a smaller tuber normally covered with roots. The flowers are large. The male flowers are in spikes up to 20 cm long. The female spikes are usually in pairs. The fruit are winged and about 2.5 cm long by 1.5 cm across. The seeds have wings. The bulbils normally have few fibres through the tissue compared to some yams tubers. The flesh of many varieties is yellow.

Distribution: A tropical plant. It will grow from the coast up to about 1700 m altitude in equatorial zones. It is common near the edge of grassland and forest at mid altitudes. Both wild and cultivated forms occur. It is common in the Philippines, Solomons and Papua New Guinea near secondary forest at low and medium altitudes. It is cultivated in Africa and the West Indies. In Nepal it grows to 2100 m altitude. It suits hardiness zones 9-12.

Cultivation: Either the bulbils off the vine, or the underground tubers are planted. Because the vines are long, training them up trees is convenient. The bulbils have to be stored for a period of time before they will sprout. The plant is annual and leaves die off for 1-4 months each year before re-sprouting from the tuber. Bulbils only grow shoots from one end unless the bulbil is cut into pieces. If the larger bulbils are cut, the cut surfaces should be dried and healed in a shady place for 2-3 days before planting. Bulbils are planted 8-12 cm below the surface and spacing can be 100 cm by 100 cm or variations of this. Normally nitrogen and potassium fertilisers give greater responses than phosphorus. Friable well-drained soils are most suitable. Often very little cultivation or mounding is done. A high level of organic matter improves yield. Staking is normally required but often trees or living stakes are used. Branched stakes 2 m high are suitable. They need to be strongly put in place as vine and tuber growth can be extensive and heavy.

Production: Bulbils or aerial yams are produced as soon as leaves begin to unfold and continue until the plant reaches maturity. These aerial tubers often fall from the plant. Harvesting can start 3 months after planting but immature tubers have less starch. Underground tubers are normally not harvested until the leaves die back. Wounds and damage to the tuber surface normally heals naturally given dry aerated conditions. Some varieties have aerial tubers that are seasonally dormant and only grow after an extended period of storage. Others germinate relatively quickly.

Use: The tubers are cooked and eaten. More commonly the aerial bulbils are eaten after cooking.
Some kinds are bitter and inedible or at least require special processing and cooking.
Some varieties are poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tubers	70.8	357	2.7		3.1		78	0.4
Bulbils								

Insects:

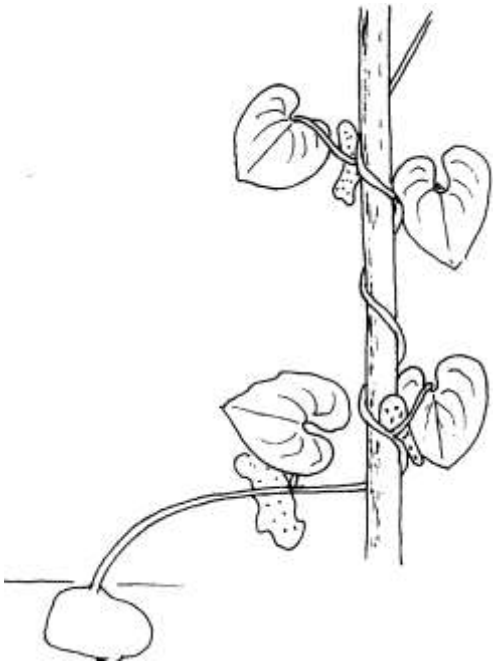
Weevils chewing the leaves.	Curculionidae (COL.)	*Eupholus spp.*

Diseases:

Brown mould underneath leaf	Fungus	*Cercospora ubi* Racib
Rust on leaves	Fungus	*Uredo dioscoreae-sativae* Sydow

Pests:

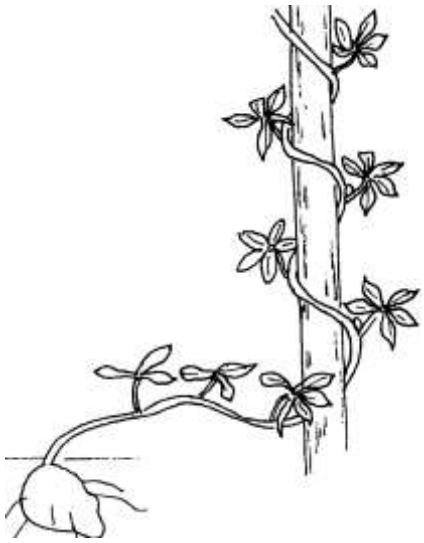
Importance:
This yam is widely distributed in lowland areas of Papua New Guinea and is a supplementary starchy staple food.



Names

English: Five leaflet yam
Tok pisin:
Tok ples:

Scientific name: *Dioscorea pentaphylla* L.
Synonyms:
Plant family: Dioscoreaceae



Description: A yam with a climbing vine 2-5 m long. The stems have scattered small spines. There are small tubers found in the axils of the leaves as well as larger underground tubers. The leaves have 5 to 7 leaflets pointed at the tip and 8 to 15 cm long. Often the lower leaves have 5-7 leaflets and upper leaves have 3 leaflets. The leaflets are spread out like fingers on a hand. The leaves are finely hairy. The flowers are small, yellowish white with a slight smell and borne in large numbers of flower clusters in the axils of leaves. The male flower spikes are 10-18 cm long and mostly occur as two together in the axil of a leaf. The female spikes occur as 1-3 together and are as long as the male ones. The fruit are winged capsules 8-12 mm long by 6-9 mm wide. The tubers vary in colour and shape. Often they are round and covered with long hairs.

Distribution: They grow from sea level up to 1800 m. It needs a well-drained, well aerated soil. They are best adapted to an abundant rainfall during the growing season and an annual dry season. Soils need to be fertile. Five leaflet yam occurs mainly in China, Malaysia, India, Indonesia, the Philippines, Papua New Guinea and into the Pacific Islands.

Cultivation: They are grown from tubers or pieces of tubers. They can be grown from aerial tubers. The dormancy of the tuber can be short. They need stakes for support. Stakes of about 2 m are adequate although live stakes are often used. They often grow wild.

Production: Tubers are harvested after the vines die back.

Use: The tubers are eaten boiled or roasted.
Caution: Poisonous types of this yam also occur. These need to be cut into pieces then repeatedly boiled and put into running water or washed and baked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tubers	80.0	266	2.3		0.44		2.8	0.4

Insects:

Diseases:

Leaf spot		
Rust	Fungus	*Uredo dioscoreae-sativae*

Pests:

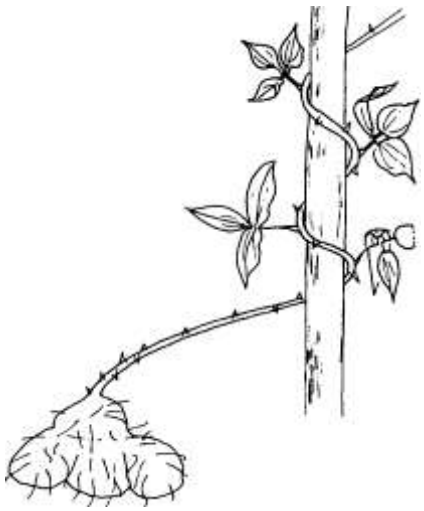
Importance:
This yam is not widely used in Papua New Guinea, but it can be found occasionally in many areas.

Names

English: Bitter yam
Tok pisin:
Tok ples:

Scientific name: *Dioscorea hispida* Dennstaedt
Synonyms:
Plant family: Dioscoreaceae

Description: A climbing vine that can be quite long. It can be 10 m long. There are thorns on the stem. It has compound leaves bearing 3 very large leaflets. The leaves can be 30 cm across. The leaflets are unequal on each side. The leaves are produced one after another along the stem. The young leaf stalks, stems and leaflets are hairy. The leaf stalk is as long as the leaflets (10-15 cm). There are small prickles on the under surface of the main vein. The flowers are small, pale yellow and borne on compound flower clusters. The fruit are 5 cm across and divided into 3 lobes. The tuber is covered with root hairs. It has lobes. Tubers are often 15-25 cm across.



Distribution: Outside Papua New Guinea it occurs in the Philippines, SE Asia and Indonesia. Plants grow from sea level to 1500 m altitude in Southern China.

Cultivation: It can be grown from a tuber. The tuber can continue to increase in size over several years.

Production:

Use: The tubers are eaten after processing by slicing, soaking in running water for 48 hours and then cooking.
Caution: This yam can be very poisonous. Normally selected varieties and special processes are needed before it is used.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tubers								

Insects:

Diseases:

Pests:

Importance:
A yam only occasionally used as an emergency food.

Names

English: White yam, White Guinea Yam
Tok pisin:
Tok ples:

Scientific name: *Dioscorea rotundata* Poir.
Synonyms: *Dioscorea cayenensis* Lam.
Plant family: Dioscoreaceae

Description: A climbing yam plant. The stems are round and can be 10-12 m long. They twine to the right around sticks. The stems are usually spiny, but can be smooth. There is a white bloom on the stems. The leaves are opposite and simple. They are 10-12 cm long by 6-8 cm wide. They are heart shaped and taper to a point. They are normally dark green and glossy. Some forms have leafy outgrowths (stipules) at the base of the leaf stalks. The flowers are often in groups of 4 and are formed near the leaves. It is mostly male flowers which occur and seeds are rarely produced. The tubers vary in shape, size and texture. Mostly they are like cylinders with rounded or pointed ends. The skin is smooth and brown with white flesh. The tubers can also be distorted in shape. Mostly only one tuber forms and the top end of the tuber is woody. A large number of different cultivars occur.



Distribution: It grows in places with a distinct dry season. Tubers have a time of dormancy. It can tolerate drought more than Greater yam (Dioscorea alata). It suits relatively heavy soils with a reasonable clay content. Rainfall of 1000-1500 mm distributed over 8-10 months is suitable.

Cultivation: Mostly setts of tubers are used. Occasionally seeds are used. Plants can also be grown from cuttings. About 1 sq metre per plant is suitable.

Production: Crops last 8-10 months. Tubers can be stored for several months. Tubers normally weigh 2-5 kg but can be up to 10 kg weight. Yields of 16-20 t/ha are normal. Tubers should not be stored below 15°C as chilling injury can result.

Use: The tubers are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tuber	80.0	298	1.5		5.2	0.8	10	0.4

Insects:

Diseases:

Pests:

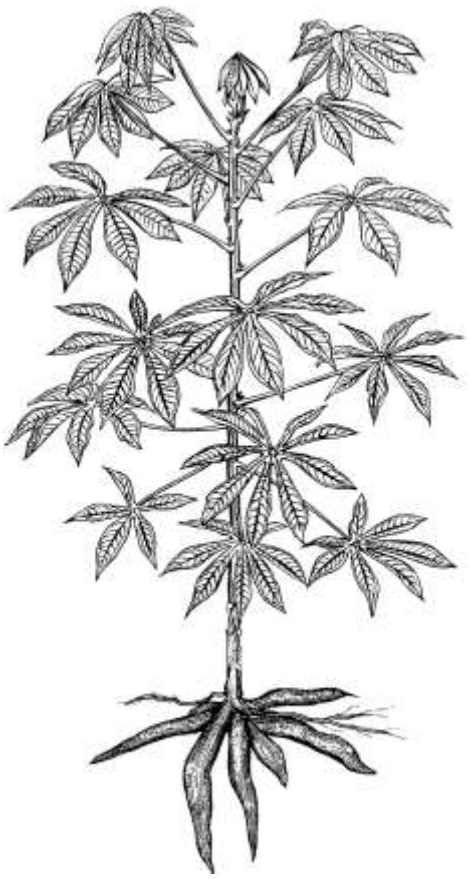
Importance:
The most important yam in West Africa. It has only recently been introduced to Papua New Guinea.

Names

English: Cassava, Manioc, Tapioca
Tok pisin:
Tok ples:

Scientific name: *Manihot esculenta* Crantz
Synonyms: *Manihot utilissima* Pohl
Plant family: Euphorbiaceae

Description: A plant that can regrow year after year from the thickened roots. It has several stems. The stems are woody and have some branches. Plants grow up to 2 or 3 metres high. Stalks have distinct scars where leaves have fallen. The leaves tend to be near the ends of branches. The leaves are divided like the fingers on a hand. The leaves have long leaf stalks. The leaves have 3-7 long lobes that can be 20 cm long. These are widest about 1/3 of the distance from the tip and taper towards the base. The colour varies. It produces several long tubers. These can be 50 cm long by 10 cm across. The flowers are on short stalks around a central stalk. They are produced near the ends of branches. The female flowers are near the base of the flower stalk and the male flowers higher up.



Distribution: Plants grow from sea level up to about 1650 m. They can grow in poor soil. They can survive drought. It is native to tropical America. It suits hardiness zones 10-12. Cassava seeds need a soil temperature of 30°C for their germination. Flower and fruit production is more common under lower temperatures such as in highland or less equatorial conditions. Cassava does not suit waterlogged soils and preferably they should not be too shallow or stony. . The crop once established can survive for several months without rain.

Cultivation: Cassava is planted from sections of the stalk. Sections about 15-20 cm long of the more mature woody stem are cut and stuck into the ground. They can be completely buried or put at almost any angle and it affects the growth little. Soon roots form and leaves start to sprout from the stalk.

Production: Cassava takes about 10 to 12 months to produce mature tubers in the lowlands tropics although some varieties produce a smaller yield earlier. Yields in the range of 20-45 t/ha have been recorded for 12-14 month crops. The plants can be left growing and the tubers stored in the soil for considerable time. Crops of 24 months duration occur. Once the tubers have been dug they do not keep for more than a few days. Preharvest pruning of plants increases the storage time of tubers after harvest

Use: The tubers are eaten after thorough cooking. They are boiled, roasted or made into flour.
Young leaves are edible after cooking.
Seeds are also eaten.

Caution: Bitter kinds of cassava contain poison but this is destroyed on heating. This kind of cassava should be cooked, sun dried, soaked and cooked again.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tuber	62.8	625	1.4		0.23	30	15	0.48
Leaves	82.0	382	7.1		7.6	11775	275	

Insects:

Abgrallaspis cyanophylli (Signoret)	Diaspididae (HEM)	
Acalolepta holotephra Boisd	Cerambycidae (COL.)	
Agrotis ipsilon (Hufnagel)	Noctuidae (LEP)	Black cutworm
Amblypelta spp.	Coreidae (HEM)	Amblypelta bugs
Apirocalus spp	Curculionidae (COL)	Horned weevil
Aulacophora spp.	Chrysomelidae (COL)	Pumpkin beetles
Bemisia tabaci (Guen.)	Aleyrodidae (HEM)	Tobacco whitefly
Brysica exigua Dist.	Pentatomidae (HEM.)	
Chrysomphalus dictyospermi (Morgan)	Diaspidiae (HEM)	
Dasychira mendosa Hubn.	Lymantriidae (LEP.)	Leaf eating caterpillar
Ectropis sabulosa Warr.	Geometridae (LEP)	Cacao looper
Eupholus spp.	Curculionidae (COL)	Eupholus weevils
Ferrisia consobrina Williams	Pseudococcidae (HEM)	
Ferrisia virgata Cockerell	Pseudococcidae (HEM)	Striped mealy bug
Hemiberlesia lataniae (Signoret)	Diaspididae (HEM)	
Hypotactus ruralis Fst.	Curculionidae (COL.)	
Leptoglossus australis (Fab.)	Coreidae (HEM)	Black leaf footed bug
Monolepta spp.	Chrysomelidae (COL)	Monolepta beetles
Oribius spp.	Curculioniodae (COL)	Shot hole weevils
Parasaissetia nigra (Nietner)	Coccidae (HEM)	Nigra scale
Pinnaspis strachani (Cooley)	Diaspididae (HEM)	
Protaetia papuana Moser	Scarabaeidae (COL.)	
Pseudaulacaspis pentagona (Taeg)	Diaspididae (HEM)	Cassava scale
Pseudococcus elisae Borchsenius	Pseudococcidae (HEM)	
Saissettia nigra (Nietner)	Coccidae (HEM)	Nigra scale
Spodoptera litura (Fab)	Noctuidae (LEP)	
Tetranychus marianae McGregor	Tetranychidae ACARINA	Red spider mite
Tiracola plagiata Walk	Noctuidae (LEP)	Cacao armyworm

Diseases:

Leaf spot	Fungus	*Cercospora vicosae?*
Brown leaf spot	Fungus	*Cercosporidium henningsii* (Allesch) Deighton
Leaf spot	Fungus	*Phyllosticta sp.*
Blight leaf spot or tip dieback	Fungus	*Colletotrichum capsici* (Syd) But. & Bis.
	And	*Glomerella cingulata*
Pink disease	Fungus	*Phanerochaete salmonicolor* (Berk. & Broome) Julich
Associated with root rot	Fungus	*Dictyosporium toriloides*
Collar rot	Fungus	*Fusarium sp.*
Root rot ?		*Helicobasidium purpureum*
	and	*Proboscispora manihotis*
	and	*Rigidoporus lignosus*
Storage rots		

Pests:

Importance: In Papua New Guinea, cassava is becoming a more widespread and important staple food especially in areas with poor soils and distinct drought.

Names

English: Potato
Tok pisin:
Tok ples:

Scientific name: *Solanum tuberosum* L.
Synonyms:
Plant family: Solanaceae



Description: A branched annual plant that grows up to 50 cm high. The stems are soft and 4 angled with compound leaves. The leaves are irregular shape and have 6-8 pairs of leaflets as well as small irregular leafets between the others. It has swollen stem tubers under the ground. The tubers can vary in colour from white to red and purple. The tuber shape can also vary greatly. The flowers are white pink or purple. The fruit is a berry. It is smooth, round and green but often striped.

Distribution: In the tropics they mostly grow at high altitude above 1500 m, but plants are grown between 900 and 2800 m. Tubers form best when soil temperatures are 15.5°C. They are damaged by frost but slightly more frost tolerant than sweet potato. It suits hardiness zones 7-11.

Cultivation: Plants are grown from tubers. Due to virus diseases it is necessary to get fresh seed tubers each few years. Large tubers can be cut to include a bud or "eye". It is best to inter-crop.

Production: The time to maturity is between 17 and 24 weeks. Yields of 5 to 12 tons/ha can be expected.

Use: The tubers are cooked and eaten. They are also fried, canned and made into starch.
The tender leaves are also occasionally eaten.
Caution: The green tubers and leaves are poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tubers	77.0	344	1.7		1.1	25	21	0.27

Insects:

Acyrthosiphon solani Kaltenbach	Aphididae (HEM.)	
Agrotis ipsilon (Hufnagel)	Noctuidae (LEP)	Black cutworm
Apachynus beccarii Dubrony	Apachyidae (DERM.)	
Aphis gossypii Glover	Aphididae (HEM.)	Melon aphid
Araecerus sp. (See *Oxyderes*)	Anthribidae (COL.)	
Aulacorthum solani Kaltenbach	Aphididae (HEM.)	Foxglove aphid
Brachylybas dimorphus		Small brown bug
Cassida diomma Boisduval	Chrysomelidae (COL.)	Small tortoise beetle
Cassida papuana Spaeth	Chrysomelidae (COL.)	Small tortoise beetles
Cassida sexguttata Boisduval	Chrysomelidae (COL.)	Small tortoise beetles
Cicadella sp.	Cicadellidae (HEM.)	
Conoderus mucronatus Candeze	Elateridae (COL.)	
Criontiades sp.	Miridae (HEM.)	
Dasychira mendosa Hubn.	Lymantriidae (LEP)	Leaf eating caterpillar
Elaunon bipatitus Kirby	Forficulidae (DERM.)	
Henosepilachna haemorrhoea (Biel)	Coccinellidae (COL)	Leaf eating ladybird

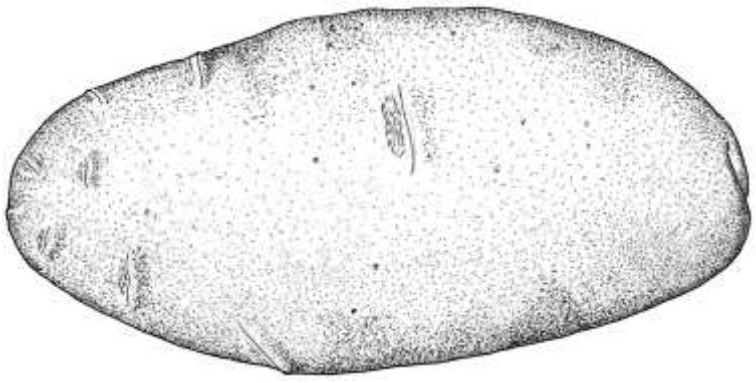
Henosepilachna signatipennis Boisd.	Coccinellidae (COL)	Leaf eating ladybird
Homeoxipha fuscipennis	Gryllidae (ORTH.)	
Idopsis coerulea Faust.	Curculionidae (COL.)	
Macrosiphum euphorbiae (Thomson)	Aphididae (HEM.)	Potato aphid
Monolepta semiviolacea Fauvel	Chrysomelidae (COL.)	
Myzus ornatus Laing	Aphididae (HEM.)	
Myzus persicae Sulzer	Aphididae (HEM.)	Green peach aphid
Nysius villicus Van Duzee	Lygaeidae (HEM.)	
Papuana aninodalis Prell	Scarabaeidae (COL)	Taro beetles
Phaenacantha spp.	Colobathristidae (HEM)	Sugarcane bug
Phthorimaea operculella (Zell.)	Scarabaeidae (COL)	Potato tuber moth
Simplicia caeneusalis Walker	Noctuidae (LEP.)	

Diseases:

Early blight	Fungus	*Alternaria solani* Sorauer
Collar rot	Fungus	*Athelia rolfsii* (Curzi) Tu & Kimbrough
Dry rot & wilt	Fungus	*Fusarium oxysporium* Schelcht ex Fr.
Storage rot	Fungus	*Fusarium solani*
Leaf spot	Fungus	*Leptosphaerulina trifolii*
Leaf spot	Fungus	*Phyllosticta sp.*
Pink rot	Fungus	*Phytophthora erythroseptica*
Late blight	Fungus	*Phytophthora infestans* (Mont) de Bary
Powdery scab	Fungus	*Spongospora subterranean*
Common scab	Fungus	*Streptomyces scabies* (Thaxt.) Waksm & Henr.
Black scurf	Fungus	*Thanatephorus cucumeris*
Verticillium wilt potato	Fungus	*Verticillium albo-atrum*
Black leg	Bacteria	*Erwinia carotovora* subsp. *atroseptica*
Soft rot	Bacteria	*Erwinia carotovora* subsp. *carotovora*
Bacterial wilt	Bacteria	*Erwinia chrysanthemi*
Bacterial wilt	Bacteria	*Pseudomonas solanacearum* E F Smith
Leaf roll	Virus	Leaf roll virus
Interveinal mottling	Virus	Potato virus x
Mosaic & dying leaves	Virus	Potato virus y

Pests:

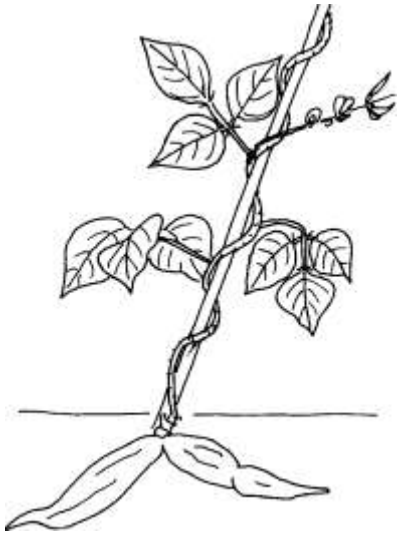
Importance: In Papua New Guinea it is gaining acceptance as a subsistence food crop above about 1900 m altitude.



Names

English: Kudzu,
Tok pisin:
Tok ples:

Scientific name: *Pueraria lobata* var. *lobata* (Willd.) Ohwi
Synonyms: *Pueraria novo-guineensis* Warb.
Plant family: Fabaceae



Description: A slow growing climbing legume with a thickened edible tuber. It has a thick stem that is hairy at the base. The stem can be 2.5 cm across. It can climb to 20 m high. The leaves are hairy and divided into 3 leafets. They are oval or diamond shaped and they have lobes. The middle leaflet is the largest. The side leaflets are not equal on both sides of the main vein. The leaflets are 10-18 cm long by 8-15 cm wide. The leaves taper towards the tip. The leaf stalk is 20 cm long. The flowers are pea like and purple. They are 2 cm long and produced in upright stalks. The clusters along the stalks are 25-40 cm long. The fruit are oblong pods 9 cm long and 1 cm wide. They are covered with dense rusty hairs. The tuber is shaped like a cassava root. It can be 60-90 cm long.

Distribution: Wild forms grow between 30 and 1860 m in the tropics. Cultivated forms are more common in high altitude areas up to 2700 m altitude in Papua New Guinea. It grows in grassland and on the edge of forests. It suits hardiness zones 5-11.

Cultivation: It is normally grown by stem cuttings. It grows slowly. Plants also grow self-sown from seed.

Production: The time to maturity is 2-3 years. A tuberous root can be 35 kg weight.

Use: The tuber is cooked and eaten. A kind of flour can also be made from the roots. This is processed into a thickener for sauces.
The leaves, shoots and flowers can be used as a vegetable.
In India the seeds are boiled and kept in a closed container for about seven days and then allowed to decompose. A drink is made from it.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Roots	68.6		2.1	15	0.6			
Leaves								

Insects:

Diseases:

False rust	Fungus	*Synchytrium minutum* (Pat) Gaum
Yellow mould	Fungus	*Mycovellosiella puerariae* D.Shaw & Deighton
Leaf spot		

Pests:

Importance: A minor root crop in Papua New Guinea. It is used as a reserve food and for ceremonies.

Names

English: Yam bean
Tok pisin:
Tok ples:

Scientific name: *Pachyrrhizus erosus* (L.) Urban
Synonyms:
Plant family: Fabaceae



Description: A climbing bean that has hairy stems. It can grow up to 6 m tall. The stems are woody at the base. It has a white-fleshed tuber. It has a rough sandy coloured skin. The leaves are alternate and made up of 3 leaflets. These leaflets have large teeth. The flowers are violet or white. The pod is 8-15 cm long, curved and hairy. The seeds are almost black. There are 8-11 seeds and they are flattened.

Distribution: It grows in warm places. It grows in coastal areas in Papua New Guinea and up to about 70 m altitude in the tropics. A well-drained soil is needed. A light rich sandy soils is suitable. It cannot tolerate frost. Plants need 11-13 hours of daylight for tubers to form. It suits hardiness zones 10-11.

Cultivation: It is grown from seeds and also grows wild. Seed should be presoaked for 12 hours in warm water to encourage rapid germination. Seed germinate within 2 weeks. Plants can be grown by dividing the root clump and then growing plants from the thickened roots. Cuttings will grow. A spacing of 50 cm between plants is suitable. Topping the plant by picking out the growing point and removing the flowers is supposed to help tubers form.

Production: Tubers are ready about 6 months after sowing. Individual tubers can be up to 20 kg weight.

Use: The young tuber is eaten either raw or cooked. It can also be pickled.
The young pods can be eaten. (They must be well cooked.)
Caution: Old pods and mature seeds can be poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tuber	89.0	160	1.0		0.6	2.0	20	0.2
Seed	8.1		38.5					
Pods	86.0	189	2.6		1.3	345		

Insects:

Diseases:

Pests:

Importance: Only occasionally seen in Papua New Guinea and mainly used by Asians.

Names

English: Queensland arrowroot
Tok pisin:
Tok ples:

Scientific name: *Canna edulis* Ker-Gawl.
Synonyms:
Plant family: Cannaceae



Description: A broad-leafed plant with purple leaf sheaths. It is about 1.5 to 2.5 m high. It grows as a perennial. The stems are in clusters. Flowers are red and produced at the top of the plant. The petals are small and red and 4-10 mm wide. The fruit is a 3-celled capsule with black seeds. Underground it has a much-branched root or rhizome with fattened sections covered with leaf scars. These are often light red on the outside and yellowish white inside. A clump of 15-20 suckers often develops. These starchy tubers are from 6 cm across to 15 cm long. The shape varies.

Distribution: It is grown and used in some of the coastal areas of the tropics and subtropics. It will grow from sea level up to 1600 m.
In the Andes it grows between 1,000 and 2,500 m altitude. It needs a heavy fertile soil. It cannot stand strong winds. It does best with an evenly distributed rainfall. It cannot stand waterlogging. It can stand some shade. It needs to be in a frost free location. It does best where both days and nights are warm.

Cultivation: The end section of the rhizome is planted. Well developed tubers with one or two undamaged buds should be used. A spacing of 1 m x 1 m is suitable. Tubers are planted about 15 cm deep and need to be kept weed free during early growth. About 2.5 tons of tubers are required to plant a hectare. The tubers are dug from between 6 and 19 months. The tubers can be stored if cool and dry. For starch manufacture they need to be processed immediately.

Production: Harvesting occurs after about 8 months. Parts of the underground root are harvested as needed. High yields of tops and rhizomes are possible. Up to 38 tons of rhizomes and 50 tons of tops have been achieved.

Use: The rhizomes are eaten after cooking. They are boiled or baked. The leaves and rhizomes are used for animals. Starch can be extracted from the roots. This is achieved by rasping the tubers, then washing the starch out and straining out the fibres. The large starch grains are very digestible.
The starch is used to make transparent noodles.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Rhizome	72.6		1.0					

Diseases:
Insects:

Shot hole weevils	Curculionidae (COL.)	*Oribius spp.*

Pests:
Importance: It is a starchy root crop of some importance in some coastal areas mainly on the Papuan side of Papua New Guinea.

Names

English: Jerusalem artichoke
Tok pisin:
Tok ples:

Scientific name: *Helianthus tuberosus* L.
Synonyms:
Plant family: Asteraceae

Description: An upright perennial plant up to 1-2 m high and with a spread of 1 m. The stem is erect and unbranched. The leaves are dull green and sword shaped. The flowers are yellow and daisy like. It produces fleshy underground stem tubers of irregular shape. The skin of these tubers is very thin and often coloured yellow or red. The flesh is white. Tubers can be 10 cm long and 6 cm wide.



Distribution: A temperate plant. Plants grow best when the temperature is 18° - 26°C and frost-free. They do best between 300 and 750 m altitude in the tropics. It needs light to medium well-drained soils. Plants should be grown in an open sunny position. It is drought and frost resistant. It suits hardiness zones 4-9.

Cultivation: Plants are grown from vegetative setts. These can be dormant for 7 months before they will grow. The flowers on the plants are removed to increase the yield. Plants can be grown from seed. Tubers are often sweetest after a frost.

Production: Harvesting can start after 3 months.

Use: The tubers are eaten boiled or baked.
They can be eaten raw in salads.
(They are suitable for people with diabetes)

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tubers	79.0	281	2.0		0.4		4	

Insects:

Diseases:

Collar rot	Fungus	*Athelia rolfsii* (Curzi) Tu & Kimbrough

Pests:

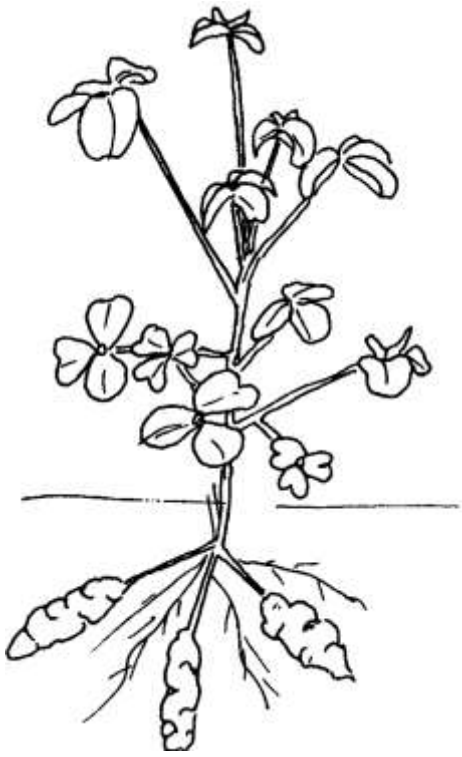
Importance: Not commonly seen in Papua New Guinea.

Names

English: Oca, New Zealand yam
Tok pisin:
Tok ples:

Scientific name: *Oxalis tuberosa* Molina
Synonyms: *Oxalis crenata* Jacq.
Plant family: Oxalidaceae

Description: A small annual herb up to 30 cm high with leaves of 3 leaflets. The stems are round and succulent. The leaves are spirally arranged. The flowers are orange-yellow. Three different kinds of flowers occur associated with three different kinds of tubers. The tubers have scales that cover long deep eyes. Tubers vary considerably in shape. The tubers are wrinkled and vary in colour between red, orange, yellow, or white. Some varieties have bitter tubers. They are about 5-8 cm long and 2-4 cm across. The plant rarely sets seed in the field but seed can be produced by self-pollinating. When seed form, they occur in 5-celled locules with 1-3 tiny seeds in each.



Distribution: It mostly grows in the Andes from Colombia to Chile at between 3,500 and 3,800 m altitude. The plant is frost hardy. They grow in the high altitude tropics. (2,800 - 4,560 m in the Andes). In the hot lowlands, tubers perish quickly. In the hot tropical lowlands, tubers perish quickly. A daylength of 9 hours is best for tuber formation. Vegetative top growth occurs under long day lengths. It suits hardiness zones 7-11.

Cultivation: Plants are grown from tubers or cut pieces of tubers that contain 1-3 eyes. Planting is normally done at the beginning of the rainy season and plants are weeded and soil mounded around them. A spacing of 20-40 cm x 20-36 cm is recommended.

Production: Tubers mature in about 8 months. Average yields in the Andes are about 3.7 t / ha. After digging tubers are cured in the sun for several days.

Use: The tubers are acid when fresh but are dried slightly then cooked and eaten. The bitter kinds are freeze-dried and stored for later use. The young leaves and shoots can be eaten.
Caution: Fresh tubers contain calcium oxalate.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tubers	84		1.1					
Leaves								

Insects:

Diseases:

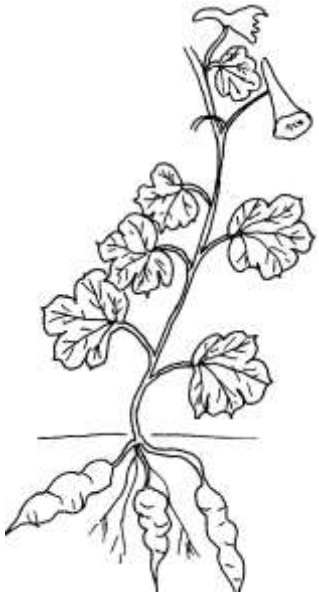
Pests:

Importance: In the Andes people say, "Stew without chunu is like life without love!" It has only recently been introduced to Papua New Guinea to try it out.

Names

English: Anu, Peruvian nasturtium,
Tok pisin:
Tok ples:

Scientific name: *Tropaeolum tuberosum* Ruiz & Pav
Synonyms:
Plant family: Tropaeolaceae



Description: A climbing herb that climbs by twining around objects. It is grown each year from tubers. It can be 2-4 m high and spread 3 m wide. It does not have hairs. Stems are greenish red. Leaves have 5 lobes. Leaves vary between 5-20 cm long. Tubers are yellowish green with purple marks. They are often deeply furrowed. Flowers are red and yellow. They are 3-4 cm across and cup shaped with a long spur. The plant sets seed easily. Tuber colour and shape varies between varieties

Distribution: It grows in high altitude, cool, moist, tropical regions. The plants are tolerant of frost. It requires 12-hour days for successful cultivation. It can grow on poor soils. In South America plants grow from 3,000 to 4,000 m altitude. It suits hardiness zones 8-10.

Cultivation: Plants are grown from tubers. A spacing of 70 cm x 70 cm is suitable. It needs to be kept weed free and to have the earth hilled up around plants. Plants mature in about 7 months. Because of its climbing pattern it can compete with weeds. Plants can also be grown from seed.

Production: Plants mature in about 7 months. Tubers store satisfactorily. Tubers are often frozen or partially dried after harvest to improve the flavour. The average yield in Peru is about 4 to 12 tonnes per hectare. Yields of up to 70 tonnes per hectare are possible. The plant growing time is 220 to 240 days in Peru.

Use: Tubers are eaten boiled. They are often sweetened.
They are cured in the sun then freeze dried then boiled like potatoes.
They can be cooked then frozen.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tubers	54.6		3.8					

Insects:

Diseases:

Pests:

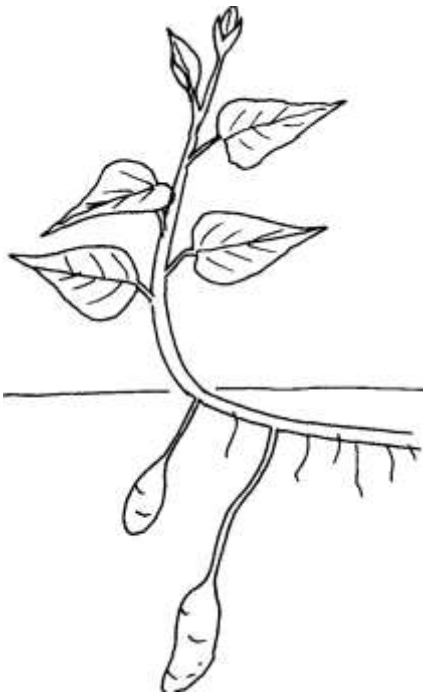
Importance: It has only recently been introduced into Papua New Guinea to try it out. It is an important crop in the high Andes.

Names

English: Ulluco
Tok pisin:
Tok ples:

Scientific name: *Ullucus tuberosus* Lozano
Synonyms:
Plant family: Basellaceae/ Chenopodiaceae

Description: A small herb with creeping pink stems. It is erect and compact. It puts up branches that can be 30-50 cm high. The stems form roots where they touch the ground. At the end of its growth plants are lying along the ground. The leaves are broad and heart shaped. In some kinds the leaves have red spots or a reddish blue edge. Small tubers form on the ends of the roots. Often they are yellow but shape and colour vary with variety. Flowers are in the axils of leaves. They are small and star shaped. Seeds are occasionally produced in a triangular capsule. These seeds will grow after their dormancy period has passed (2-3 months). Aerial tubers sometimes also occur. There are about 50-70 cultivars.



Distribution: Tropical. It grows well in cool moist climates in the tropics. It will probably suit high altitude places. In the Andes it grows at altitudes of 3,000-4,000 m. It can stand light frosts. It shows drought resistance and has low fertility demands. It gives low tuber yields under long day conditions.

Cultivation: Plants are grown from tubers. They can be grown from cuttings. Soil needs to be earthed up around the growing plant. A spacing of 60 to 80 cm between plants is suitable. Some plants have 3 sets of chromosomes and these must always be grown from tubers or cuttings. Plants are often severely affected by viral diseases.

Production: Tubers mature in about 4-6 months but can be 7-8 months.

Use: The tubers are eaten. They are also dried and ground into flour.
The leaves are edible cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tubers								
Leaves								

Insects:

Diseases:

Pests:

Importance: One variety has been introduced and is being tried out in Papua New Guinea. It is an important food plant in the Andes, especially Peru.

Names

English: Banana, Plantain
Tok pisin:
Tok ples:

Scientific name: *Musa sp* (A &/or B genome) cv.
Synonyms: Often as *Musa x paradisiaca*
Plant family: Musaceae

Description: These are the main group of cultivated bananas. They can be classed into diploid, triploid and tetraploid kinds with various amounts of the A or B parents. They are large non-woody herbs with broad long leaves. Most kinds have several suckers. Bananas grow a soft firm false stem from an underground corm. The fruiting stalk eventually emerges from the top of this false stem and normally curves over pointing towards the ground. Fruit occur in clumps or hands along this stem. The male flowers are in a red bud at the end of the flower stalk. The colour of the stem, bracts, bud and fruit varies considerably depending on the variety. The fruit can be 6-35 cm long depending on variety. They can also be 2.5-6 cm across.



Distribution: They grow from sea level up to about 2000 m altitude in the tropics. They are rarely an important food above about 1600 m. In Nepal they grow to about 1800 m altitude. They do best in warm and humid tropical climates. Temperatures need to be above 15°C. The best temperature is 27°C. The maximum temperature is 38°C. Bananas grow best in full sun. For best growth, a rainfall of 200-220 mm per month is needed. A deep friable soil is best. They can tolerate a pH between 4.5-7.5. It suits hardines zones 10-12.

Cultivation: They are planted from sword suckers. Diploids need re-planting annually but many triploids can be re-suckered from the base on the same site. Spacing depends on variety. A spacing of 1000-3000 plants per hectare is used depending on variety. Suckers are usually put 30 cm deep.

Production: Time to maturity varies from 6 to 18 months depending on variety and altitude. Triploids have larger bunches than diploids. Tetraploids are very large plants.

Use: Fruit are eaten raw or cooked depending on variety.
Male buds and flowers are eaten on some varieties. They are cooked as a vegetable.
The central pith of the false stem and the underground rhizome are also sometimes eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	65.3	510	1.3		0.6	113	18.4	0.1
Buds								

Insects:

Apiraculus cornutus (Pascoe)	Curculionidae (COL)	Horned weevil
Bactrocera bryoniae (Try)	Tephritidae (DIPT)	Fruit fly
Bactrocera musae (Try)	Tephritidae (DIPT)	Banana fruit fly
Cosmopolites sordidus (Germar)	Curculionidae (COL)	Banana weevil
Dermolepida nigrum (Nonf)	Scarabaeidae (COL)	Chafer beetle
Diacrisia papuana Roths	Arctiidae (LEP)	
Eumossula gracilis	Tettigoniidae (ORTH)	Coconut treehopper
Heliothis armiger Hubner	Noctuidae (LEP)	Corn earworm
Lema papuana Jac.	Chrysomelidae (COL)	

Locusta migratoria (Linnaeus)	Acrididae (ORTH)	Migratory locust
Myospila argentata Walker	Muscidae (DIPT)	
Nacoleia octasema (Meyrick)	Pyralidae (LEP)	Banana scab moth
Opagona sp.	Hieroxestidae (LEP)	
Oribius cruciatus Fst.	Curculionidae (COL)	Shot hole weevil
Oribius inimicus Mshl	Curculionidae (COL)	
Oryctes rhinoceros (L)	Scarabaeidae (COL)	Rhinoceros beetle
Othreis fullonica (Cl)	Noctuidae (LEP)	
Papuana huebneri Fairm.	Scarabaeidae (COL)	Taro beetle
Papuana laevipennis Arrow	Scarabaeidae (COL)	Taro beetle
Papuana japenensis Arrow	Scarabaeidae (COL)	Taro beetle
Papuana semistriata	Scarabaeidae (COL)	Taro beetle
Papuana woodlarkiana (Montr.)	Scarabaeidae (COL)	Taro beetle
Pentalonia nigronervosa Coq	Aphididae (HOM)	Banana aphid
Scapanes australis-australis Boisd.	Scarabaeidae (COL)	Australian Rhinoceros beetle
Scapanes australis-grossepunctatus	Scarabaeidae (COL)	New Guinea rhinoceros beetle
Scopelodes nitens B.Bak	Limocodidae (LEP)	
Segestidea defoliata Uvarov	Tettigoniidae (ORTH)	
Segestidea novaeguineae F.Willemse	Tettigoniidae (ORTH)	
Taenaris dimona Hew	Amathusiidae (LEP)	
Taenaris myops kirschi Stgr.	Amathusiidae (LEP)	Banana butterfly

Diseases:

Armillaria corm rot	Fungus	*Armillaria mellea* (Vahl. ex Fr.) Krumer
Leaf spot	Fungus	*Cladosporium musae*
Anthracnose of fruit	Fungus	*Colletotrichum musae*
Cordana or diamond leaf spot	Fungus	*Cordana musae* (Zimm.) Hohnel
Black spot	Fungus	*Deightoniella torulosa* Syd.) M.B.Ellis
Leaf spot	Fungus	*Haplobasidium musae*
Leaf spot	Fungus	*Phyllosticta sp.*
Black leaf streak	Fungus	*Mycosphaerella fijiensis*
Sigatoka leaf spot	Fungus	*Mycosphaerella musicola* R Leach
Black cross leaf spot	Fungus	*Phyllachora musicola* C Booth & D Shaw
Freckle	Fungus	*Guignardia musae*
Speckle	Fungus	*Ramichloridium musae*
Banana rust	Fungus	*Uredo musae* Cummins
Root rot	Fungi	*Pythium splendens*
	And	*Pythium vexans* etc
Stem end rot fruit	Fungus	*Botryodiplodia theobromae*
Algal leaf spot	Alga	*Cephaleuros virescens*
Infectious chlorosis	Virus	Cucumber mosaic virus
Root knot	Nematode	*Meloidogyne incognita*
Burrowing nematode	Nematode	*Radopholus similis*
Nematode	Nematode	*Helicotylenchus multicinctus*
		Pratylenchus sp.
		Rotylenchus sp.
Bacterial corm rot	Bacteria	*Erwinia chrysanthemi*
Stalk rot	Bacteria	*Erwinia carotovora carotovora*

Pests:

Importance: The major food in many areas of the moist lowland tropics and an important supplement in most areas.

Names

English: Sago
Tok pisin: Saksak
Tok ples:

Scientific name: *Metroxylon sagu* Rottb.
Synonyms: *Metroxylon rumphii* (Willd.) C. Martius
Plant family: Arecaceae



Description: A clumping palm. It can grow up to 10 to 70 m high with a fat trunk (50-75 cm across). A palm can have 18-24 leaves that are 5-7 m long. The leaflets can be up to 100 per leaf and 50-160 cm long by 3-6 cm wide. After about 15 years the palm produces a large flower on top, then the palm dies. The flowering stalk can be 5-7 m long. The palm has suckers near the base. Some kinds have fertile seeds about 2-3 cm across on the flower. There is a complete range from very long thorns to short or no thorns on the leaf bases.

Distribution: A high watertable is tolerated or required by the plant. Temporary flooding does not appear to affect the crop but permanently flooded sites do not appear to be suitable. Because of the site requirements sago is almost always on locally level ground. The level ground can be a broad flat basin or flood plain or a local depression or stream edge in more dissected terrain. Sago seedlings are hardly harmed, by one rather saline flooding, per fortnight.
Sago seedlings can probably withstand a salinity of EC = 10mmho / cm. The maximum altitude is about 1200 m but the optimum is between sea level and 800 m. Sago palms grow well in wet conditions. It can tolerate saline or brackish water. It grows better in well drained than in poorly drained conditions. They are widely distributed in the central and southern Philippines. They also occur in Papua New Guinea and Indonesia. It suits hardiness zones 11-12.

Cultivation: Suckers or seedlings are planted in fresh water swamps or along creeks. Once stands are established in swamps, they continue to re-grow from suckers. Plant clusters are thinned by removing some suckers. Some "seeds" will not grow but those that are fertile need to be planted as soon as they form because they loose their viability. Seeds germinate within 3 weeks. To plant sago, the planting site near a creek or in a damp place, is first cleared of trees and rubbish. A sucker of a suitable variety is chosen from an old sago clump. A suitable sucker probably has fronds 3-4 m long and is about 1.5 years old. This is chopped through with an axe. The sucker is then simply taken to a new site and planted in a shallow hole 30 cm x 30 cm x 30 cm. If several palms are being planted, they should be about 7 m apart. The optimum spacing is considered to be 275 clumps per hectare. To thin out a large group of suckers a small hole (10 cm x 10 cm) is cut with an axe into the top of the trunk of a sucker that is not wanted. This hole lets the sago beetle in and the sago grubs that develop quickly kill out the sucker. They don't get into the main palm or other suckers unless a hole is made. After a few months when the sucker is seen to be dead it can be split open to provide a feed of sago grubs.

Production: It takes 12 to 15 years for a sago palm to grow big enough to cut down. Palms in poor soil grow more slowly. Palms are ready to harvest after about 15 years. In swamps, about 10 to 60 trunks are ready per hectare each year. An average processing rate is 2.2 kg/hr of starch.
First the sago palm is cut down. Mostly this is men's work. Then the bark is split off the trunk for about one metre along its length. Normally this bark is carefully laid out at the sides propped up by logs so that it both makes a seat for the person to sit on and a mat for the shredded pith of the trunk to fall onto. Sago in the trunk of the palm is all mixed up with the fibres of the plant.

So this pith has to be shredded up into small pieces and the starch is then washed out. Special tools are made for pounding up the trunk. They need to be light, strong and with a hard stone (or metal) head. In areas where sago is the main food, sago is women's work. The woman sing special songs while they work. In areas where sago is not the main food, both men and women pound sago. The shredded pith of the palm is put into the bowl made by the fronds and the starch is washed out by banging the pith with a stick and pouring water over it. The filtered starch is allowed to settle out in a bowl. It is then dried and taken home. It takes about one hour to pound enough sago, then wash out the starch, seive it and allow the starch to settle to give between 2 and 3 kilograms of starch.

Use: The bud can be eaten cooked.
Sago starch can be processed from the pith. This is cooked and eaten.
The sap can be collected for a drink that is called "tuba" in the Philippines.
Sago grubs are often cultivated and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Starch	27	1197	0.2		0.7		0	
Cabbage								
Grubs								

Insects:

Agapophyta bipunctata Boisd.	Pentatomidae (HEM.)	A bug
Oryctes centaurus Sternberg	Scarabaeidae (COL)	Rhinoceros beetle
Oryctes rhinoceros (L.)	Scarabaeidae (COL)	Asiatic rhinoceros beetle
Papuana spp.	Scarabaeidae (COL)	Taro beetles
Promecotheca papuana Csiki	Hispidae (COL)	Coconut leaf miner
Rhabdoscelus obscurus Boisduval	Curculionidae (COL)	Cane weevil borer
Rhynchophorus bilineatus (Montr.)	Curculionidae (COL)	Black palm weevils
Rhynchophorus ferrugineous (Oliv.)	Curculionidae (COL)	Red palm weevils
Rhynchophorus papuanus Kirsch	Curculionidae (COL)	Palm weevils
Scapanes australis (Boisd.)	Dynastidae (COL)	
Trochorhopalus strangulates Gyllenhal	Curculionidae (COL.)	A weevil
Leptococcus metroxyli Reyne	Pseudococcidae (HEM)	

Diseases:

Sooty mould	Fungus	*Borinquenia sp.*
Black mould on leaves	Fungi	*Melanographium sp*
	And	*Tripospermum sp.*
	and	*Zygosporium gibbum* (Sacc.Rousseau & E Bommer) S. Hughes
Parallel sided leaf spot	Fungus	*Sphaerulina sp.*
Leaf spot	Fungus	

(Also several fungi isolated from processed sago)

Pests:

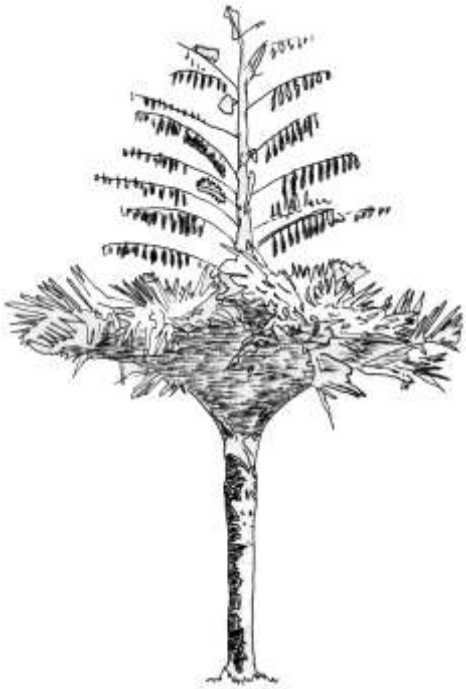
Importance: A very important staple food in several swampy coastal areas of Papua New Guinea.

Names

English: Solomon's sago
Tok pisin:
Tok ples:

Scientific name: *Metroxylon salomonense* (Warburg) Becc.
Synonyms: *Metroxylon bougainvillense* Becc.
Plant family: Arecaceae

Description: A sago palm. It is a solitary palm with no suckers at the base. It can grow 17 m high. The trunk can be 1.3 m across. The crown is graceful with arching fronds. There can be spines on older palms. The leaves are long with wide leaflets along the stalk. They are dark green. The flower is produce at the top of the palm. The flower is very large and takes 15-20 months for the flower to fully develop and produce seeds. The flower arrangement has branches that are spreading and drooping. The seeds are large (10 cm across). They are scaly and straw coloured. After another 2 years the palm gradually dies.



Distribution: It is a tropical plant. It grows in North Solomons Province of Papua New Guinea and the Solomon Islands. It grows in less swampy sites than sago. It needs fertile soils. It can grow up to 880 m altitude. It suits hardiness zones 11-12.

Cultivation: Plants are grown from seed.

Production: Time to maturity is 12-15 years. The palm is felled, the outer hull stripped off then the pith pounded and the starch extracted by washing in water and letting the starch settle out. Four men can cut, process and collect the starch from one palm in 4-5 hours. When a team do this work it is allocated amongst cutters, shredders, washers and packers.

Use: The starch is extracted from the trunk and eaten cooked.
The palm cabbage is edible.

Food Value: Per 100 g edible portion

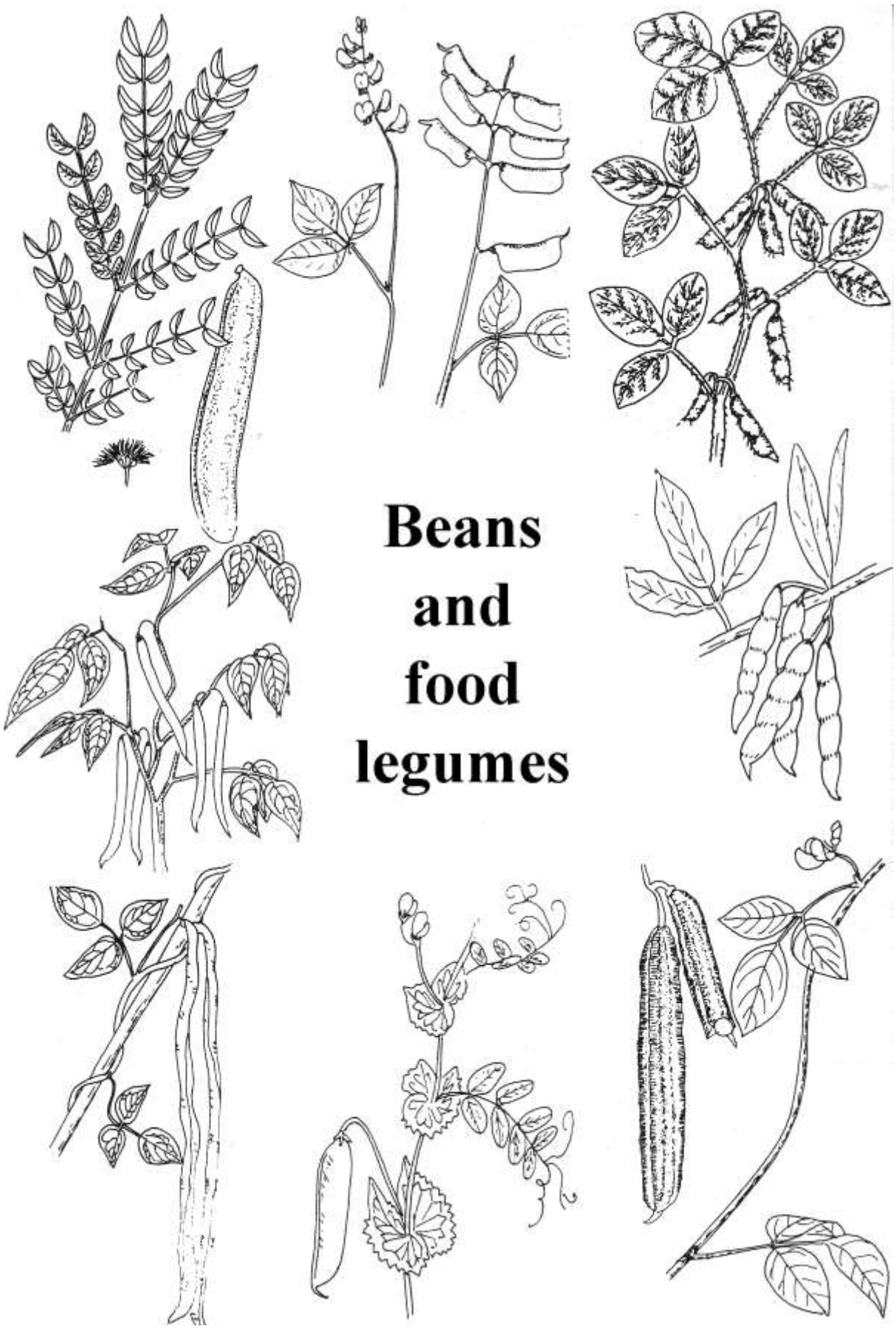
Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Starch								
Cabbage								

Insects:
Probably similar to sago

Diseases:
Probably similar to sago

Pests:

Importance: In Papua New Guinea, mostly in North Solomons province, the sago starch is used as a reserve food and for special functions.


Beans
and
food
legumes

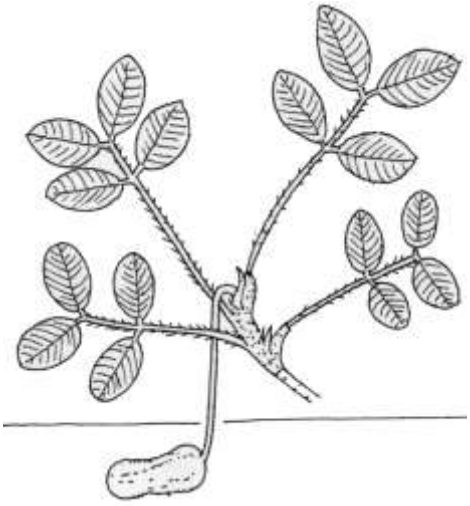
Beans and food legumes

English name	Tok Pisin	Scientific name	Page
Peanut	Pinat	*Arachis hypogea*	**51**
Winged bean	Asbin	*Psophocarpus tetragonolobus*	**53**
Lablab bean		*Lablab purpureus*	**56**
Yard long bean		*Vigna unguiculata* subsp. *sesquipedalis*	**57**
Cowpea		*Vigna unguiculata* subsp. *unguiculata*	**59**
Pigeon pea		*Cajanus cajan*	**61**
Soybean		*Glycine max*	**63**
Lima bean		*Phaseolus lunatus*	**65**
Common bean	Bin	*Phaseolus vulgaris*	**66**
Pea	Pi	*Pisum sativum*	**68**
Jack bean		*Canavalia ensiformis*	**70**
Sword bean		*Canavalia gladiata*	**71**
Mung bean		*Vigna mungo*	**72**
Green gram bean		*Vigna radiata*	**74**
Rice bean		*Vigna umbellata*	**75**
Scarlet runner bean		*Phaseolus coccineus* subsp. *coccineus*	**76**
Velvet bean		*Mucuna pruriens*	**77**
Velvet bean		*Mucuna pruriens* var *utilis*	**78**
D'Albertis creeper		*Mucuna albertissi*	**79**
Broad bean		*Vicia faba*	**80**
Guar bean		*Cyamopsis tetragonolobus*	**81**
Chickpea		*Cicer arietinum*	**82**

Names

English: Peanut
Tok pisin: Pinat
Tok ples:

Scientific name: *Arachis hypogea* L.
Synonyms:
Plant family: Fabaceae



Description: A spreading bushy plant that grows up to about 40 cm high. Leaves are made up of 2 pairs of leaflets arranged opposite each other. Flowers are produced in the axils of leaves. Two main kinds occur. They are often called runner and bunch types. The runner kind has a vegetative or leafy branch between each fruiting branch and therefore produces a more spreading type of plant. This is called "Virginia" peanut. The pods have 2 dark brown seeds. The other kind produces fruiting branches in a sequence one after the other along the branches. These are called "Spanish-Valencia" types. They grow as a more upright plant and grow more quickly. They have lighter coloured leaves and the pods have 2 to 6 seeds that are often white. Virginia types have the flowers in alternate pairs.
Spanish and Valencia types have several flower branches one after another along the stem. Pods are produced on long stalks that extend under the ground. The stalk or peg from the flower grows down into the soil and then produces the pod and seed under the ground. The flower needs to be no more than 18 cm from the soil for the seedpod to develop under ground.

Distribution: Peanuts grow well from sea level up to about 1650 metres altitude in the equatorial tropics. They need a temperature of about 28°C and between 24°C and 33°C. The plants get killed by frost. They need a well drained soil and cannot stand waterlogging. Therefore they are often grown on raised garden beds. They do better in drier areas but need 300 to 500 mm of rain during the growing season. Near harvest dry weather is needed. Short season cultivars are used in semi arid regions. It suits hardiness zones 8-12. Peanuts require soil with good levels of calcium or they produce empty pods. Adding gypsum will improve this. If the nutrient boron is short then flowers won't flower and fruit properly. Because peanuts are legumes, they have root nodule bacteria that can fix their own nitrogen and this means they can still give good yields in grassland soils where nitrogen is at a lower level

Cultivation: The seeds or nuts are normally removed from the shell before planting and are sown 2 to 3 cm deep. The alternately branched or Virginia-type of peanuts have a dormancy period so that they must be stored before replanting. A suitable spacing is 10 cm between plants and 60 to 80 cm between rows. Often plants are grown in mixed cultures with other plants but where a pure stand is used up to 250,000 plants per hectare are used. The soil needs to be weeded and loose by the time the flowers are produced to allow the peg for the seedpods to penetrate the soil. Normally when the whole plant dies off the plant are ready to pull. They are left to dry in the sun for 3 or 4 days.

Production: Flowering may commence in 30 days. It takes from 3.5 to 5 months till maturity. They are harvested when the top of the plants die. The whole plant is pulled out. Virginia peanuts have a longer growing season and the seeds need to be stored for a while before they will start to regrow. (30 days.)

Use: The seeds can be eaten raw, or cooked. The young leaves are edible, cooked.
Oil is extracted from the seeds and is edible. The remaining meal is also eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds fresh	45.0	1394	15.0		1.5	Tr	10	
Seeds dry	4.5	2364	24.3		2.0	0	Tr	3.0
Leaves								

Insects:

Achaea janata (Linnaeus)	Noctuidae (LEP)	Cacao false looper
Adoxophyes melichron	Tortricidae (LEP)	Leaf roller
Alticus minutus Reut	Miridae (HEM)	Grass bug
Alticus tibialis Reut	Miridae (HEM)	Grass bug
Aphis craccivora Koch	Aphididae (HEM)	Cowpea aphid
Apirocalus spp.	Curculionidae (COL)	Horned weevil
Aulacophora spp.	Chrysomelidae (COL)	Pumpkin beetles
Coccus longulus (Douglas)	Coccidae (HEM)	
Dysmicoccus brevipes (Cockerell)	Pseudococcidae (HEM)	Pineapple mealy bug
Ectropis sabulosa Warr.	Geometridae (LEP)	Cacao looper
Euborellia annulipes Lucas	Labiduridae (DERM)	
Gryllotalpa africana Pal.	Gryllotalpidae (ORTH)	Mole crickets
Homona coffearia Nietn.	Tortricidae (LEP)	Coffee leaf roller
Lamprosema indica F.	Pyralidae (LEP)	Bean leaf rollers
Lamprosema diemenalis (Guenee)	Pyralidae (LEP)	Bean leaf rollers
Megalurothrips usitatus Bagnall	Thripidae (THYS)	
Nysius epiensis China	Lygaeidae (HEM)	
Orosius argentatus Evans	Cicadellidae (HEM)	
Oxidus gacilis		
Papuana spp.	Scarabaeidae (COL)	Taro beetles
Philia femorata Walk.	Pentatomidae (HEM.)	
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Spodoptera litura (Fab)	Noctuidae (LEP)	Cluster caterpillar

Diseases:

Seedling death	Fungus	*Aspergillus niger* van Tieghem.
Collar rot	Fungus	*Athelia rolfsii*
	And	*Botryodiplodia theobromae*
Large leaf spot	Fungus	*Leptosphaerulina trifolii*
Leaf spot	Fungus	*Colletotrichum sp.*
Leaf spot	Fungi	*Mycosphaerella arachidis* Deighton
	And	*Mycosphaerella berkeleyi* Jenkins
Collar rot	Fungus	*Phomopsis sp.*
Rust	Fungus	*Puccinia arachidis* Speg
Root rot	Fungus	*Pythium sp.*
	And	*Rhizoctonia*
Blackening stems	Fungus	*Thanatephorus cucumeris*
Bacterial wilt peanut	Bacterium	*Pseudomonas solanacearum*
Mosaic	Virus	
Leaf mottle	Virus	Marginal leaf chlorosis virus
Mild mottle	Virus	Cowpea mild mottle virus

Pests:

Importance: A very popular snack food in all areas where it can be grown. Seeds are also sold.

Names

English: Winged bean
Tok pisin: Asbin
Tok ples:

Scientific name: *Psophocarpus tetragonolobus* (L.) DC
Synonyms:
Plant family: Fabaceae



Description: A climbing perennial bean up to 3 or 4 m tall. It can regrow each year from the fattened roots. The stems twine around supports or trail over the ground. The leaves have 3 leaflets. The leaf stalks are long. The leaflets are 8-15 cm long. The flowers are blue or white. They occur on the ends of branches from within the axils of leaves. Pods have wavy wings or are roughly square in cross section. They are 6-36 cm long with 5-30 seeds. Seeds can be white, yellow, brown or black. They are bedded in the solid tissues of the pod. The seeds are round smooth and brown with a small hilum. Nodules on the roots are many and large.

Distribution: The bean grows from sea level up to about 1850 m altitude in the tropics. It normally only produces tubers between 1200 and 1850 m. Because of the effect of daylength is will not produce flowers or pods at places far removed from the equator. Winged bean is a short day plant. Winged bean is a plant ideally suited to the tropics including the hot humid lowlands.

Papua New Guinea is a centre of diversity for winged beans and they are grown in many areas of the country. They can be seen from sea level up to about 2300 m altitude although they are less common above 1850 metres and normally only produce tubers between 1200 and 1850 m altitude. For maximum seed production winged beans need temperatures between 23°C and 27°C and for tubers the temperatures should be between 18°C and 22°C. This means the main areas of production occur between 20°N and 10°S latitudes. Winged beans can grow on a wide variety of soils. Winged beans have been grown on soils with pH from 3.6 to 8.0. Soils that are very acid have soluble aluminium to which winged beans are sensitive. Soils should not be waterlogged. Winged beans are mostly self-pollinated but limited outcrossing has been reported. Hard seed coats have been reported from dried stored seed. The amount of vegetative growth increased with increasing pH from 4.7 to 5.5. Nitrogen percentage in tissues increased with pH from 4.7 to 6.2. Winged beans have been grown in soils with pH between 3.6 and 8.0. Winged bean is sensitive to aluminium in soil solution. Plants are intolerant of waterlogging. Flowering is reduced by low levels of sunlight. Shading improves pod length and seed number. Root knot nematode can cause severe damage in some places.

Cultivation: Seeds are sown at the beginning of the rainy season. Seeds are planted 2-3 cm deep and about 25-35 cm apart. If seeds have been dried and stored then they can suffer from hard seed coats and this delays the germination of seeds. But normally seeds start to grow in about 15 or 16 days. Plants grow slowly to start with, so weeding is important but then plants grow rapidly. After 46 to 92 days they are producing flowers. If fattened roots are important some of the leaves and flowers and tips are pruned off at this stage. These can be eaten. Pods develop 10 to 13 weeks after planting and tubers occur 4-5 months after planting.

For tubers, vines are pruned off at about 1 m high (or left unstaked) and some flowers are removed. Winged beans are grown for their edible roots, edible leaves, edible flowers, edible pods and edible seeds. The cultivation procedures vary slightly depending on which product is the preferred goal. The two main types of winged bean are short-podded ones that are used for

tubers, and long podded ones that have poor tubers. Tuber production is poor in tropical lowland conditions.

Production: The first green pods are ready about 10 weeks after sowing. Tubers are ready after 4-8 months. Seed yields of 1.2 tons/ha and tuber yields of 4 tons/ha are possible. A single plant can produce up to 75 pods. Dry bean yields of 45 to 330 g per plant can be produced depending on variety. Tuber yields of 5500 to 12000 kg per hectare have been produced. Seeds can contain a trypsin inhibitor that reduces protein digestibility. This inhibitor is destroyed by soaking seeds then boiling them well. Tubers can also contain this chemical and need to be well cooked.

Use: The young pods are edible.
The ripe seeds are edible.
The young leaves are edible.
The flowers are edible.
The root tubers are edible.
The seeds can be used to extract an edible oil.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	8.5	1764	41.9		15.0		Tr	
Pods	92.0	105	2.1					
Leaves	95.0	197	5.0		6.2	809	30	1.3
Roots	57.4	619	11.6		2.0	0	0	1.4
Flowers								

Insects:

Amblypelta spp.	Coreidae (HEM)	Amblypelta bugs
Aphis craccivora Koch	Aphididae (HEM)	Cowpea aphid
Aphis gossypii Glover	Aphididae (HEM)	Melon aphid
Araecerus fasciculatus Degeer	Anthribidae (COL)	
Araeocorynus cumingi Jekel	Anthribidae (COL)	
Erythroneura sp.	Cicadellidae (HEM)	
Euproctis sp.	Lymantriidae (LEP)	
Hedylepta spp.	Pyralidae (LEP)	
Homeoxipha fuscipennis	Gryllidae (ORTH)	
Henosepilachna haemorrhoea (Biel)	Coccinellidae (COL)	Leaf eating ladybird
Henosepilachna signatipennis Boisd.	Coccinellidae (COL)	Leaf eating ladybird
Lampides boeticus L.	Lycaenidae (LEP)	Pea Blue butterfly
Lamprosema diemenalis (Guenee)	Pyralidae (LEP)	Bean leaf rollers
Lamprosema indica F.	Pyralidae (LEP)	Bean leaf rollers
Leucoptera psophocarpella Brad. & Cart.	Lyonetiidae (LEP)	Winged bean blotch miner
Maruca testulalis (Geyer)	Pyralidae (LEP)	Bean pod borer
Mythimna loreyi (Dup.)	Noctuidae (LEP)	Rice armyworms
Mythimna separata (Walk.)	Noctuidae (LEP)	Rice armyworms
Nezara viridula (Linnaeus)	Pentatomidae (HEM)	Green Vegetable bug
Nyctemera baulus Boisduval	Arctiidae (LEP)	
Ophiomyia phaseoli (Try.)	Agromyzidae (DIPT)	Bean fly
Oribius inimicus Mshl.	Curculionidae (COL)	Shot hole weevil
Phaneroptera brevis Aud.-Serv	Tettigoniidae (ORTH)	Grasshopper
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Prosoplus oblique plagiatus Breuning	Cerambycidae (COL)	
Riptortus annulicornis Boisd.	Coreidae (HEM)	
Ropica honesta Pascoe	Cerambycidae (COL)	

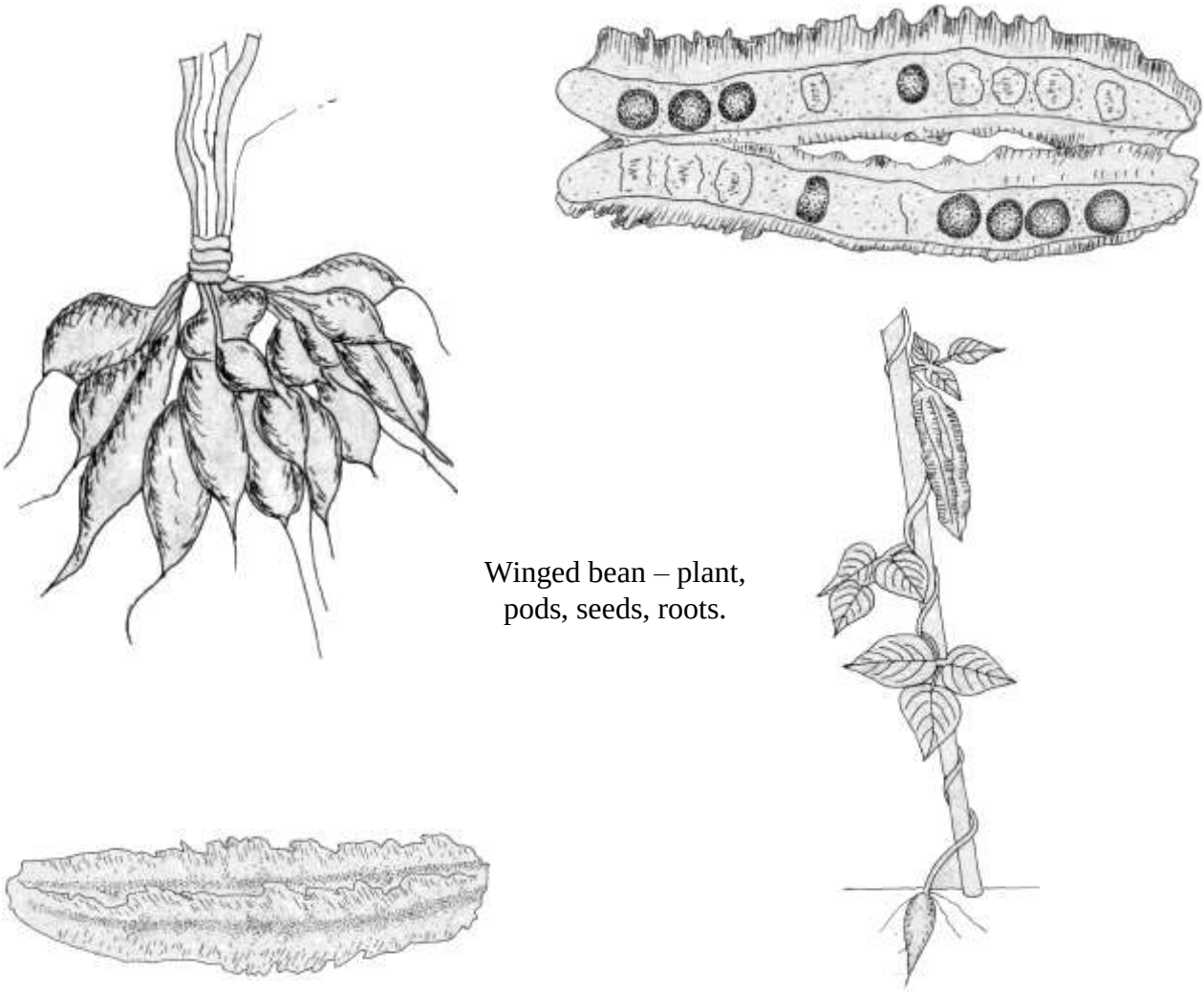
Spodoptera litura Fab.	Noctuidae (LEP)	Cluster caterpillar
Tiracola plagiata Walk	Noctuidae (LEP)	Cacao armyworm
Zizina otis (F.)	Lycaenidae (LEP)	Common grass blue butterfly
Zygina sp.	Cicadellidae (HEM)	

Diseases:

Flower blight	Fungus	*Choanephora cucurbitarum*
Anthracnose	Fungus	*Colletotrichum lindemuthianum*
Leaf spot	Fungus	*Didymella sp.*
Collar rot	Fungi	*Macrophomina phaseolina*
	And	*Fusarium spp.*
	And	*Thanatephorus cucumeris*
Sooty mould	Fungus	*Meliola erythrinae* var. *psophocarpi*
Powdery mildew	Fungus	*Erysiphe cichoracearum*
Leaf spot	Fungus	*Pseudocercospora psophocarpi*
False rust	Fungus	*Synchytrium psophocarpi* Racib
Leaf curl	Possible virus	
Little leaf	Possible mycoplasma like organism	

Pests:

Importance: Winged bean is very important for tubers in the Eastern and Western Highlands of Papua New Guinea and moderately common for beans in other places.



Winged bean – plant, pods, seeds, roots.

Names

English: Lablab bean
Tok pisin:
Tok ples:

Scientific name: *Lablab purpureus* (L.) Sweet
Synonyms: *Dolichos lablab* L.
Plant family: Fabaceae



Description: A climbing bean that can have vines 1-5 m long. It keeps growing from year to year. The stems can be smooth or hairy. Leaves are made up of 3 almost triangular leaflets. The leaflets are 5-15 cm long and 3-14 cm wide. The side leaflets are somewhat asymmetrical. Often the plants are flushed purple. The flowering clusters are 5-20 cm long. Flowers are often white but can vary from red to blue. The pods are flattened, pointed and up to 12 cm long and 2 cm wide. Inside there are 3-5 white or dark seeds. Seedpods have a wavy margin. The seeds are 0.5-1.5 cm long. (This bean is similar to Lima bean but the keel of the flower in not spirally twisted, the pod ends more bluntly with a long thin style at the end and the hilum on the seed is longer.)

Distribution: It mostly grows between 750 and 2175 m altitude in the tropics. It is drought resistant and can grow in quite low rainfall areas. In Nepal it grows to about 2500 m altitude. It suits hardiness zones 9-12.

Cultivation: Seeds are sown at 30 x 60 cm spacing near stakes or trees. About 20 kg of seed per hectare are required. Fertilising with nitrogen and potash until flowering is recommended. Young pods are ready 4-6 months after planting and seeds 6-8 months. Pods are often harvested over 2 or 3 years. Pollination and seed setting are reduced in cold weather.

Production: Young pods are ready 4-6 months after planting and seeds 6-8 months. Pods are often harvested over 2 or 3 years. Pollination and seed setting are reduced in cold weather.

Use: The young pods, ripe seeds and young leaves are edible, cooked.
The seeds can also be sprouted then crushed and cooked.
Caution: Many types can be poisonous unless boiled and the cooking water thrown away.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed young	86.9	209	3.0		0.8	14	5.1	0.4
Seeds dry	10.0	1428	22.8		9.0		Tr	
Pods	82.0		4.5		10.0		1.0	
Leaves								

Insects: and probably other bean insects

Icerya seychellarum (Westwood)	Margarodidae (HEM)	

Diseases:

Leaf spot	Fungus	*Ascochyta dolichi* Fragaso
Angular leaf spot	Fungus	*Cercospora canescens* Ellis and Martin
Tip wilt	Fungus	*Choanephora cucurbitarum*
Leaf blight	Fungus	*Thanatephorus cucumeris*
Small twisted leaves	Probably virus	

Pests:

Importance: A traditional bean common and quite widely used in some Highland areas of Papua New Guinea.

Names

English: Yard long bean, Snake bean

Scientific name: *Vigna unguiculata* subsp. *sesquipedalis* (L.) Verdc.

Tok pisin:

Synonyms: *Vigna sesquipedalis* (L.) Fruw.

Tok ples:

Plant family: Fabaceae

Description: A climbing bean with long pods. The vines can be 3 m long. They normally twine around sticks. Dwarf kinds also occur. Leaves have 3 leaflets. The leaflets are oval and side leaflets are at an angle. Leaflets can be 2-16 cm long by 1-12 cm wide. The centre leaflet can have lobes near the base and the side leaflets can have lobes on the outer edge. The leaf stalks can be 2-13 cm long. The flowering stalks are in the axils of leaves. There can be few or several flowers. The flowers can be white, yellow or blue. Flowers are 1-3 cm long by 1-3 cm wide. Pods are long (up to 90 cm) and flexible. The seeds can vary between white to dark brown. They are oblong or kidney shaped. Seeds are 4-12 mm long by 2-6 mm wide.



Distribution: Plants grow in coastal areas in the tropics from sea level up to about 300 m in equatorial regions. Seeds germinate in moist soil over 22°C. For growth, day temperatures between 25-35°C and night temperatures not below 15°C are required. It suits wet areas and cannot tolerate drought. Plants are day length neutral. They perform best under full sunlight but can tolerate some shade. It has a high water requirement for the full-grown crop (6-8 mm per day). It can tolerate a wide range of soils with pH of 5.5-7.5. Seeds show no dormancy.

Cultivation: Plants are grown from seed. Seeds germinate quickly (2-3 days) and plants grow rapidly. Flowering occurs after 5 weeks and harvesting of young pods can start 2 weeks later. Plants die after about 3-4 months. A spacing of 60 cm is suitable. Plants need sticks to climb up. Sticks about 2-2.5 m long are suitable. Often 5 or 6 seeds are sown around the one stick. Plants are often topped when growing too vigorously. It only grows as an annual bean so seeds need to be replanted each year.

Production: The pods need to be harvested every 2 or 3 days. Diseases get worse if the bean does not have sticks to climb. The damage by bean pod borer is less if snake beans are grown intercropped with maize.

Use: Both the young pods and leaves are eaten.
The ripe seeds can also be eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Pods								
Seeds								
Leaves								

Insects:

Anticarsia irrorata F.	Noctuidae (LEP.)	
Aphis craccivora Koch	Aphididae (HEM)	Cowpea aphid
Cassena intermedia Jac.	Chrysomelidae/Galerucidae (COL.)	Leaf beetles
Cassena papuana (Jac.)	Chrysomelidae/Galerucidae (COL.)	Leaf beetles
Chrysodeixis chalcites (Esp.)	Noctuidae (LEP)	Green looper
Coccus longulus (Douglas)	Coccidae (HEM)	
Ferrisia virgata (Cockerell)	Pseudococcidae (HEM)	
Helopeltis clavifer (Walker)	Miridae (HEM)	Cacao mired
Homona coffearia Nietn.	Tortricidae (LEP)	Coffee leaf roller
Lampides boeticus L.	Lycaenidae (LEP)	Pea Blue butterfly or pod borer
Lamprosema indica F.	Pyralidae (LEP)	Bean leaf rollers
Lamprosema diemenalis (Guenee)	Pyralidae (LEP)	Bean leaf rollers
Maruca testulalis (Geyer)	Pyralidae (LEP)	Bean pod borer
Nezara viridula (Linnaeus)	Pentatomidae (HEM)	Green Vegetable bug
Ophiomyia phaseoli (Tryon.)	Agromyzidae (DIPT)	Bean fly
Oribius spp.	Curculionidae (COL)	Shot hole weevils
Plautia brunneipennis	Pentatomidae (HEM)	Stink bug
Riptortus spp.	Coreidae (HEM)	Pod sucking bug
Saissetia coffeae (Walker)	Coccidae (HEM)	Coffee scale
Zizina otis (F.)	Lycaenidae (LEP)	Common grass blue butterfly

but often the damage is less than on other beans

Diseases:

Leaf spot	Fungus	*Cercospora canescens* Ell. & Martin
Leaf spot	Fungus	*Choanephora cucurbitarum*
Powdery mildew	Fungus	*Sphaerotheca fuliginea*
Rust	Fungus	*Uromyces appendiculatus*
Mosaic	Virus	Cowpea mosaic virus

Pests:

Importance: The most common and important bean in coastal areas of Papua New Guinea.

Names

English: Cowpea
Tok pisin:
Tok ples:
Scientific name: *Vigna unguiculata* subsp. *unguiculata* (L.) Walp.
Synonyms: *Vigna sinensis* (Linn.) Savi ex Hassk.
Plant family: Fabaceae

Description: A creeping bean type plant with straight firm pods. Both cover crop types (leafy) and grain types occur. There is a deep taproot and many branches occur from it in the surface of the soil. The root nodules are large and round. They can be 5 mm across. The leaves have 3 leaflets. The end leaflet can be 12-16 cm long. This leaflet is larger than the side leaflets. The side leaflets are assymetrical. The stipules at the base of the leaf are large and with spurs at their base. Flowers occur often in pairs on the end of long flowering shoots. This stalk can be 2 cm to 30 cm long. Only 2-4 flowers in each stalk produce pods. Flowers are white, yellow or blue. They are large and showy. The standard petal is 2-3 cm across. The pods are about 15 cm long. The seeds are white except for a dark scar.



Distribution: It grows from sea level to 1800 metres altitude in the tropics. Plants can stand high temperatures. Some kinds can tolerate drought. They are sensitive to cold and killed by frost. They can grow on a range of soils providing they are well drained. They are a short day plant. They do well in the semiarid tropics.

Cultivation: It is grown from seeds. Seed collection is easy. Seeds remain viable for several years if carefully stored. A seeding rate of about 20 kg per ha is suitable and seed are sometimes broadcast then thinned. Cowpeas mostly inbreed giving pure lines.

Production:

Use: The young leaves, young pods and ripe seeds are all eaten.
The seeds are also used for bean sprouts.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Pods	89.5	142	2.6		0.7	45	17.0	0.2
Leaves	91.3	92	4.7		1.1	576 IU	18	0.2
Seeds dry	11.2	1189	23.5		4.7	712 IU	35	0.3
Seeds young	75.5	406	3.2		1.1	79	2.2	1.0

Insects:

Acrocercops caerulea Meyrick	Gracillariidae (LEP.)	
Aphis craccivora Koch	Aphididae (HEM)	Cowpea aphid
Aspidiotus destructor Signoret	Diaspididae (HEM)	Coconut scale
Dysdercus cingulatus (F.)	Pyrrhocoridae (HEM)	Red cotton bug
Dysdercus sidae Montr.	Pyrrhocoridae (HEM)	Red cotton bug
Epilachna signatipennis Boisd.	Coccinellidae (COL.)	Leaf eating beetle
Euproctis sp nr *fulvistriata*	Lymantriidae (LEP.)	
Ferrisia virgata (Cockerell)	Pseudococcidae (HEM)	
Heliothis armiger Hubn.	Noctuidae (LEP)	Corn earworm

Lampides boeticus L.	Lycaenidae(LEP)	Pea Blue butterfly
Lamprosema indica F.	Pyralidae(LEP)	Bean leaf rollers
Lamprosema diemenalis (Guenee)	Pyralidae (LEP)	Bean leaf rollers
Maruca testulalis (Geyer)	Pyralidae (LEP)	Bean pod borer
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Saissetia neglecta De Lotto	Coccidae (HEM)	
Spodoptera litura Fab.	Noctuidae (LEP)	Cluster caterpillar

and possibly some other bean insects

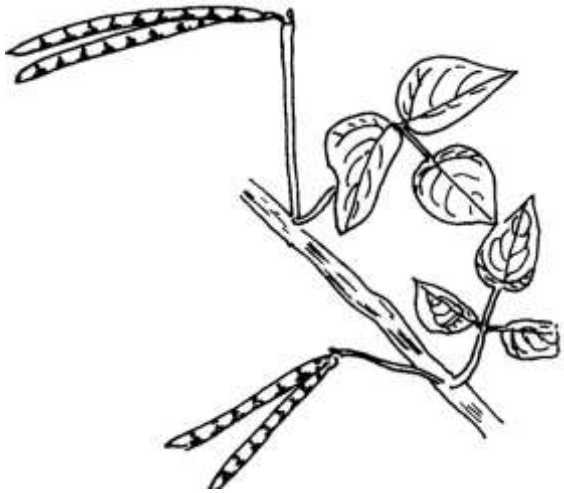
Diseases:

Leaf spot	Fungus	*Alternaria sp.*
Leaf spot	Fungus	*Ascochyta phaseolarum*
Leaf spot	Fungus	*Cercospora canescens*
Leaf spot	Fungus	*Corynespora cassiicola*
Root rot	Fungi	*Fusarium sp.*
	and	*Athelia rolfsii*
Associated with leaf spot	Fungus	*Periconia byssoides* Pers. ex Schw.
Leaf spot	Fungus	*Phoma exigua*
Powdery mildew	Fungus	*Sphaerotheca fuliginea*
Leaf blight	Fungus	*Thanatephorus cucumeris*
Rust	Fungus	*Uromyces appendiculatus*
Mosaic	Virus	Cowpea mosaic virus
Storage rot	Fungus	*Botrydiplodia theobromae*

Pests:

Importance:

It has become well accepted in some areas of Papua New Guinea. eg Baiyer River.



Names

English: Pigeon pea, Dhal
Tok pisin:
Tok ples:

Scientific name: *Cajanus cajan* (L.) Millsp.
Synonyms:
Plant family: Fabaceae

Description: An upright perennial shrubby legume. It lives for 3-4 years. They can be up to about 4 m tall and spreads to 1.5 m wide. The stem is erect and branching. It has a bushy appearance. It has a strong deep taproot. The root nodules are round and sometimes lobed. Young stems are angled and hairy. A leaf consists of 3 leaflets. Leaflets are narrow and green with a silvery green underneath. Leaflet size can be 10 cm x 3 cm. The end leaflet is larger with a longer leaf stalk. Flowers are red and yellow. The large petal has red lines. They are pea shaped and on branched flower stalks which stick upwards in the axils of leaves. Pods are long, straight and narrow, often with 4-8 seeds. The pods are slightly hairy. Pods are often 4-8 cm long and have a beak at the end. Pods are constricted between the seeds. Many varieties of pigeon pea occur. Some are dwarf and daylength neutral. Seeds vary in shape, size and colour.



Distribution: Plants require a tropical or subtropical climate. Plants grow from sea level up to about 1800 m in the tropics. They can tolerate drought and are suited to a drier climate. They can grow in places with less than 600 mm rainfall per year. They do less well in the wet tropics. It suffers in waterlogged soils and is damaged by frost. It can also tolerate heat. It will grow on poor soils. It cannot grow on salty soils. It grows to about 2000 m in Nepal. It suits hardiness zones 10-12.

Cultivation: They are grown from seeds. It is best to sow seeds where the plants are to grow. Seeds normally germinate easily and well. Before sowing seed it helps to soak them in cold water for one day. Seeds store well if kept cool and dry. A spacing of 1.5 m x 1.5 m is suitable. Plants can be cut back and allowed to regrow. Plants can also be grown from cuttings.

Production: Plants are fast growing. Pods are ready after 5 months. Mature seeds take about 8 months. Plants will often live for 3-4 years. Plants are cross-pollinated by insects, or self-pollinated.

Use: Young leaves, shoots and pods are eaten.
Ripe seeds are also edible.
Bean sprouts can be produced and eaten.
Preparation of the seeds for dahl is somewhat complicated.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds dry	10.0	1449	19.5		15.0	55	Tr	
Seeds young	71.8	464	6.0		1.6	13	28.1	0.8
Pods								
Leaves								

Insects:

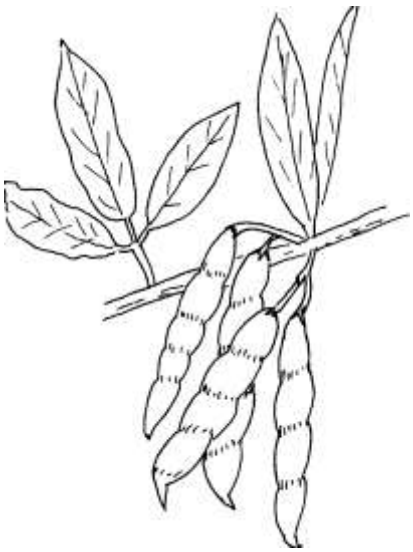
Agapophyta viridula Blote	Pentatomidae (HEM)	
Ceroplastes rubens Maskell	Coccidae (HEM)	Pink wax scale
Clavigralloides acantharis Fabricius	Coreidae (HEM)	
Coptosoma pygmaeum Mont.	Pentatomidae (HEM)	
Depsages granulosa Guerin-Meneville	Cerambycidae (COL)	
Dysmiccocus brevipes (Cockerell)	Pseudococcidae (HEM)	Pineapple mealybug
Heliothis armigera (Huebner)	Noctuidae (LEP)	Corn earworm
Icerya purchasi Maskell	Margarodidae (HEM)	
Icerya seychellarum (Westwood)	Margarodidae (HEM)	
Lampides boeticus L.	Lycaenidae (LEP)	Pea Blue butterfly
Lamprosema indica F.	Pyralidae (LEP)	Bean leaf rollers
Lamprosema diemenalis (Guenee)	Pyralidae (LEP)	Bean leaf rollers
Maruca testulalis (Geyer)	Pyralidae (LEP)	Legume pod borer
Mictis profana F.	Coreidae (HEM)	Crusader bug
Phaneroptera brevis Aud.-Serv	Tettigoniidae (ORTH)	
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Platystomus wallacei Pascoe	Anthribidae (COL)	
Polyomonatus boeticus (L)	Lycaenidae (LEP)	
Pterolophia grisescens Pascoe	Cerambycidae (COL.)	
Saissetia miranda (Cockerell & Parrott)	Coccidae (HEM)	
Steatococcus samaraius Morrison	Margarodidae (HEM)	
Zizina otis (F.)	Lycaenidae (LEP)	Common grass blue butterfly

Diseases:

Leaf spot	Fungus	*Mycovellosiella cajani* (P.Henn) Rangel ex Trot.
Pink disease	Fungus	*Phanerochaete salmonicolor*
On seeds	Fungus	*Aspergillus niger*
	and	*Chaetomium sp.*
	and	*Curvularia lunata*
	and	*Fusarium solani*
	and	*Penicillium sp.*
	and	*Nigrospora oryzae*

Pests:

Importance: A crop being tried out in many villages in Papua New Guinea. It is very popular in many tropical countries especially India and Pakistan. In these countries they are eaten at almost every meal.



Names

English: Soybean
Tok pisin:
Tok ples:

Scientific name: *Glycine max* (L.) Merr
Synonyms:
Plant family: Fabaceae

Description: A small erect bean up to 60 cm tall. It grows each year from seed. Straggling kinds can occur. Stems, leaves and pods are softly hairy. The leaves have 3 leaflets. The leaflets have stalks. Flowers are small and white or blue. They occur in groups in the axils of leaves. Pods have 2-4 seeds. The seeds can be yellow to black.



Distribution: It suits lowland areas. It can be grown from sea level to 2000 m altitude. Many varieties will not flower in the tropics (short days). It needs fertile soil. The best soil acidity is pH 5.5 to 7.0. It is damaged by frost. In Nepal it grows to 1800 m altitude. It suits hardiness zones 7-8.

Cultivation: It is grown from seed. Seeds need to be inoculated with bacteria before planting. Plants need to be about 20 cm apart.

Production: Plants flower about 8 weeks after sowing and pods mature about 16 weeks after sowing. Often plants are pulled up and hung up before threshing out the seed.

Use: The young pods and ripe seeds are eaten. They are used for flour.
Sometimes the young leaves are eaten.
The seeds are also used for sprouts and for making cooking oil and soya sauce etc.
Because soybean contains a trypsin inhibitor they should be cooked and even the sprouts should be lightly cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Pods								
Seeds dry	9.0	1701	33.7		6.1	55		
Seeds young	68.0	584	13.0		3.8	16	27	0.9
Seed sprouts	79.5	339	8.5		1.3	1	8.3	1.0
Leaves								

Insects:

Acrocercops sp.	Gracillariidae (LEP)	Aibika leaf miner
Adoxophyes sp.	Tortricidae (LEP.)	Leaf roller
Alticus tibialis Reut	Miridae (HEM)	Grass bug
Arsipoda tenimberensis Jacoby	Chrysomelidae (COL)	Black flea beetle
Aulacophora spp.	Chrysomelidae (COL)	Pumpkin beetles
Cassena intermedia Jac.	Chrysomelidae/Galerucidae (COL)	
Cassena papuana (Jac.)	Chrysomelidae/Galerucidae (COL)	
Chrysodeixis chalcites (Esp.)	Noctuidae (LEP)	Green looper
Coelophora inaequalis F.	Coccinellidae (HEM)	
Demonax collaris Pascoe	Cerambycidae (COL)	
Dysmiccocus brevipes (Cockerell)	Pseudococcidae (HEM)	Pineapple mealybug
Halticus minutus Reuter	Miridae (HEM)	Flea hopper
Hedylepta inaequalis F.	Pyralidae (LEP)	

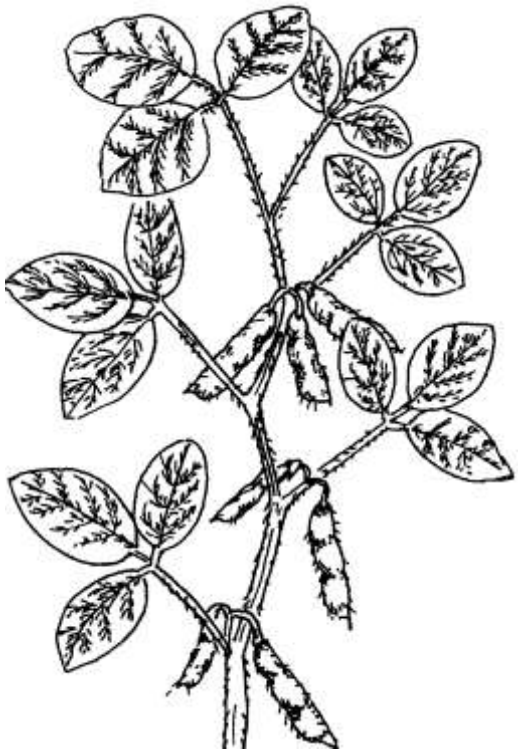
Henosepilachna haemorrhoea (Biel)	Coccinellidae (COL)	Leaf eating ladybird
Henosepilachna signatipennis Boisd.	Coccinellidae (COL)	Leaf eating ladybird
Homona coffearia Nietn.	Tortricidae (LEP)	Coffee leaf roller
Lamprosema diemenalis (Guenee)	Pyralidae (LEP)	Bean leaf rollers
Lamprosema indica F.	Pyralidae (LEP)	Bean leaf rollers
Maruca testulalis (Geyer)	Pyralidae (LEP)	Bean pod borer
Megalurothrips usitatus Bagnall	Thripidae (THYS)	
Nezara viridula (Linnaeus)	Pentatomidae (HEM)	Green Vegetable bug
Ophiomyia phaseoli (Tryon)	Agromyzidae (DIPT)	Bean fly
Oribius inimicus Mshl.	Curculionidae (COL)	
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Pseudaulacaspis pentagona (Targioni)	Diaspididae (HEM)	White scale
Rhinoscapha funebris Chev.	Curculionidae (COL)	
Rhyparidella wauensis	Chrysomelidae (COL)	
Riptortus spp.	Coreidae (HEM)	Pod sucking bug

Diseases:

Leaf spot	Fungi	*Ascochyta sp.*
	And	*Cercospora canescens*
Rust	Fungus	*Phakopsora pachyrhizi* Sydow
Bacterial leaf spot	Bacteria	*Xanthomonas campestris*
Leaf distortion	Possibly virus	
Mosaic	Possibly virus	
Yellow mosaic	Virus	

Pests:

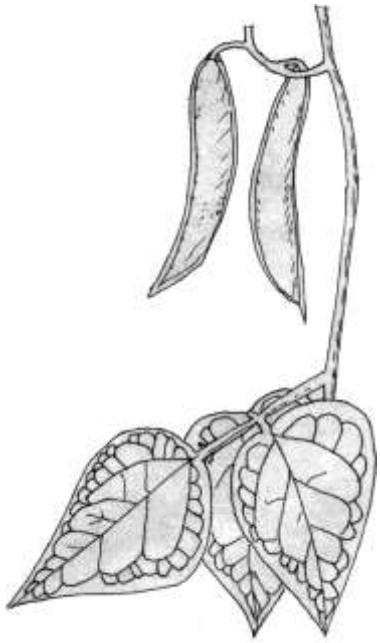
Importance: These beans can be found in small amounts in many places throughout the country of Papua New Guinea. Soybean is a major food plant in warm temperate and subtropical zones.



Names

English: Lima bean
Tok pisin:
Tok ples:

Scientific name: *Phaseolus lunatus* L.
Synonyms:
Plant family: Fabaceae



Description: A perennial climbing bean. It is often a tall vigorously climbing plant that can keep growing for some years. The leaves are slightly rounded at the base and pointed at the tip. The flower is white or yellow. The keel of the flower is twisted which helps tell the difference between this bean and Lablab bean. The pods are long (10 cm), flattened and curved and have 3-4 seeds that are very variable in colour. The seeds are large. The seeds have a short round hilum where the seed is attached to the pod. The seeds also have lines going out from this point across the bean seed.

Distribution: In the tropics it is common between 500 and 2100 m altitude but grows to the limit of cultivation (2700 m). For germination it must have a soil temperature above 15.5°C and cannot withstand frost. In very hot weather seeds often do not set. It is sensitive to a pH less than 6. It suits hardiness zones 8-11.

Cultivation: It is grown from seed. Coloured seeds are often hard to get to grow but white seeded kinds start growing easily. Sow 3-4 seeds in a hill and put a stick 2-3 m tall in the middle. Hills should be about 1 m apart. Seeds should be 2-4 cm deep.

Production: Harvesting can begin after about 100 days. Dried beans can be stored for several months. Yields of 0.12 kg of seeds per square metre have been obtained.

Use: The leaves, young pods and seeds are all eaten. The seeds are eaten fresh or after drying. They are also fried in oil. Dried beans are boiled or baked.
The seeds are sometimes grown as bean sprouts then cooked and eaten.
Caution: Some kinds have poison (hydrocyanic acid). The poison is destroyed by thorough cooking. As well the beans contain a protein inhibitor but this is destroyed by cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds dry	12.0	1407	19.8		5.6	Tr	0	
Seeds young	67.2	515	6.8		2.5	37	10.1	0.8
Pods								
Leaves								

Insects: Probably also other bean insects.

Bean pod borer	*Maruca testulalis* (Geyer)	

Diseases: Probably some other bean diseases as well.

Rust	Fungus	*Phakopsora vignae* (Bres.) Arth.
Concentric spots	Fungus	*Phoma exigua*

Pests:

Importance: A quite important and common bean in many highland areas of Papua New Guinea.

Names

English: Common bean
Tok pisin: Bin
Tok ples:

Scientific name: *Phaseolus vulgaris* L.
Synonyms:
Plant family: Fabaceae

Description: This bean has very many varieties and varies a lot in details. Both short and climbing cultivars of this bean occur. It has a long taproot. Climbing forms can be 2-3 m tall. Bush types are 20-60 cm tall. The leaves are carried one after another along the stem and the leaves have 3 leaflets. The leaf stalk has a groove on the top. The side leaflets are asymmetrical in shape. The leaflets can be 8-15 cm by 5-10 cm. The flowers are in the axils of leaves and have few flowers in a loose form. Flowers are white to purple and pods smooth. Pods are slender and 8-20 cm long by 1-1.5 cm wide. The pods are straight or slightly curved and with a beak at the end. Pods often have 10-12 seeds that are kidney shaped and coloured.



Distribution: A temperate plant. It mostly grows from 700 m to 2000 m altitude in the tropics. In the lowlands it suffers from pest and disease but it can be grown to sea level. It is not suited to the wet tropics. In Nepal it grows up to 1200 m altitude. It suits hardiness zones 8-11.

Cultivation: Plants are grown from seed. Seed should preferably be planted on raised beds. Climbing types need stakes. Plants are self-fertilised. Seeds remain viable fro 2 years. Germination is normally good if seed have been well stored. In many places these beans are intercropped with other plants. If they are grown on their own, bush types can be spaced at 25 cm by 25 cm. Or they can be put closer together in rows wider apart to make weeding and harvesting easier. For dried beans, once the pods are mature and turning yellow, the whole plants are pulled, then dried and threshed.

Production: Dwarf kinds take 6-8 weeks to mature and climbing types take 10-12 weeks. Picking starts 2 weeks after flowering. Yields of dried beans of 1,200 kg per hectare are possible.

Use: The young pods, leaves and mature seeds are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds dry	10.0	1386	25.0		8.0	10	1	2.8
Seeds young	92.0	142	3.0		0.8		20	0.2
Pods	88.0	151	2.5		1.4	750	27	0.2
Seed sprouts	90.7	121	4.2		0.8	0	38.7	0.4
Leaves								

Insects:

Arsipoda tenimberensis Jacoby	Chrysomelidae (COL)	Black flea beetle
Atherigona orientalis Schiner	Muscidae (DIPT)	Shootfly
Aulacophora spp. Olivier	Chrysomelidae (COL)	Pumpkin beetles

Cassena intermedia Jac.	Chrysomelidae/Galerucidae (COL)	Leaf beetles
Cassena papuana (Jac.)	Chrysomelidae/Galerucidae (COL)	Leaf beetles
Colposcelis vignaphila Bryant	Chrysomelidae (COL)	
Epilachna signatipennis Boisd.	Coccinellidae (COL)	Leaf eating beetle
Euricania villica	Ricaniidae (HEM)	Plant hopper
Halticus minutus Reuter	Miridae (HEM)	Flea hopper
Henosepilachna signatipennis Boisd.	Coccinellidae (COL)	Leaf eating ladybird
Henosepilachna haemorrhoea (Biel)	Coccinellidae (COL)	Leaf eating ladybird
Hyposidra talaca (Wlk.)	Geometridae (LEP)	
Icerya seychellarum (Westwood)	Margarodidae (HEM)	
Maruca testulalis	Pyralidae (LEP)	
Nezara viridula (L)	Pentatomidae (HEM)	Green vegetable bug
Ophiomyia phaseoli (Tryon.)	Agromyzidae (DIPT)	Bean fly
Riptortus spp.	Coreidae (HEM)	Pod sucking bug
Pseudaulacaspis pentagona (Targioni)	Diaspididae (HEM)	
Tiracola plagiata Walk	Noctuidae (LEP)	Cacao armyworm

and other insects

Diseases:

Leaf spot	Fungus	*Alternaria tenuis*
Leaf spot	Fungus	*Ascochyta phaseolarum*
Collar rots	Fungus	*Athelia rolfsii*
Grey mould	Fungus	*Botryotinia fuckeliana*
Anthracnose	Fungus	*Colletotrichum lindemuthianum* (Sacc. & Mag.)
Angular leaf spot	Fungus	*Phaeoisariopsis griseola*
Leaf blight & collar rot	Fungus	*Thanatephorus cucumeris* (Frank) Donk.
Leaf spots	Fungi	*Cercospora canescens*
(on old leaves)	and	*Cladosporium oxysporum*
	and	*Corynespora casiicola*
	and	*Periconia byssoides*
Floury white mould	Fungus	*Mycovellosiella phaseoli* (Drummond) Deighton
Rust	Fungus	*Uromyces appendiculatus* (Pers.) Unger
Mosaic	Virus	Bean common mosaic virus ?
Bacterial blight	Bacteria	*Xanthomonas phaseolin*
On seeds	Fungus	*Aspergillus sp.*

Pests:

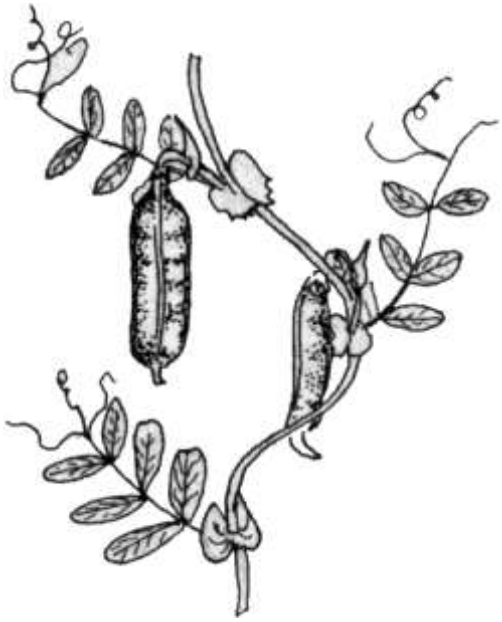
Importance: Of considerable importance at high altitude locations in the tropics.



Names

English: Pea
Tok pisin:
Tok ples:

Scientific name: *Pisum sativum* L.
Synonyms:
Plant family: Fabaceae



Description: A short-lived plant. It is a creeping plant with white or pink flowers. Plants can be 30 cm to 150 cm tall. It has a well-developed taproot and many slender side roots. The stem is weak and round. Leaves are made up of 1-3 pairs of leaflets and a branched tendril at the end. There are large leaf-like stipules at the base of the leaf. The lower half of these stipules has teeth. The flowers occur in the axils of leaves and are either on their own or in 2-3 flowered clusters with equal length stalks. The pods are swollen and green and can have up to 10 seeds inside. Seed shape can vary. Large numbers of varieties have been recorded.

Distribution: Plants grow best at altitudes over 1000 m in the tropics. They suit a humid climate. Hot dry weather interferes with seed setting. They are frost tolerant except at flowering. It is a temperate plant and needs temperatures of 13°C to 18°C. They need a pH of 5.5-6.5 and reasonably good fertility. They cannot tolerate waterlogging or very acid soils. It suits hardiness zones 7-9.

Cultivation: Plants are grown from seed. Seed can be collected for re-sowing. A spacing about 5 cm apart in rows 25 cm apart is suitable. Seed can be 3-5 cm deep. If rotting is a problem, plants can be supported off the ground. Plants need inoculation with bacteria for good production. For dried peas plants are cut when mature then dried and threshed.

Production:

Use: Mostly the young seeds are eaten. They can be eaten raw or cooked.
Sometimes the young pods and leaves are eaten.
The young leaves and buds are cooked as a vegetable.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	78.5	223	5.0		1.2	300	15	0.5
Pods								
Leaves								

Insects:

Adoxophyes melichron	Tortricidae (LEP)	Leaf roller
Cassena intermedia Jac.	Chrysomelidae/Galerucidae (COL)	Leaf beetles
Cassena papuana (Jac.)	Chrysomelidae/Galerucidae (COL.)	Leaf beetles
Heliothis armigera (Huebner)	Noctuidae (LEP)	Corn earworm
Homona coffearia Nietn.	Tortricidae (LEP)	Coffee leaf roller
Lampides boeticus L.	Lycaenidae (LEP)	Pea blue butterfly
Lamprosema diemenalis (Guenee)	Pyralidae (LEP)	Bean leaf rollers

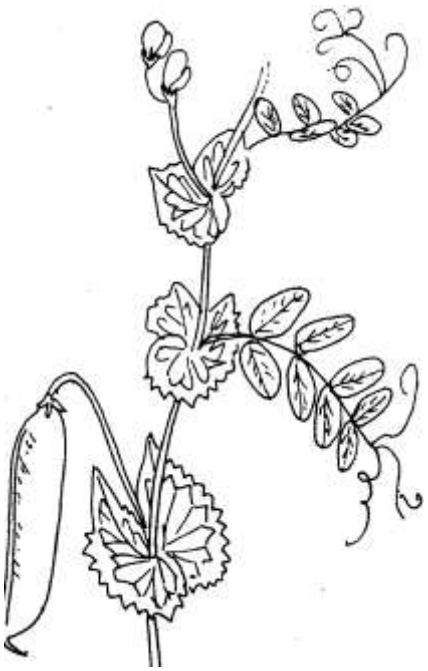
Lamprosema indica F.	Pyralidae (LEP)	Bean leaf rollers
Lyriomyza brassicae (Riley)	Agromyzidae (DIPT)	Cabbage leaf miner
Phaneroptera brevis Aud.-Serv	Tettigoniidae (ORTH)	
Riptortus spp.	Coreidae (HEM)	Pod sucking bug
Spodoptera exempta (Walker)	Noctuidae(LEP)	African armyworm
Spodoptera litura (Fab)	Noctuidae (LEP)	Cluster caterpillar
Tetranychus marianae McGregor	Tetranychidae ACARINA	Red spider mite

Diseases:

Leaf spot	Fungus	*Mycosphaerella pinodes* (Berk & Blex) Vest.
Brown mould	Fungus	*Fulvia fulvum*
Powdery mildew	Fungus	*Oidium sp.*
Leaf spot	Fungus	*Phyllosticta sp.*
Mosaic	Probably virus	
Dry rot seeds	Fungus	*Penicillium sp.*

Pests:

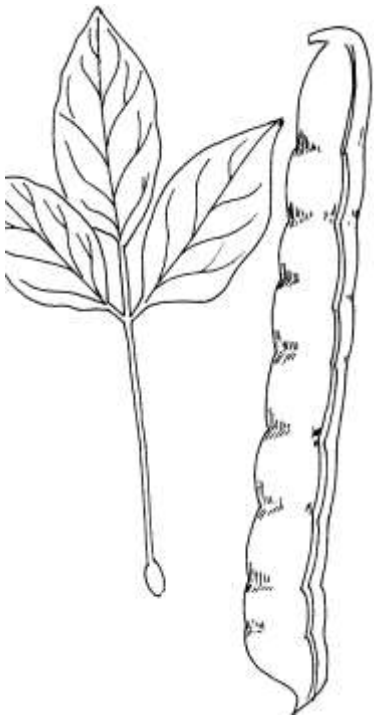
Importance: Gaining importance in some highlands areas in the tropics.



Names

English: Jack bean
Tok pisin:
Tok ples:

Scientific name: *Canavalia ensiformis* (L.) DC.
Synonyms:
Plant family: Fabaceae



Description: A perennial climber, although short kinds do occur. Often it is a more bushy plant than the sword bean. Plants grow up to 1.5 m long. Stems can be hairy. Leaves have 3 leaflets. The leaflets are oval and 5.7-20 cm long by 3.2-11.5 cm wide. The leaf tends to be wedge shaped at the base. The leaf stalks are 2.5-11 cm long. Flowers are red/purple. They occur on flower clusters 5-12 cm long and with flower cluster stalks that are 10-34 cm long. The individual flower stalks are 2-5 mm long. Pods are long and sword shaped. Pods can be 15-35 cm long. Seeds are white with a light brown hilum half as long as the seed. Seeds are 2 cm long, by 1 cm across.

Distribution: It grows in tropical and subtropical places. It requires a fairly high temperature (15°-30°C). It will possibly grow up to 900 m altitude. It is fairly drought resistant and also has some resistance to water-logging and salt in the soil. It can tolerate shade. It can tolerate pH from 4.5 - 8.0 but does best at about 6.1. The optimum mean annual temperature is 14.4°-27.8°C.

Cultivation: It is grown from seeds. Seeds need to be 2 cm deep. A spacing of about 60 cm is suitable. Plants preferably need a support to climb over. It benefits from a fertile soil but adding nitrogen depresses yield.

Production: Green pods are produced in 3-4 months, but ripe seeds need 6-9 months. Yield of seeds can range from 700 to 5,400 kg / ha.

Use: The leaves and top shoots are eaten.
The young pods are eaten.
The flowers can be eaten.
The young and ripe seeds are eaten.
Caution: The ripe seeds can contain poison and need to be well cooked and the water changed before eating. They are also often left under running water or fermented.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Pods	88.0	155	2.4					
Seeds	10.0	1423	20.4		4.9	160	0	
Flowers								
Leaves								

Insects:

Diseases:

Leaves small & distorted	Probably virus	

Pests:

Importance: It is being accepted and grown in some coastal and mid altitude areas.

Names

English: Sword bean
Tok pisin:
Tok ples:

Scientific name: *Canavalia gladiata* (Jacq) DC
Synonyms:
Plant family: Fabaceae



Description: A climbing or sometimes a bushy and upright bean plant. Mostly it is a climber. It can be 4 m long. The leaves have 3 large leaflets. The leaflets are oval and 7.5-20 cm long by 5-12 cm wide. The top of the leaf can narrow abruptly to a tip while the base can be rounded or broadly wedge shaped. The leaves are slightly hairy on both surfaces. The leaf stalk is 5-12 cm long. The flowers are in groups and are white. The flower cluster is 7-12 cm long and the flower cluster stalk 4-20 cm long. The individual flower stalks are 2 mm long. The pods are long (20-40 cm) and curved. Seeds are coloured red or pink. The hilum is dark brown and almost as long as the seed.

Distribution: It requires a tropical climate. Temperatures of 20-30°C suit it well and it grows from sea level to about 1000 m altitude in equatorial zones. They are drought and salt resistant. They can grow on lowland tropical nutrient depleted soils. They can grow on soils with pH from 4.5-7.0. They can tolerate some shade.

Cultivation: They are grown from seeds. Seeds germinate readily and the plant is relatively fast growing. Seeds can be sown 5 cm deep. Plants should be 60-70 cm apart. Climbing types need support. Often natural supports such as trees, walls and fences are used in backyard production. For large scale production 25-40 kg/ha of seed are needed.

Production: Green seeds/pods are produced in 3-4 months and mature seeds in 5-10 months. Seed yields of 700-900 kg/ha are possible. Green pods are hand picked when 10-15 cm long before they swell and become fibrous.

Use: Young pods are cooked and eaten.
Seeds can be cooked and eaten, but the water should be changed.
Caution: The seeds can be poisonous due to hydrocyanic acid and saponin.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Pods	89.0	142	2.8					
Seeds	15.0	1335	27.1					

Insects:

Diseases:

Pests:

Importance: Only occasionally grown.

Names

English: Mung bean
Tok pisin:
Tok ples:

Scientific name: *Vigna mungo* (L.) Hepper
Synonyms: *Phaseolus mungo* L. non Roxb.
Plant family: Fabaceae

Description: A small annual bean with hairy pods. It is an erect herb 20-80 cm tall. Sometimes the stems are twining. The stems have dense yellow or rusty hairs. Leaves have 3 leaflets. The leaflets are oval and 3-10 cm long by 1-5.5 cm wide. The leaf stalks are long but the leaflets stalks are short. Flowers are yellow. They are 1-2 cm long in dense flower clusters. The fruit is a pod 4-7 cm long. They are 5-6 mm wide. Seeds are small and black. There are 4 to 10 seeds per pod. Seeds are 4-4.5 mm long by 4 mm wide. They have square ends.



Distribution: Mainly coastal but probably will grow up to 1800 m altitude in the tropics. It suits dry areas. It is drought resistant. It is grown in areas with rainfall of 900 mm per year. It cannot stand frost or long periods of cloud. It is not suited to the wet tropics. In Nepal they grow to 2000 m altitude. It suits hardiness zones 10-12.

Cultivation: It is grown from seed. Seed collection is easy. Seed can be broadcast or sown as individual plants 25 cm apart.

Production: Flowering commences after 6 weeks. Plants are self-pollinated. Pods are ready to harvest 2 to 4 months after planting. Pods shatter easily. It is easiest to pull the whole plant, dry them for a week then thresh out the seeds. Seed yields of 450-560 kg per hectare after 80 - 120 days are common. 100 seeds weigh about 4 g.

Use: The ripe seeds are eaten. They are mostly eaten as dahl in India. They are fried and roasted and eaten as a snack.
The young pods and young leaves are also edible.
The beans are also used for bean sprouts.
The seeds are used in lentil soup, parched and ground into flour for porridge, or baked into bread.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds dry	12.0	981	22.0		8.0	24	Tr	
Seeds young	93.4	88	2.0		0.7	1	11.4	0.5
Pods								
Leaves								

Insects:

Alticus tibialis Reut	Miridae (HEM)	Grass bug
Amblypelta spp.	Coreidae (HEM)	Tip wilt bug
Anticarsia irrorata F.	Noctuidae (LEP)	
Aphis craccivora Koch	Aphididae (HEM)	Cowpea aphid
Apirokcalus spp.	Curculionidae (COL)	Horned weevil

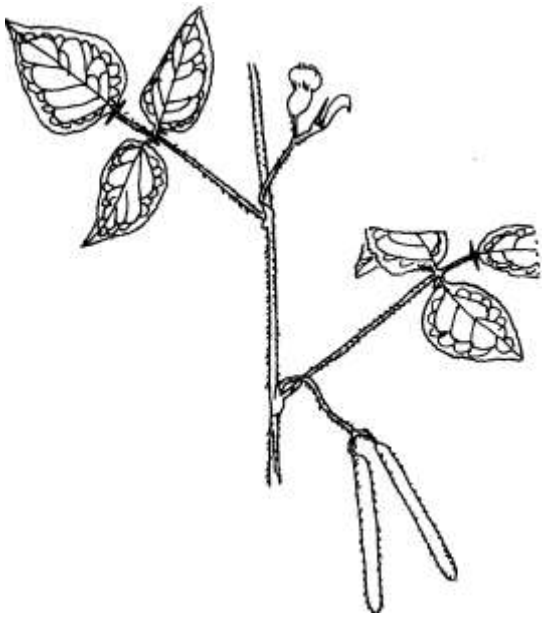
Aulacophora similis Olivier	Chrysomelidae (COL)	Pumpkin beetles
Cassena intermedia Jac.	Chrysomelidae/Galerucidae (COL)	Leaf beetles
Cassena papuana (Jac.)	Chrysomelidae/Galerucidae (COL)	Leaf beetles
Henosepilachna signatipennis Boisd.	Coccinellidae (COL)	Leaf eating ladybirds
Henosepilachna haemorrhoea (Biel)	Coccinellidae (COL)	Leaf eating ladybirds
Homona coffearia Nietn.	Tortricidae (LEP)	Coffee leaf roller
Lampides boeticus L.	Lycaenidae (LEP)	Pea blue butterfly
Lamprosema diemenalis (Guenee)	Pyralidae (LEP)	Bean leaf roller
Lamprosema indica F.	Pyralidae (LEP)	Bean leaf roller
Maruca testulalis (Geyer)	Pyralidae (LEP)	Bean pod borer
Megalurothrips usitatus Bagnall	Thripidae (THYS)	
Melacanthus argineguttatus	Alydidae (HEM)	
Monolepta semiviolacea Fauvel	Chrysomelidae (COL)	Beetles
Nezara viridula (Linnaeus)	Pentatomidae (HEM)	Green vegetable bug
Ophiomyia phaseoli (Tryon.)	Agromyzidae (DIPT)	Bean fly
Oribius spp.	Curculionidae (COL)	Shot hole weevils
Piezodorus rubrofasciatus Fab.	Pentatomidae (HEM)	
Rhyparida coriacea Jac.	Chrysomelidae (COL)	
Rhyparidella wauensis	Chrysomelidae (COL)	
Riptortus spp.	Coreidae (HEM)	Pod sucking bug

Diseases:

Leaf spot	Fungus	*Alternaria sp.*
Leaf spot	Fungus	*Phoma exigua*
Leaf spot	Fungus	*Phyllosticta sp.*
Leaf spot	Fungus	*Myrothecium roridum* Tode ex Fr.
Collar rot	Fungus	*Athelia rolfsii*
Mosaic	Virus	
Root knot	Nematode	*Meloidogyne incognita*

Pests:

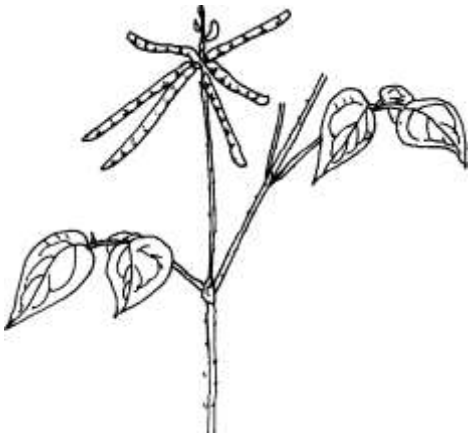
Importance: It is being encouraged and grown in a number of coastal areas in Papua New Guinea. It is a very important crop in India for dahl and porridge.



Names

English: Green gram bean
Tok pisin:
Tok ples:

Scientific name: *Vigna radiata* (L.) Wilczek
Synonyms: *Phaseolus aureus* Roxb.
Plant family: Fabaceae



Description: An upright hairy bean plant that can grow to 1 m tall. It has many branches. The leaves have 3 leaflets and are dark green. The leaves are on long leaf stalks. There are oval stipules at the base of the leaf. Flowers are pale yellow and small. They occur in bunches of 10-20 on the ends of long hairy flower stalks. Pods are black and straight. They do not have a beak. Pods contain 10-20 seeds that are usually green or golden yellow. They are smaller than black gram. The beans can be black. They have a flat white hilum. There are 2,000 varieties.

Distribution: The plant will grow from sea level up to probably 2000 m in the tropics. It is drought resistant but can't stand water-logging. Plants are damaged by frost. They cannot stand salinity.
Rainfall at flowering is detrimental. It requires a deep soil. Both short day and long day kinds occur. It can grow where annual temperatures are from 8°C to 28°C. It can tolerate a pH from 4.3-8.1. In Nepal it grows up to 1000 m altitude. It suits a drier climate. It suits hardiness zones 10-11.

Cultivation: Plants are grown from seed. In some areas these are broadcast while for small plots often 2-3 seeds are sown in holes 50-60 cm apart. Seeding rates of 6 to 22 kg per ha are used in different locations. It normally requires phosphorus fertiliser for adequate growth. Seeds germinate in 3-5 days.

Production: Green pods are ready after about 2 months and ripe pods may take another 1-2 months. For ripe beans the whole plant is harvested and dried before threshing. Yields of 450-560 kg/ha of seeds are common.

Use: Seeds are eaten ripe. They are eaten raw or roasted. The seeds can be germinated for sprouts. Young pods can be eaten. Young leaves can be eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	11.0	1432	22.9		7.1	55	4	
Seed sprouts	90.4	126	3.0		0.9	2	13.2	0.4
Pods								
Leaves								

Insects: Probably similar to other beans

Diseases:

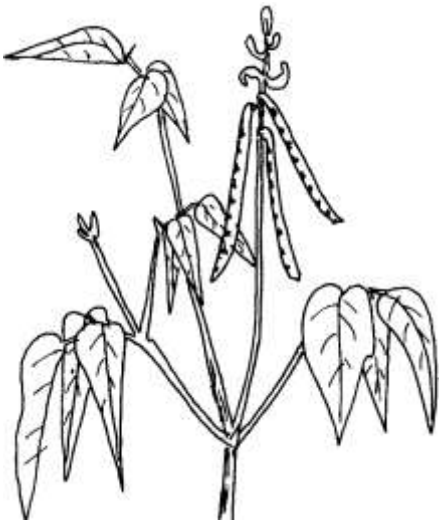
Leaf spot	Fungus	*Cercospora canescens*
Powdery mildew	Fungus	*Oidium sp.*
Yellow mosaic	Possibly virus	

Pests:

Importance: Not widely grown in Papua New Guinea.

Names

English: Rice bean
Tok pisin:
Tok ples:
Scientific name: *Vigna umbellata* (Thunb.) Ohwi & Ohashi
Synonyms: *Phaseolus calcaratus* Roxb.;
Plant family: Fabaceae



Description: A climbing bean plant with a slender hairy vine. It is twining and an annual plant. It grows from seed each year. It grows to 1.5-3 m long. Stems are hairy. Leaves have 3 leaflets that can vary in shape. They are mostly oval and 3-13 cm long by 1.5-7 cm wide. They taper towards the tip and are rounded at the base. Usually they are hairy. The leaf stalks are 3-16 cm long. Flowers are about 1.5 cm long in dense cone shaped clusters. These flowering stalks can be 3-10 cm long. The flowers are yellow. The fruit are straight pods about 10 cm long and 5 mm wide. Seeds are small (5-8 mm long) and yellow to brown. The pods split open easily. The seeds can be yellow, green, brown, red, black or mottled.

Distribution: It grows from 0-1800 m altitude in the tropics. It suits wet climates. It occasionally becomes self sown in coastal grasslands. It needs a sunny potected position. They are drought and frost tender.

Cultivation: It is grown by seeds. Seed collection is easy. Seeds often have a hard skin that must be broken (eg by scraping) before seeds will germinate easily.

Production:

Use: The young pods and ripe seeds are eaten. The young leaves can be eaten.
The seeds are used in bean sprouts. (Seeds should be cooked or crushed if fed to pigs.)

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Pods								
Seeds	13.0	1373	20.9		10.9			
Leaves								

Insects:

Bean pod borer	*Maruca testulalis* Geyer	(LEP)
Ladybird	*Epilachna signatipennis* Boisd.	Coccinellidae (HEM)
Green vegetable bug	*Nezara viridula* L.	Pentatomidae (HEM)

Diseases:

Blossom blight	Fungus	*Choanephora cucurbitarum* (Berk. & Rav.) Thaxter
False rust	Fungus	*Synchytrium phaseoli* Weston
Rust	Fungus	*Uromyces sp.*
Mosaic	Probably due to a virus	
On seeds	Fungus	*Aspergillus niger*
	and	*Penicillium sp*
	and	*Periconia byssoides*
	and	*Rhizopus nigricans*
	and	*Verticillium sp.*

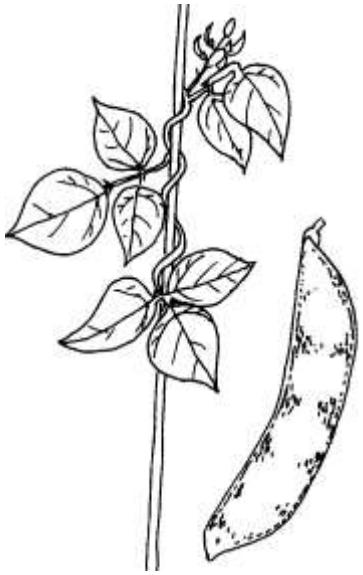
Pests:
Importance: Seen occasionally in several areas in Papua New Guinea but only of minor importance as a food.

Names

English: Scarlet runner bean
Tok pisin:
Tok ples:

Scientific name: *Phaseolus coccineus* subsp. *coccineus* L.
Synonyms: *Phaseolus multiflorus* Lam.
Plant family: Fabaceae

Description: A climbing bean. The stems are often hairy. It grows 1.8-2.4 m high. It can spread 1.8-2.4 m wide. It twines around a trellis. The leaves are compound and have three leaflets. The flowers are bright red. They are in clusters 2.5 cm long. The pods are long (30 cm) and with a wavy edge. The seeds are large and can be several different colours. It sometimes has a root tuber.



Distribution: It is grown in the highlands in the tropics. On the coast seedlings die and pods are not formed. It is damaged by frost. It suits hardiness zones 8-10.

Cultivation: It is grown from seeds. Seed are planted 2.5 cm deep. Plants are spaced 20 cm apart. It needs sticks to climb up. It can be allowed to re-grow from the tubers or the tubers re-planted.

Production: It grows quickly.

Use: The very young pods can be eaten.
The seeds are edible.
The tubers can be eaten after they are cooked and the cooking water thrown away.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	12.0	1419	20.3		9.0	Tr	7	
Pods								
Tubers								

Insects:

Diseases:

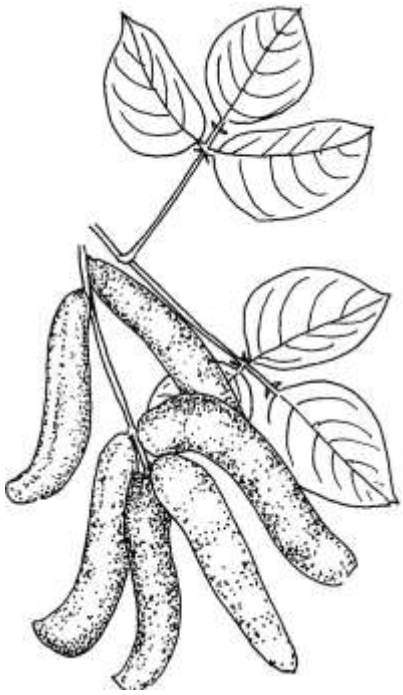
Pests:

Importance: Only occasionally grown in Papua New Guinea.

Names

English: Velvet bean
Tok pisin:
Tok ples:

Scientific name: *Mucuna pruriens* (L.) DC.
Synonyms: *Stizolobium pruriens* (L.) Medic
Plant family: Fabaceae



Description: An evergreen vine. It climbs to 6 m high. It can regrow each year or live for a few years. The stems are slender with long, slender branches. They are very hairy when young. The leaves are alternate with sword shaped leaves. The leaf stalks are hairy. There are 3 leaflets. The leaflets are 5-19 cm long and 4-16 cm wide. The leaflets are rounded at the base and the side leaflets are unequal in shape. The flowers are large and white with bluish butterfly shaped petals. They occur in clusters of 2 or 3. The flowers are 2-4 cm long. The fruit are thick, leathery pods covered with hairs. They are 10 cm long and contain 4-6 seeds. The pods are dark brown.

Distribution: It is a tropical plant. It does best in a rich, moist, well-drained soil. It needs a protected, sunny position. It is damaged by drought and frost. They need a temperature above 8°C.

Cultivation: Plants are grown from seed. The seed need treatment to assist them to germinate.

Production:

Use: The pods are burnt over a fire to remove the prickles then the beans are soaked until they sprout and then washed and boiled or pounded.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	7.29		29.3				4.8	

Insects:

Diseases:

Pests:

Importance: It is a common plantation cover crop and is probably rarely used as food.

Names

English: Velvet bean

Tok pisin:

Tok ples:

Scientific name: *Mucuna pruriens* var *utilis* (L.)DC, (Wall.ex Wight) Baker ex Burck

Synonyms: *Mucuna utilis* Wall. ex Wight

Plant family: Fabaceae

Description: A climbing bean with vines 2-3 m long. The stems are slender and twining. The leaves have 3 leaflets. Leaves are hairy when young but without hairs when older. Leaflets are about 10-18 cm long x 8-15 cm wide. Leaves are dark green above and paler underneath. Flowers are purplish. Pods are 9-14 cm long, hard, curved and covered with soft hairs. There are 4-6 white seeds inside.

Distribution: A tropical plant. A bean of low altitudes. The wild species is used as a cover crop in coconut plantations. It needs a sunny pocation.

Cultivation: Plants are grown from seed. They can also be grown from cuttings.

Production:

Use: The young leaves, young pods and ripe seeds are edible cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds								
Pods								
Leaves								

Insects:

Diseases:

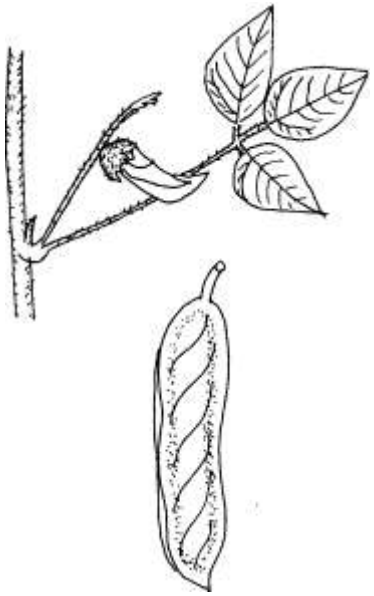
Pests:

Importance: Plants are grown and used occasionally in some coastal areas of Papua New Guinea.

Names

English: D'Albertis creeper
Tok pisin:
Tok ples:

Scientific name: *Mucuna albertissi* F.v.M.
Synonyms:
Plant family: Fabaceae



Description: A climbing legume. It grows 5-20 m long. It has a brown rusty appearance and short hairs on the stem and leaves. The leaf stalk is 3.5-10 cm long. The leaves are compound. The leaflets are 6-16 cm long by 6-13 cm wide. They taper at the tip. Normally there are a clump of white or yellow flowers together. They are on a stalk 7-25 cm long. This stalk zigzags. The flower stalks are 2 cm long. The pod has wings along the edge and sides. The pod is 6-11 cm long. The seeds can be black or grey. They are 1.7 cm long by 1.4 cm wide. The hilum is black.

Distribution: It grows in rainforest and bush from near sea level to over 2000 m altitude.

Cultivation: It grows wild.

Production:

Use: The seeds are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds								

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea, a minor wild edible plant. It is eaten at least in the Mendi area.

Names

English: Broad bean
Tok pisin:
Tok ples:

Scientific name: *Vicia faba*
Synonyms:
Plant family: Fabaceae



Description: An upright plant up to 1 m tall. Plants vary in height from 30 cm to 180 cm. It has a well developed taproot. It has square stems which are hollow. They have wings at the angles. There can be 1-7 branches from near the base of the plant. The leaves have leaflets along the leaf stalk and ending in a short point. There are 2-6 leaflets. These are 5-10 cm long. Flowers occur in the axils of leaves and there are 1-6 flowers on a stalk. The flowers are white with black spots. Pods are large and fat and contain several large beans inside. The pods are 5-10 cm long in field varieties and can be 30 cm long in garden varieties. They are fleshy with a white velvety lining. They become tough and hard at maturity. The seeds can vary a lot in shape and size. They can be flat or rounded and white, green, brown, purple or black. They are 1-2.6 cm long. The hilum along the seeds is prominent.

Distribution: A temperate plant only suitable for the highlands over about 1200 m. in the tropics. It mainly occurs between 1900 - 2700 m altitude in equatorial zones. It is frost tolerant. In the lowland hot tropics it often flowers but does not set seed. It requires fertile soils. It does best with adequate lime. In Nepal they grow to 1800 m altitude. It suits hardiness zones 8-10.

Cultivation: The crop is grown from seed. Seeds are sown at 15 to 40 cm spacing. If the seed pod formation is poor, it can be improved by pinching out the tops of the plants when in flower. Hand pollination also helps. Plants are self pollinated but also cross pollinated by insects.

Production: Time to maturity is 12-16 weeks. Yields in the cool tropics vary between 1 and 2 tons per hectare.

Use: It is mostly the young beans that are eaten. The ripe beans and leaves are also edible. The tender pods are eaten as a vegetable. The beans should be well cooked.
Caution: Some people, mainly of Mediterranean origin can get a disease called Favism from these beans. Also they can react with some people using some antidepressant drugs.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed	83.7	259	4.8		1.5	27	20	0.5
Leaves								
Pods								

Insects: **Pests**:
Diseases:

Leaf spot	Fungi	*Ascochyta sp. & Cladosporium sp.*
Sooty mould	Fungus	*Epicoccum sp.*
Leaf blight	Fungus	*Fusarium sp.*
Leaf spot	Fungus	*Phoma sp.*
Rust	Fungus	*Uromyces viciae-fabae*

Importance: Moderately common in some highland areas of Papua New Guinea but does not produce well. It is a major crop in China.

Names

English: Guar bean
Tok pisin:
Tok ples:

Scientific name: *Cyamopsis tetragonolobus* (L.) Taub
Synonyms:
Plant family: Fabaceae



Description: An upright bushy plant often only 1 m high. Some kinds grow 3 m high. The branches are stiff and usually with white hairs. The branches stick upwards and are angled and with grooves. The leaves are produced alternately and have 3 leaflets. The leaflets are oval and with slight saw teeth around the edge. The leaf stalks have grooves. The flowers are small in clusters in the axils of leaves. The flowers are white with pink wings. It produces clusters of thick fleshy pods. They are stiff and straight. There is a double ridge along the top of the pod and a single one below. There are also 2 ridges along the flat sides. The pods have a beak at the end. There are 8-10 small oval seeds inside.

Distribution: A tropical plant. It is a hardy drought resistant plant. It suits dry areas. It grows well on alluvial and sandy soils.

Cultivation: They are grown from seed. Often they are grown in mixed cropping situations.

Production: Plants mature in 3 to 3.5 months.

Use: The green immature pods are eaten cooked.
The seeds contain a gum used as a thickening agent.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Pods	82.0		3.7		5.8	198	49	
Seeds	11.8		29.8					

Insects:

Diseases:

Powdery mildew	Fungus	Oidium sp.

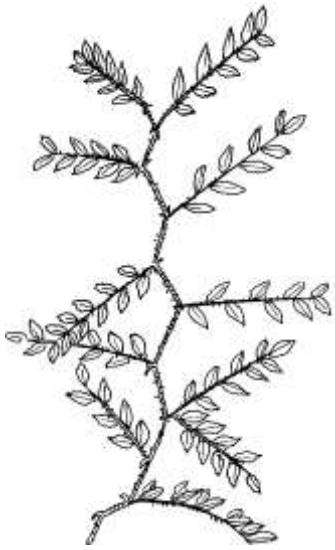
Pests:

Importance: This bean has only been tried in small trial plots in Papua New Guinea.

Names

English: Chickpea,
Tok pisin:
Tok ples:

Scientific name: *Cicer arietinum* L.
Synonyms:
Plant family: Fabaceae



Description: An annual legume. Plants are 40-60 cm high and all parts are hairy. It is erect with many branches. Plants are often bluish green in colour. Plants have a strong taproot. The root carries many nodules. The leaves are 5 cm long. It has leaves made up of 9-15 pairs of leaflets along a stalk and a single leaflet at the end. The leaflets are 1-2 cm long by 0.3-1.4 cm wide and strongly pointed and with a saw toothed edge. The flowers can be white, pink or purple. The flowers are carried singly on long stalks in the axils of leaves. The flowers normally never open and are self pollinated. The pods are inflated. Pods are 2-3 cm long and have 1 or 2 seeds. The seeds are angular and up to 1 cm across. They have a pointed beak. The seed colour can vary from brown, white, red or black.

Distribution: A subtropical crop. It suits high altitudes in the tropics because it needs cold nights with dew. It is well suited to semi arid regions. It can tolerate salt and drought. It does not do well in warm, humid places. It needs well drained soil. It is damaged by frost. For best growth, night temperatures between 18-26°C and day temperatures of 21-29°C, are required. The temperature range of 8°C between day and night is required. Rainfall of 600-750 mm and a relative humidity of 20-40% is suitable. The best pH is 5.5-7.5 but they will grow on alkaline soils. In Nepal they are grown up to 1300 m altitude. It suits hardiness zones 8-11.

Cultivation: It is grown from seed. Often other crops are grown mixed with chickpea but these are planted 3-4 weeks after sowing the chickpea. Seed should be at 2-12 cm depth. Seed will germinate at temperatures above 5°C but are best above 15°C. Spacing plants 10 cm apart in rows 25-30 cm apart is suitable if plants are put in rows. Plants are cut and harvested when leaves turn brown.

Production: Yields of 400-1600 kg per hectare of seed, are average. Plants can reach maturity in 4.5-5 months but 7 months or longer, are taken for some types.

Use: Mainly the ripe seeds are eaten. Often they are boiled and mashed.
The young leaves, shoots and pods are sometimes eaten.
The seeds can be roasted, boiled or fried.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	9.9	1362	20.2		6.4	190	3	
Pods								
Leaves								

Insects:

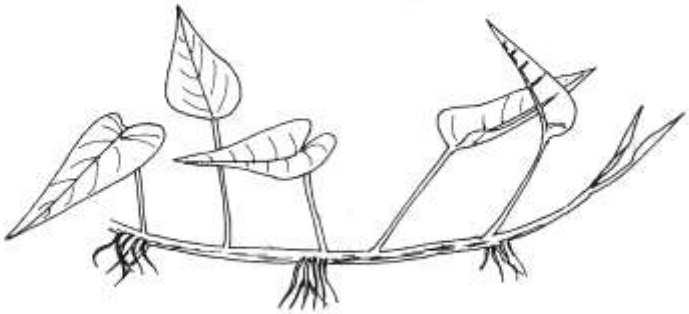
Diseases:

Pests:

Importance: Very rarely grown in Papua New Guinea.



Edible green leaves or kumus







Green leafy vegetables or Kumus

English name	Tok Pisin	Scientific name	Page
Chinese amaranth	Aupa	*Amaranthus tricolor*	**85**
Purple amaranth		*Amaranthus cruentus*	**87**
Grain amaranth		*Amaranthus caudatus*	**88**
Green amaranth		*Amaranthus viridus*	**89**
Spleen amaranth		*Amaranthus dubius*	**90**
Slender amaranth		*Amaranthus lividus*	**91**
Native amaranth		*Amaranthus interruptus*	**92**
Prickly amaranth		*Amaranthus spinosus*	**93**
Sunset Hibiscus	Aibika	*Abelmoschus manihot*	**94**
Spinach joint fir	Tu-lip	*Gnetum gnemon*	**96**
Water dropwort		*Oenanthe javanica*	**98**
Rungia		*Rungia klossii*	**99**
Blackberried nightshade	Karakap	*Solanum nigrum*	**100**
Plentiful fig	Kumu musong	*Ficus copiosa*	**101**
		Ficus wassa	**102**
Lovo		*Ficus pungens*	**103**
Highlands breadfruit	Hailans kapiak	*Ficus dammaropsis*	**104**
White sandpaper fig		*Ficus hispida*	**105**
Dye fig		*Ficus tinctoria*	**106**
Swamp morning glory	Kangkong	*Ipomoea aquatica*	**107**
	Valanguar	*Polyscias verticillata*	**108**
Panax		*Polyscias fruticosa*	**109**
		Polyscias scutellaria	**110**
		Polyscias macgillivrayi	**111**
	Kalava	*Ormocarpum orientale*	**112**
		Nasturtium schlechteri	**113**
Watercress	Wara kebis	*Rorippa nasturtium-aquaticum*	**114**
Common comfrey		*Symphytum officinale*	**115**
Waterleaf		*Talinum triangulare*	**116**
Silver beet		*Beta vulgaris* ssp. *cicla*	**117**
Sweet leaf		*Sauropus androgynus*	**118**
Drumstick tree		*Moringa oleifera*	**119**
Leucaena		*Leucaena leucocephala*	**120**
Indian spinach		*Basella alba*	**121**
Hibiscus		*Hibiscus rosa-sinensis*	**122**
Wandering Jew		*Commelina cyanea*	**123**
Wandering Jew		*Commelina diffusa*	**124**
		Dicliptera papuana	**125**
Indian coral tree	Palpal	*Erythrina variegata*	**126**
Coral tree		*Erythrina variegata* var. *orientalis*	**127**
		Deeringia amaranthoides	**128**
Spider flower		*Cleome gynandra*	**129**
Purslane		*Portulaca oleracea*	**130**
Spinach		*Spinacia oleracea* L.	**131**
Striped cucumber	Kongakonga	*Diplocyclos palmatus*	**132**

Names

English: Joseph's coat, Chinese amaranth
Tok pisin: Aupa
Tok ples:

Scientific name: *Amaranthus tricolor* L.
Synonyms:
Plant family: Amaranthaceae



Description: A herb that grows about 1 m high and spreads 45 cm wide. It is a small annual leafy green. An upright, much branched annual with a thin membrane covering the stems. Sometimes the plant lies over. The stems are angular. The plant branches in the upper part of the plant. It is smooth and grows from seed each year. Leaves have long leaf stalks that can be 5-10 cm long. Leaves vary in shape, size and colour. The leaf blade can be 5-25 cm long by 2-6 cm wide. Leaves are dull purplish and the top leaves can be yellow or red. Some types have coloured leaves or patterns on the leaves. It has a clumpy seed head at the top. The flower spike at the top can be 30 cm long. The seed are 1-1.2 mm across and black.

Distribution: It grows in many tropical and warm temperate places. Plants grow wild in waste places. Amaranths grow from sea level to 2400 m altitude in the equatorial tropics. For amaranth seeds to germinate they need a temperature above 15°-17°C. In the higher areas of the equatorial highlands above 1800 m., temperatures on the average are probably below this during the cooler months. It may be more difficult to get amaranths started during these months. It suits hardiness zones 8-11.

Cultivation: The very small seeds of these plants are scattered over the ashes or fine soil in fertile ground. The seed are normally sown by rubbing the dry seed heads between the hands and letting the seed drop. Some types are self-sown. These plants grow in most tropical countries. The soil must be fertile. If they are put in an old garden they will only grow very poorly. So they are either put in a new garden site when it is cleared from bush, or in build up the old ground by adding compost. The small gardens close to a house can often be built up to a good fertility by using the scraps and ashes and things that are left over near houses. Amaranths need high amounts of two nutrients, nitrogen and potash. The ashes from fires are high in potash so farmers scatter seeds of amaranth over areas where they have burnt. Amaranths are tropical plants grown in most tropical countries. Normally the hotter it is the better they grow. They also like plenty of sunlight and do not suit shaded places. The more sunlight the better they grow. They need to have water most of the time they are growing. In areas with a high rainfall this is mostly not a big problem.

Production: Plants can be harvested when small due to thinning out closely spaced plants. These can be either transplanted or eaten cooked. Plants can be harvested whole or have top leaves harvested several times. Harvesting begins after 4-7 weeks and can continue over 2 months.

Use: The young leaves and stems are cooked and eaten as a vegetable.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	91.7	96	2.5		2.3	292	43.3	0.9

Insects:

Cletus sp.	Colobathristidae (COL)	Sucking seeds
Dysmiccocus brevipes (Cockerell)	Pseudococcidae (HEM)	Pineapple mealybug
Hymenia recurvalis (Fab.)	Pyralidae (LEP)	Beet webworm
Leptocorisa solomonensis Ahmad	Alydidae (HEM)	Paddy bugs
Nisotra basselae Bry	Chrysomelidae (COL)	
Oribius spp.	Curculionidae (COL)	Shot hole weevils
Parasaissetia nigra (Nietner)	Coccidae (HEM)	Nigra scale
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Spodoptera litura (Fab.)	Noctuidae (LEP)	Cluster caterpillar
Tiracola plagiata Walk	Noctuidae (LEP)	Cacao armyworm

Diseases:

Damping off of seedlings	Fungus	*Rhizoctonia solani* Kuhn
Wet rot of leaves	Fungus	*Choanephora cucurbitarum* (Berk & Rav.) Thaxt.
Leaf spot	Fungus	*Alternaria sp.*
Leaf blight	Fungus	*Colletotrichum sp.*
Wilt	Fungus	*Fusarium sp.*

Pests:

Importance: Different species of amaranths occur in most parts of Papua New Guinea and they are one of the commonest cultivated greens.



Names

English: Purple amaranth, Red amaranth
Tok pisin:
Tok ples:

Scientific name: *Amaranthus cruentus* L.
Synonyms: *Amaranthus hybridus* subsp. *cruentus* (L.) Thell.;
Plant family: Amaranthaceae



Description: An annual erect plant. It grows to 2 m high. The stems are angular. It often branches in the upper section. It is smooth but may be hairy on younger plant parts. The young parts can be tinged purple. The leaves are oval to sword shaped and can be 10-15 cm long by 3-6 cm wide. They have a leaf stalk 1-7.5 cm long. The leaves often narrow towards the tip. They can also become thinner towards the base. There may be hairs on the midrib. The leaf may be tinged purple underneath. The flowers clusters are often branched and on side branches. The stiff branched flower arrangement at the top can be 15-25 cm long. The fruit is oval and the seed can be 1-1.3 mm across. The seed is dark brown but pale brown forms are used as grain in Central America.

Distribution: It grows in the tropics and more temperate regions. In the tropics it is mainly in the highlands. In Papua New Guinea it occurs between 1,200 and 2,200 m altitude. It suits hardiness zones 8-11.

Cultivation: Plants can be grown from seed if the soil is warm. Seeds are small and grow easily. Cuttings of growing plants root easily.

Production: Yields of 800-1500 kg per hectare are achieved.

Use: The leaves and young plant are eaten cooked.
The seeds are ground into flour and used to make bread.
Caution: This plant can accumulate nitrates if grown with high nitrogen inorganic fertilisers and these are poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Seeds								

Insects:

Diseases:

Pests:

Importance:

Names

English: Grain Amaranth, Quinoa
Tok pisin:
Tok ples:

Scientific name: *Amaranthus caudatus* L.
Synonyms:
Plant family: Amaranthaceae



Description: An annual plant which can be 2 m high and 45 cm across. The stems are angular and it can have a single stem or be branched. It is often limp in the upper parts. Plants are hairy at first but become smooth. Often they are tinged purple. Leaves are 2-4 cm long by 0.7-1.6 cm wide on a leaf stalk 0.5-1.5 cm long. Leaves can taper to a tip at the end. They can also thin towards the base. The veins are pale underneath. The flower clusters are in spikes on the side or top branches. The flowers are sometimes branched and can droop over. They can be 45 cm long. The fruit is oval. Seed are 1-1.3 mm across.

Distribution: A tropical plant. It cannot tolerate frost. Plants do best under high light, warm conditions and dry conditions. They need a well drained soil. Some varieties can tolerate pH up to 8.5 and there is some salt tolerance. It suits hardiness zones 8-11.

Cultivation: Plants can be grown from seed if the soil is warm. Seeds are small and grow easily. To get the plants well spaced the seeds are mixed with some sand and then this mixture is spread along a row. Seedlings can be transplanted when about 5-7 cm tall. Cuttings of growing plants root easily. A spacing of about 8 cm x 8 cm is used if the plants are to be harvested by pulling up the whole plant. If the harvesting is to be done by picking off the top leaves, a wider spacing is normally used. When the tops are picked out 3 or 4 times over the life of the one plant, a spacing about 30 cm x 30 cm is used. As far as producing a large amount of food is concerned, the spacing is not very important. Having between 200 and 1,000 plants per square metre gives about the same total amount of food. The main thing that varies is the size of the leaves. Mostly people like larger leaves so a wider spacing of 8 cm to 10 cm for plants to be pulled out is suitable. For plants to be harvested by picking out the tops, they can be picked down to about 15 cm high.

Production: Amaranths grow quickly. Seedlings come up above the ground in 3 to 5 days. They are 5 to 7 cm high and big enough for transplanting after about 20 days. The plants can be pulled out and used after 6 weeks. If they are harvested by picking out the tops, this can be started at 5 to 7 weeks and continued 3 or 4 times over the next 2 months. Flowering occurs after about 3 months and seed can be recollected about a month later. Yields from 1-3 or 5 tonnes per hectare of seed are common. Yields of up to one kilogram of edible leaves have been harvested by pulling out plants from an area of one square metre.

Use: The leaves and young plant are eaten cooked.
The seeds are ground into flour and used to make bread
Caution: This plant can accumulate nitrates if grown with high nitrogen inorganic fertilisers and these are poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Seed			13					

Insects: **Diseases**: **Pests**:
Importance: This species is cultivated and important for its edible seed and leaves in the Andes. Seed varieties have been introduced to Papua New Guinea.

Names

English: Green amaranth
Tok pisin:
Tok ples:

Scientific name: *Amaranthus viridus* L.
Synonyms:
Plant family: Amaranthaceae

Description: An erect smooth branched herb without thorns. It is 30 to 60 cm high and grows from seeds each year. The leaves are broad near their base and narrow near the top. Usually the leaves have notches. Leaves are 1-3 cm long with exceptionally long petioles. The flowers occur in the angles of the leaves and the seeds are small and brown or black. The spikes are not bristly.

Distribution: It is a tropical plant. It is common in open waste places. In Nepal it grows to about 1400 m altitude.

Cultivation: It can be grown from seed or cuttings.

Production:

Use: The young leaves and seeds are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	87.3		4.5		6.0		169	
Seeds								

Insects:

Diseases:

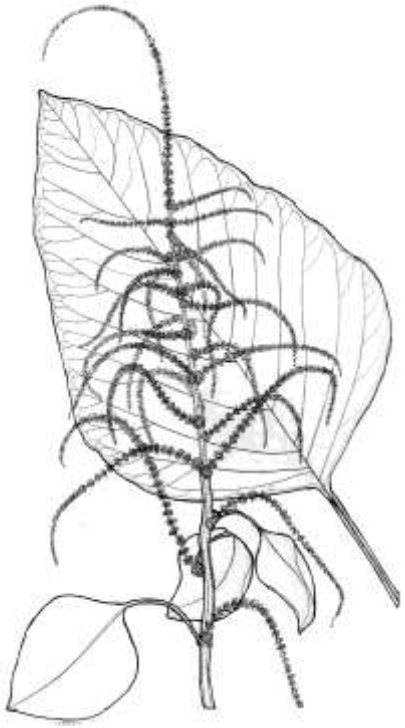
Pests:

Importance:

Names

English: Spleen amaranth
Tok pisin:
Tok ples:

Scientific name: *Amaranthus dubius* C. Mart. ex Thell
Synonyms:
Plant family: Amaranthaceae



Description: An annual plant. It is erect and grows up to 1.2 m tall. The stems are angular and the plant is often branched from the base upwards. Plants can be green or tinged purple. The leaves are 3-8 cm long by 2-5 cm wide. The leaf stalk is 1-5 cm long. Leaves can taper to a point at the tip and taper quickly towards the base. The flower clusters are in spikes on side branches and these can be branched. The flower stalks at the tip can be lax. The flower clusters can be 10-20 cm long and either stick upwards or bend over. Most of the flowers are female. Seed are 1-1.2 mm across and rather flat.

Distribution: A tropical plant. In Papua New Guinea it grows between sea level and 1,300 m altitude.

Cultivation: Plants can be grown from seed if the soil is warm. Seeds are small and grow easily. Cuttings of growing plants root easily.

Production:

Use: The leaves and seeds are eaten cooked.
Caution: This plant can accumulate nitrates if grown with high nitrogen inorganic fertilisers and these nitrates are poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Seeds								

Insects:

Diseases:

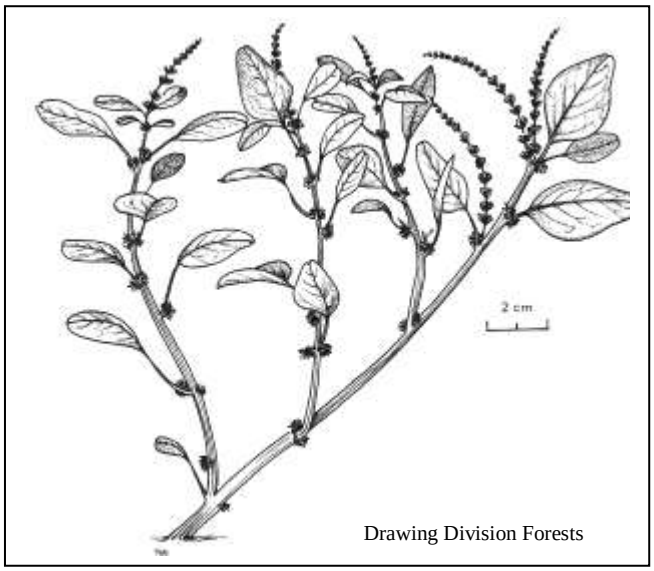
Pests:

Importance:

Names

English: Slender Amaranth
Tok pisin:
Tok ples:

Scientific name: *Amaranthus lividus* Desf.
Synonyms:
Plant family: Amaranthaceae



Drawing Division Forests

Description: A herb which can be erect or hang over. It is 80 cm tall. The stems are angular and curve in a zigzag manner. They often branch from the base upwards. The leaves are oval and 1-3 cm long by 0.3-1.5 cm wide. The leaves are wedge shaped at the base and have a sharp point at the tip. The leaf stalk is 0.3-2.5 cm long. The side veins can be clearly seen under the leaf. The leaves are without hairs but are sometimes tinged with purple. The flower spikes can be 1-10 cm long and have side clusters. The fruit are smooth and pale. Seeds are 1-1.2 mm across.

Distribution: It occurs world wide in the tropics. In Papua New Guinea it grows between 1,200 and 2,000 m altitude. In Nepal it grows between 1500-2300 m altitude.

Cultivation: Mostly plants are self sown. Plants can be grown from seed.

Production:

Use: Leaves are eaten as a green vegetable, after cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	84.6	84	3.4				63	

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea an occasionally used wild edible leaf.

Names

English: Native Amaranth
Tok pisin:
Tok ples:

Scientific name: *Amaranthus interruptus* R. Br.
Synonyms:
Plant family: Amaranthaceae

Description: A herb which can be erect or lying down. It can be 60-120 cm tall. The stems are angular. The plant often branches from the base upwards. The leaves are 1.5-4 cm long by 0.7-2 cm wide. The leaf stalk is 0.5-2.5 cm long. The side veins are prominent underneath. The flower cluster can be slightly branched at the base and at the top of the plant. Seed are 1 mm across and rather thick.

Distribution: It occurs in the northern parts of Australia and in Papua New Guinea and the Solomon Islands.

Cultivation:

Production:

Use: The leaves are used cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: Prickly amaranth
Tok pisin:
Tok ples:

Scientific name: *Amaranthus spinosus* L.
Synonyms:
Plant family: Amaranthaceae

Description: An annual plant 60 -100 cm high. It can be erect or lie over. The stems can be nearly round or they can be angular. The plant branches from the base upwards. Leaves are fairly smooth or hairless but can be tinged purple. The leaf stalk can be 0.5-10 cm long. The leaf blade is oval or sword shaped and 2-7 cm long by 0.6-3 cm wide. There can be a short tip at the top end and gradually tapering to the base. Flower clusters occur at the sides and these can be single or arranged in compound spikes. The flower clusters at the top can be 3-10 cm long. The top flowers often droop over. Parts of the flowers in the clusters of the leaves form spines. These are very sharp. They can be 0.5-2 cm long. The upper flowers are male and the lower flowers are female. The seed are 1-1.2 mm across and flattened.



Drawing Division Forests



Distribution: A tropical plant. It occurs worlc from the tropics to the warm temperate zone. In it grows to 1500 m altitude. It grows well in damp soil.

Cultivation: Plants are often self sown. Plants ca

Production:

Use: The leaves are edible cooked.
The seeds are ground into flour and cooked.
Caution: This plant can accumulate nitrates if gr nd these are poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	91.7	84	3.6				46	
Seeds								

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea an occasionally used wild edible leaf.

Names

English:
Tok pisin: Aibika
Tok ples:

Scientific name: *Abelmoschus manihot* (L.) Medic.
Synonyms: *Hibiscus manihot* L.
Plant family: Malvaceae



Description: A branched shrub up to 2 m or more high. It has rounded twigs which are green and smooth. The leaves are simple, smooth and with 3 to 5 lobes. The leaves are large and can vary in shape. Normally the leaves are very dark green, but occasionally pale green types occur. The leaf stalks are 6 to 13 cm long. The stalks can be green or have red colours on them. The flowers are borne singly and are yellow with dark purple centres. They are produced on mature bushes and the flowers are hibiscus like. The fruit pods are rather stiff or with bristly hairs. They are a dry capsule with many small seeds. Plants can last for a year or for several years. Old plants produce a hibiscus type flower.

Distribution: It is well suited to the tropical lowlands but grows only poorly at 1800 metres. It needs fertile soil. The plant occurs in countries from India, China, Japan, Malaysia and Indonesia to the Pacific Islands. Plants will withstand occasional short-lived temperatures down to about -5°C so long as they are in a very well-drained soil. It suits areas with high humidity. It suits hardiness zones 10-12.

Cultivation: It is grown from cuttings. Cuttings with 2-3 nodes are sufficient. It can be grown from seeds. The narrow leafed types tend to compete less well with weeds. A fertile soil is needed. Picking out the tips off branches of Aibika plants encourages the plant to produce more branches and therefore more leaves.

Production: Leaves are ready to harvest after about 80 days. Yields of 6.7-7.3 tons/ha/crop have been recorded.

Use: Young leaves are cooked and eaten.
They are slimy unless steamed or fried.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves		197	5.7					

Insects:

Acrocercops sp.	Gracillariidae (LEP)	Aibika leaf miner
Amblypelta cocophaga China	Coreidae (HEM)	Green coconut bug
Amblypelta lutescens papuensis Br.	Coreidae (HEM)	Papua tip wilt bug
Amblypelta theobromae Brown	Coreidae (HEM)	
Anomis flava F.	Noctuidae (LEP)	Cotton looper or Cotton semi looper
Aphis gossypii Glover	Aphididae (HEM)	Melon aphid
Cassena intermedia Jac.	Galerucidae (COL)	
Cassena papuana (Jac.)	Galerucidae (COL)	
Colgar tricolor Dist.	Flatidae (HOM)	

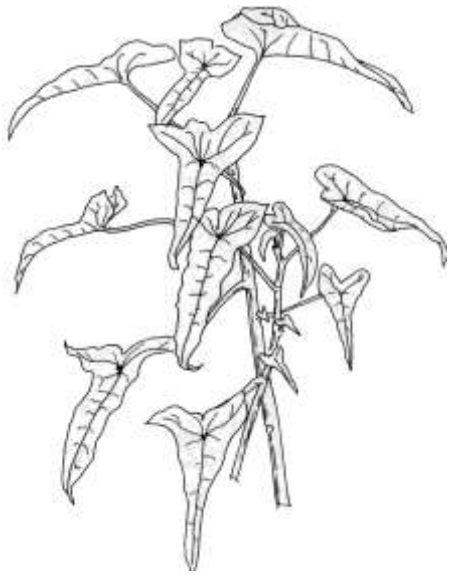
Dysdercus cingulatus (F.)	Pyrrhocoridae (HEM)	Red cotton bug
Earias vittella (F.)	Noctuidae (LEP)	Aibika shoot boring grub
Euricania discigutta (Walk.)	Riconiidae	
Nisotra sp.	Chrysomelidae (COL)	
Oribius spp.	Curculionidae (COL)	Shot hole weevils
Parasaissettia nigra	Coccidae (HEM)	Nigra scale
Phaneroptera brevis Serv	Tettigoniidae(ORTH)	
Pseudaulacaspis pentagona (Taeg)	Coccidae(HEM)	White scale
Saissetia nigra (Nietner)	Coccidae(HEM)	Nigra scale
Spodoptera litura (F)	Noctuidae (LEP)	Cluster caterpillar
Sylepta derogata F.	Pyralidae(LEP)	Cotton leaf roller
Valanga irregularis (Walker)	Acrididae (ORTH)	
Valanga sp.	Acrididae (ORTH)	

Diseases:

Leaf spot	Fungus	*Myrothecium roridum* Tode ex Fr.
Leaf blight	Fungus	*Colletotrichum sp.*
Leaf spot	Fungus	*Phyllosticta sp.*
Powdery mildew	Fungus	*Oidium sp.*
Collar rot/root rot	Fungus	*Phytophthora nicotianae* var. *nicotianae*
	And	*Fusarium sp.*
	And	*Sclerotium rolfsii*
Basal stem rot	Fungus	*Sarcopodium vanillae*
Green mottle	Virus	

Pests:

Importance: The most important edible leafy green in coastal areas of Papua New Guinea, the Pacific and SE Asia.



Names

English: Spinach Joint fir
Tok pisin: Tu lip
Tok ples:
Scientific name: *Gnetum gnemon* L.
Synonyms:
Plant family: Gnetaceae



Description: A shrub or small tree about 10 m high. It can grow to 20 m high. It normally has a cone shaped crown. The bark is greyish brown. The small branches are slender and like a vine. The leaves are produced in pairs opposite each other. They are dark green and shiny, oval and pointed at both ends. The leaves are 7.5-12.5 cm long by 2.5-7.5 cm wide. Trees are either male or female. Male spikes are 3-6 cm long. They consist of 50-80 very small flowers in rings along the stalk. Flowers are produced as cones made up of rings of scales along stalks 3-6 or 12 cm long. There are 5-8 flowers at each node. Fruits are oval and green when young but red when ripe. Fruit are 2-3 cm long and contain one seed.

Distribution: Trees occur in tropical rainforest from sea level to about 1200 metres altitude. These trees grow in Malaysia, Indonesia and islands out to Fiji. They can grow on a range of soils but do best on deep well drained soils. It suits hardiness zones 10-12.

Cultivation: Trees are grown from seed. For using as seed for growing, a fully ripe red fruit is needed. Seeds exhibit a natural dormancy due to a hard impermeable seed coat. Breaking this seed coat can normally hasten germination. This is done by boring a hole into the seed. Propagation can be naturally by seeds distributed by birds, by planting seeds or by cuttings. A spacing of 6 m is suitable although in rows they are often put more closely. Trees appear to establish in the forest understory indicating some shade tolerance. Trees recover readily from pruning. Coppicing can produce a rapid flush of new leaves. Flushes of new leaves tends to occur seasonally. Trees can be topped to keep them shorter. If plants are grown by air layering they are shorter and more compact.

Production: Trees grow by flushes of young reddish leaves. Flowers are produced throughout the year. Trees grown from seed take 5-8 years to bear fruit. Air layered trees produce fruit in 2-3 years. Leaves are harvested when fully expanded but still soft and succulent. The fruit are harvested when the skin turns red. Trees can produce 20,000 fruit per year or 6-7 kg.

Use: Young leaf tips are eaten cooked.
Young flowers are eaten, cooked.
Young fruit are eaten, cooked.
Ripe fruit are eaten raw or cooked.
(Fruit should be crushed before cooking or they can explode.)
Young flowers and fruit need cooking to get rid of irritating substances.
The seeds are dried and flattened and then deep fried in hot oil and salt added.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	66.0	378	5.9		2.7	3700	200	
Flowers								

Seeds								

Insects:

Eucalymnatus tessellatus (Signoret)	Coccidae (HEM)	Soft scale
Milviscutulus mangiferae (Green)	Coccidae (HEM)	Soft scale

Diseases:

Pests:

Importance: A particularly well liked edible green leaf occurring in almost all lowland areas of Papua New Guinea either cultivated or wild.





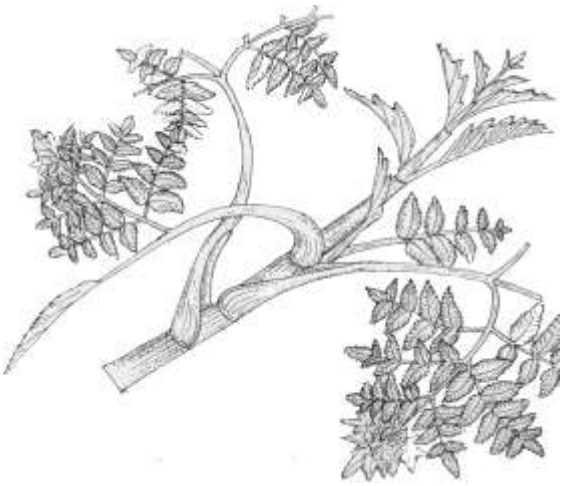


Names

English: Water drop wort
Tok pisin:
Tok ples:

Scientific name: *Oenanthe javanica* D.C.
Synonyms:
Plant family: Apiaceae

Description: This plant is a hollow stemmed creeping green leafy vegetable. The stem is often up to 100 cm long and normally lies along the ground and turns up near the tip. The leaves are finely divided like carrot tops but the size, shape and colour of the leaves can vary quite a bit, even on the one plant. The leaves often have leaf sheaths which wrap around the stem. The flowers occur at the ends of the branches and are a group of small white flowers. Several kinds occur with different colours and leaf sizes. It mostly grows near water and will float on water.



Distribution: It mostly occurs between 700 and 2800 m altitude in the tropics. But it also grows down to the coast where it is becoming more popular. It also grows in China, Indonesia and other Asian countries. It suits hardiness zones 9-12.

Cultivation: This plant often grows wild. These self sown plants are not as tasty as the cultivated types but they are eaten. The plant is also grown in gardens. It is planted by using cuttings. Often 5 or 6 cuttings are planted in a hole made with a digging stick. In moist soil the plants establish quickly and easily. It is also possible to grow the plants by seeds, but these are rarely used in Papua New Guinea. The leaves and young tips of the plant are often eaten raw or cooked.

Production:

Use: The plant is often eaten raw or cooked.
Caution: Although not known to contain the very poisonous oenanthotoxin it contains a hallucinatory drug myristicin.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves							6	

Insects:

Diseases:

Pests:

Importance: A common green in most highland areas of Papua New Guinea.

Names

English: Rungia
Tok pisin:
Tok ples:

Scientific name: *Rungia klossii* S.Moore
Synonyms:
Plant family: Acanthaceae

Description: Rungia is a small clumpy much branched leafy vegetable. Dark green and yellow and green marked leaf colours occur. It grows to about 40 cm high. It produces a pale blue flower. At least 20 different varieties occur being distinquished by size, shape and colour of leaves.



Distribution: It mostly grows from 1000 to 2000 metres altitude but will grow down to sea level. It is only known from Papua New Guinea and Irian Jaya/West Papua.

Cultivation: Plants are grown from rooted stems or cuttings. It only occurs as a cultivated plant. Some feral and relatively short lived plants can be found in old garden sites. It needs reasonably fertile soil, preferably moist but will grow in most soils. The young leaf tips are eaten raw or cooked. It requires a fairly fertile soil and a damp area.
Plants are put about 50cm apart. It is mostly grown in mixed cropping situations with sweet potato or Setaria pitpit. The plant is grown from cuttings which are about 25 cm long and a clump are sown together. These stems often already have roots developing from the nodes or quickly develop roots. Rungia is planted at any time of the year. Regular picking keeps branches short and productive of leaves. It grows reasonably slowly. Once established the young tips (2 or 3 leaves) are picked regularly. The shoot tips and upper leaves are harvested starting about 2-4 months after planting and continuing at 1-2 monthly intervals for 2 years or more. Regular picking keeps branches short and productive of leaves.

Production: It grows reasonably slowly. Yields can be 2 kg/plant/year. The harvested tips weigh about 0.8 g each. If the plants were spaced at 50cm spacing this would give a yield of 4 kg per square metre of garden. The leaves are eaten raw or cooked. After harvesting they will not keep very long. (2-3 days).

Use: The leaves are eaten raw or cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance: One of the main and most popular greens in the highlands of Papua New Guinea.

Names

English: Blackberried nightshade
Tok pisin: Karakap
Tok ples:

Scientific name: *Solanum nigrum* L.
Synonyms:
Plant family: Solanaceae



Description: An erect branched smooth herb. It grows about 60-100 cm high. The stems are green and 3 angled. Leaves are pointed at both ends. The leaves are 1.3-9 cm long by 0.5-6 cm wide. They are oblong and taper to the tip. They can have wavy lobes. The inner ring of petals are white and about 8 mm across. The fruit are black, smooth and round. They hang downwards.

Distribution: They occur in waste places at low and medium altitudes throughout the country. It grows from sea level up to high altitudes such as 2700 m in the tropics. It often comes up self sown after fires.
It is grown in most tropical countries as a green leafy vegetable. It occurs between 600-3000 m. in southern China. In Nepal it grows to about 2900 m altitude.

Cultivation: It is grown from seed. In the highlands areas it is almost always self sown or encouraged by burning grassland but then weeded and harvested as a normal component of the garden. In coastal areas seeds are sown by broadcasting. Good yields can be obtained under moderate fertility levels. A spacing of 40 cm x 40 cm is suitable. Topping encourages branching. It can be grown from cuttings.

Production: Seeds germinate about a week after planting. Leaves can be harvested after about 8-10 weeks by cutting off the last 5 cm of each branch. High yields can be obtained. 5-8 harvests over 6-8 weeks are possible. *Solanum nigrum* grows rapidly, has high seed production and high viability of seed. This gives it a competitiveness as a weedy species but also means it is one of the first harvested edible greens from a new garden.

Use: The ripe fruit are cooked and eaten. They are also used for soup.
The leaves and young shoots are eaten cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	87.0	160	4.3		1.0	3660	20	
Fruit								

Insects: And probably others.

		Aphids
Icerya seychellarum (Westwood)	Margarodidae	
Phthorimaea operculella (Zell.)	Gelechiidae (LEP)	Potato tuber moth
Pulvinaria ubicola (Cockerell)	Coccidae (HEM)	
Saissetia coffeae (Walker)	Coccidae (HEM)	Coffee scale

Diseases:

Bacterial wilt	Bacteria	*Pseudomonas solanacearum*

Pests:
Importance: It is a significant food plant throughout the tropics. A commonly used green vegetable in most areas of Papua New Guinea. It mostly grows wild in the highlands and is cultivated on the coast.

Names

English: Plentiful fig
Tok pisin: Kumu musong
Tok ples:

Scientific name: *Ficus copiosa* Steud.
Synonyms:
Plant family: Moraceae

Description: A small tree. It grows up to 10 m high. The trunk is slender and straight. The bark is grey and smooth. Young stems and veins have a purplish colour and the tips have a rough feel due to raised bristles on the leaves and stems. The leaf shape varies. Leaves are 10-25 cm long by 5-12 cm across. They are oval. The leaves are often heart shaped at the base and bluntly pointed at the tip. The edges of the leaves are irregular. The leaf stalks are about 2 cm long. Fruit are 1-2 cm across and often on old twigs in small clusters.



Distribution: A tropical tree. Trees grow from sea level up to about 1800 m above sea level. They are normally in mixed forest.

Cultivation: Trees are often planted by seeds or self sown seedlings are transplanted. Trees can also be grown by cuttings and aerial layering. In some areas trees are grown as a hedge and pruned to increase branching. Plants occur both wild and cultivated.

Production: Young tips of 3-5 g are picked.

Use: The young leaves are eaten cooked.
The fruit are eaten raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Fruit								

Insects:

Cacao mirid sucks sap	Coreidae (HEM)	*Helopeltis clavifer* (Walker)

Diseases:

Sooty mould on leaves	Fungus	*Capnodium thuemenii* Sacc.
Rust	Fungus	*Cerotelium fici* (Cast.) Arth.
Tar spot	Fungus	*Phyllachora kaernbachii* P.Henn.

Pests:

Importance: Probably the most widely used fig leaf in Papua New Guinea. It is fairly common throughout the country and important in some areas.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Ficus wassa* Roxb.
Synonyms: *Ficus portus-finschii*
Plant family: Moraceae

Description: A shrubby tree up to 4 m tall. The bark is grey, flaky and scaly. The young leaf parts have grey hairs underneath them. The leafy twigs are reddish brown. The leaves are produced opposite one another. The leaf is rough to the touch. The edges of the leaves are wavy and slightly toothed. The tip of the leaf is pointed and the base is wedge shaped. There is a gland at the base of the leaf veins. Fruit are produced in clusters on the leafless stems. They are red to purple when ripe.

Distribution: It occurs in areas of regrowth. In Papua New Guinea it grows in lowland areas and up to 300 m altitude or higher.

Cultivation: Plants can be grown from seed or cuttings.

Production:

Use: The leaves are eaten cooked.
The fruit are also cooked with the young leaves.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Fruit								

Insects:

Diseases:

Pests:

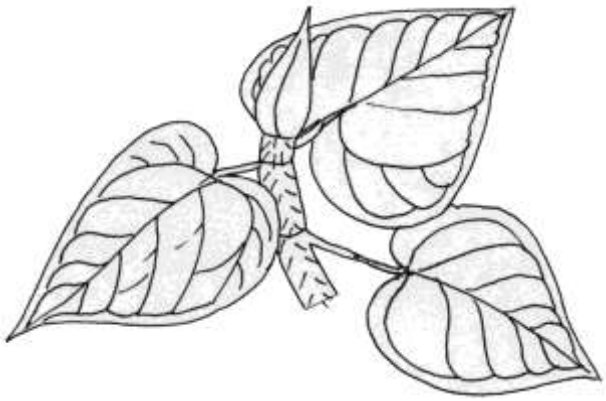
Importance: A commonly used edible leaf in Papua New Guinea.

Names

English: Lovo
Tok pisin:
Tok ples:

Scientific name: *Ficus pungens* Reinw. ex Bl.
Synonyms: *Ficus myriocarpa* Miq.
Plant family: Moraceae

Description: A tall tree with large leaves 30 cm long and 25 cm wide. Young leaves are light green. They have teeth along the edge and are rough on both surfaces. They have 10 pairs of side veins. Stalks have very sharp thorns. These can fall off. The fruit are small (0.5 cm) and in clusters along long stalks hanging from the trunk. The stalks can be 50-80 cm long. The fruit are greenish-yellow but turn red as they ripen.



Distribution:

Cultivation: Normally near streams and drains. Trees grow from sea level up to about 1600 m. Trees are mostly self sown.

Production:

Use: The young leaves are cooked and eaten with meat.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

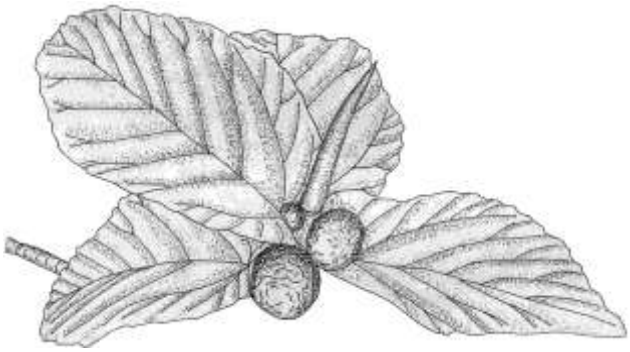
Importance: The leaves are moderately commonly eaten with meat in areas where the tree occurs.

Names

English: Highlands kapiak
Tok pisin: Hailans kapiak
Tok ples:

Scientific name: *Ficus dammaropsis* Diels
Synonyms: *Dammaropsis kingiana* Warb
Plant family: Moraceae

Description: A fig tree. It grows to 9-13 m high. The large young leaves are eaten. The branches are strong and flexible and contain a milky juice. The tree has a single trunk without buttresses or aerial roots. It is often straggling. Seedling trees vary considerably in size of leaves and colour of young leaves and veins. The leaves are large. They can be 60-100 cm long. They are deeply corrugated with veins. The veins can be red or yellow. The fruit is large (15 cm across) and made up of large overlapping scale leaves. It ripens to a deep purple.



Distribution: Trees occur from 900 m to 2700 m but it is most common between 1600 and 1750 m altitude. It suits hardiness zones 9-11.

Cultivation: Trees grow from seeds and are transplanted. Cuttings of branches do not normally establish.

Production:

Use: The young leaves are eaten with meat.
The outside layer of the fruit is edible.
The young fruit are boiled and eaten as a vegetable.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Fruit								

Insects:

Fruit flies are common in the ripe fruit		*Bactrocera spp.*
A weevil damages plants	Curculionidae (COL)	*Rhinoscapha cobaltinata* Hell.
Longhorn beetles collect sap of damaged trees	Cerambycidae (COL)	*Rosenbergia weiskei* Hell.

Diseases:

Sooty mould	Fungus	*Chaetothyrium boedignii* Hansf.

Pests:

Importance: In Papua New Guinea, leaves are fairly widely used at pig kills and for mumus in the highlands. Fruit are less widely eaten.

Names

English: White Sandpaper Fig
Tok pisin:
Tok ples:

Scientific name: *Ficus hispida* L.f.
Synonyms:
Plant family: Moraceae

Description: A small bushy tree. It grows 6-8 m high and spreads to 2-5 m across. The branches are hollow. It has strangling roots but not aerial roots. The trunk is short and fairly straight and slender. The bark is grey. The young shoots are red and hairy. The leaves are 10-35 cm long by 6-12 cm wide. The leaf stalks are 2-9 cm long. The leaves are dark green, thin and rough on both surfaces. The fig is 3-5 cm across. They are reddish-green and borne in clumps on the trunk and larger branches. The figs split open and are red inside. There are some varieties described based on the colour and size of the figs.

Distribution: It is a tropical and subtropical plant. It occurs naturally in monsoonal rainforests. In Nepal plants are grown between 500-1100 m altitude. In S China it grows between 1000-1500 m altitude.

Cultivation: Plants are grown from seed or root suckers.

Production:

Use: The green fig fruit are eaten, cooked. They are used in curries. (They may cause giddiness)
The ripe fruit are eaten raw. They are also made into jam.
The young leaves are used as a vegetable.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English: Dye fig
Tok pisin:
Tok ples:

Scientific name: *Ficus tinctoria* Forster f.
Synonyms:
Plant family: Moraceae



Description: A small tree or shrub 2-4 m high. It can climb and scramble over other plants and be up to 10 m high. The small branches are rough. The small branchlets are yellow or pale brown. The bark is grey or brown and cracked or flaky. The leafy structure at the base of the leaves is sword shaped and 5-10 mm long and thick. The leaves of the tree are yellowish with purple veins and short leaf stalks. The leaves are 4-13 cm long and 2-6 cm wide. The leaf stalk is 0.6-1 cm long. Male and female flowers occur on separate plants. The figs are in the leaf axils and up to 2 cm across and orange coloured. There are some varieties described based on the size of the plant and the size of the figs.

Distribution: Trees are common on limestone or coral rocks near the sea shore. It tends to be on coral soils.

Cultivation: It normally grows wild.

Production: In Australia, fruit are produced in May to July.

Use: The young tips are picked and eaten.
The fruit are eaten cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Leaves								

Insects:

Diseases:

Pests:

Importance: Mostly reported as a wild occasional food on the Gazelle Peninsula and New Ireland in Papua New Guinea. It is an important food in Tuvalu and Micronesia.

Names

English: Swamp Morning Glory
Tok pisin: Kangkong
Tok ples:

Scientific name: *Ipomoea aquatica* Forsk.
Synonyms: *Ipomoea repens* Roth
Plant family: Convolvulaceae



Description: Kangkong is a creeping sweet potato like plant. It has hollow stems and can float on water. The leaves are green and are normally not divided like some sweet potato leaves, but the shape and size varies a little between different kinds. The trumpet shaped flower looks like a sweet potato flower and is normally white. The runners develop roots at the nodes and also branch. This branching increases when tips are picked off. Some variation in leaf shape can be observed. Leaf shape is less variable than in the related sweet potato, but narrow and broad leafed kinds occur. White and green stemmed kinds occur. Green stemmed kinds have more cold tolerance than white stemmed.

Distribution: It grows best in short day stable high temperature, moist conditions. Temperatures need to be above 25°C for satisfactory growth.
In equatorial region plants probably grow up to 1000m altitude. Below 23°C the growth rate is too slow for economic production. So production is mainly in the lowland tropics. Optimum pH is between 5.3-6.0. It suits damp places and grows well in swamps. It can grow as a partly floating plant in swamps and lagoons behind the beach along the coast. Kangkong is grown in a number of other tropical countries including Malaysia, Indonesia, Egypt, Fiji and especially Hong Kong and Taiwan. In some of these countries they grow the dry land form in gardens. In Nepal it grows up to 500 m altitude.

Cultivation: Dryland kangkong is normally grown from seed. Sometimes seed are presoaked for 12-24 hours prior to sowing. Plants can also be grown from cuttings and establishment is rapid. Top cuttings 25-40 cm long can be planted beside a pond.

Production: Young tips can be taken 30 days after planting, and subsequent harvests every 7 to 10 days. Production of new shoots probably declines at flowering. Yields up to 60,000 kg/ha have been recorded in other countries.

Use: The young tips are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	92.9	84	2.1		1.3	520	16.0	0.2

Insects:

Diseases:

Leaf spot	Fungus	

Pests:
Importance: Common in most swampy coastal areas in the tropics.

Names

English:
Tok pisin:
Tok ples: Valanguar

Scientific name: *Polyscias verticillata* Stone
Synonyms: *Nothopanax spp.*
Plant family: Araliaceae

Description: A shrub grown as a hedge and of which the young leaves are eaten. The leaf sheaths form a flat section clasping the leaf stalk. Leaf shapes, colours and size vary between species and varieties.



Distribution: It occurs in coastal areas and probably up to 1000 m altitude. It is mostly planted around houses.

Cultivation: Plants are grown by cuttings. They are often used as an ornamental hedge. This plant is often used to form a hedge around their houses and gardens. Constantly picking the leaves helps maintain it as a small pruned shrub. As a shrub they grow from 2 to 5 m tall. Seeds are produced and spread by birds. These self sown seedlings are sometimes replanted.

Production:

Use: The young leaves are cooked and eaten.
The young leaves have a nice smell and are used as a vegetable as well as to flavour stews.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Cacao mired		*Helopeltis clavifer* (Walker)

Diseases:

Pests:

Importance: In Papua New Guinea it is moderately common as an ornamental in coastal areas, but not always eaten. It is popular in the Gazelle Peninsula.

Names

English: Panax
Tok pisin:
Tok ples:

Scientific name: *Polyscias fruticosa* (L.) Harms
Synonyms: *Nothopanax fruticosum* (L.)Miq.
Plant family: Araliaceae



Description: A tall shrub. It grows 3-5 m high and spreads 2-3 m wide. The branches are spreading. The leaves are clustered near the tips. The leaves are divided 3 times. They are 75 cm long. They sheath the stem at the base. The leaflet stalks are 25 cm long and the leaflets are 1-12 cm long by 0.5-4 cm wide. They vary in shape. They can be lobed or have teeth. The flowers are 0.5 cm across and in a spreading group 60 cm long. The fruit are 0.5 cm across. They are fleshy.

Distribution: A tropical plant. It suits tropical and subtropical regions. They need well drained acid soils.

Cultivation: Plants can be grown from fresh seed. They can also be grown from cuttings.

Production:

Use: The young leaves are eaten as a flavouring.
They are also boiled and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Polyscias scutellaria* (Burm.f.)Fosb.
Synonyms: *Nothopanax scutellaria* (Burm.f.)Merr.
Plant family: Araliaceae



Description: A shrub which forms many branches from the base. It is 1-6 m high and spreads 1.5-3 m wide. The stems are bronze-green and there are distinct scars where the leaves fall off. The leaves have long leaf stalks and they can be simple or have 1-5 leaflets. The leaves are often cup shaped. The leaf is elongated along the leaf stalk for about a quarter of its length. The leaves have teethed and are smooth on both sides. They are dark green on top and lighter green beneath. The leaf blade is 8-25 across and almost round or kidney shaped. The leaf stalk is 6-28 cm long. The flowers are 0.5 cm across. They are white or yellow. The fruit is 0.7 cm across and purplish-black. It is round and fleshy.

Distribution: It occurs in the lower altitude regions. It needs well drained soils.

Cultivation: The shrub is often planted and pruned to form a hedge. It is grown from cuttings.

Production:

Use: The young leaves and tips are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	82.0	227	3.7		4.0		85	

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Polyscias macgillivrayi* (Seem.) Harms
Synonyms: *Tieghemopanax macgillivrayi* (Seem.)R.Vig.
Plant family: Araliaceae

Description: A tall shrub. It grows 4-7 m high and spreads 2-4 m wide. Young growth is smooth. There is usually a single trunk. The bark is grey. There are only a few branches and they are spreading. The leaves are divided along the stalk. The leaves are 1 m long. The leaflets are 20-25 cm long by 8-10 cm wide. They are oblong and often broadest near the base. They are green and often rolled downwards. The flowers are 0.5 cm across. They form loose open groups. The fruit is about 0.8 cm across and flattened.

Distribution: It grows in rainforest. It is a tropical plant. It needs well drained soil.

Cultivation: Plants can be grown from fresh seed.

Production:

Use: The leaves are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

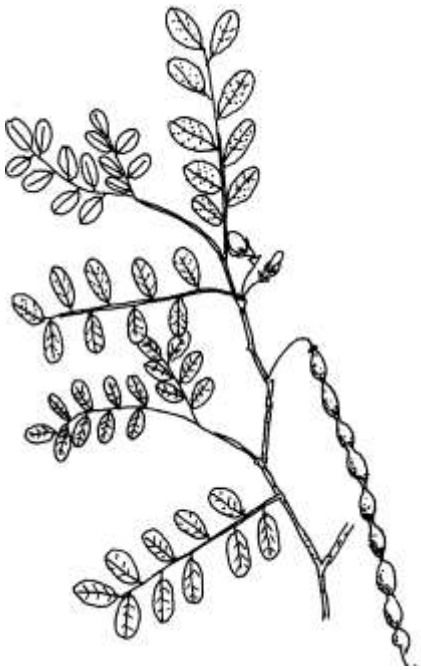
Pests:

Importance:

Names

English:
Tok pisin: Kalava
Tok ples:

Scientific name: *Ormocarpum orientale* (Spreng.) Merr.
Synonyms: *Ormocarpum sennoides* D.C.
Plant family: Fabaceae



Description: A small leguminous shrub or tree up to 7.5 m tall with light brown bark which strips off showing a greener bark underneath. The leafy shoots are hairy. When the plant flowers it has a flower like a bean and a pale yellowish green in colour with reddish veins. It produces a pod which is up to 9 cm long and jointed in a chain of 2 to 8 seeds. The seeds are small 5 mm and bean shaped. Flowers and pods are rare. It is a legume.

Distribution: It grows along the beach and in mud flats. It also comes up in old gardens. It mostly occurs naturally below about 30 m altitude. It is planted in gardens up to 500 m altitude.

Cultivation:
In gardening situations it is normally grown from cuttings.

Production:

Use: The young leaf tips are used cooked as a vegetable.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

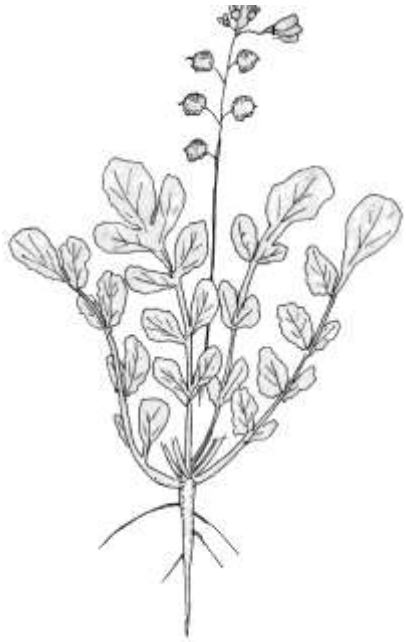
Importance: In Papua New Guinea, it is mostly grown and used in the Gulf Province and along the South Coast or by people from there. It is grown in the Gazelle Peninsula.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Nasturtium schlechteri* O.E.Schultz
Synonyms: May be renamed *Rorippa sp*.;
Plant family: Brassicaceae

Description: A cabbage family plant with yellow flowers and short seed pods. The leaves are divided and it has a tap root



Distribution: It is common in highland areas from 1000 to 2,200 m altitude but it also grows down to the coast.

Cultivation: The seeds are normally broadcast over the garden. *Rorippa schlechteri* is grown as a vegetable in gardens in the highlands. Because it has a well developed taproot, the plant does not transplant easily.

Production: Plants are harvested after 4-6 weeks.

Use: The leaves and whole plant are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Agrotis ipsilon (Hufnagel)	Noctuidae (LEP)	Black cutworm
Crocidolomia binotalis Zeller	Pyralidae (LEP)	Cabbage cluster caterpillar
Plutella xylostella (L.)	Plutellidae (LEP)	Diamond back moth

Diseases:

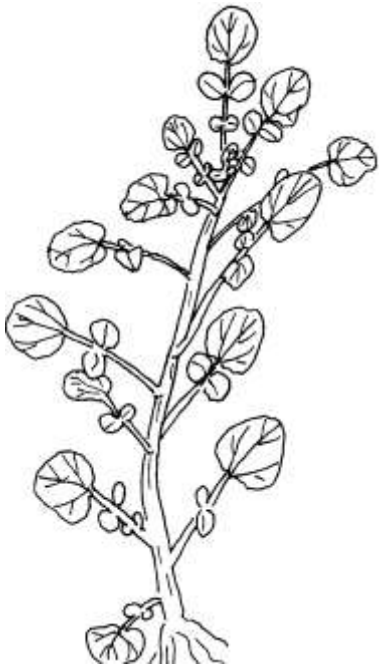
Pests:

Importance: A common and widely cultivated green in Papua New Guinea.

Names

English: Watercress
Tok pisin:
Tok ples:

Scientific name: *Rorippa nasturtium-aquaticum* (L.) Hayek
Synonyms: *Nasturtium officinale* R.Br.
Plant family: Brassicaceae



Description: A small leafy plant that grows in water and lasts for several years. It has hollow stems and roots freely from the nodes. It branches freely. The leaves consist of 3 to 7 pairs of small leaflets then a larger leaflet at the end. The flowers are small and white and grow grow in a cluster. Flowers are not always produced and need days with more than 12 hours of sunlight to form. A small narrow curved seed pod about 2 cm long can develop. It grows attached to the banks of streams.

Distribution: This is a temperate climate crop. It is common in tropical highland creeks especially those flowing off limestone hills. (pH 6.5-7.5) It needs to be in running water. In the tropics it occurs from about 1000 m up to at least 2900 m altitude. It grows in streams, ditches, lakes, swamps, marshes from near sea level to 3700 m altitude in China.

Cultivation: It is grown from cuttings planted along the edges of clear running water. Cuttings of 10-15 cm long are suitable. The plant has roots along the stem at the node and cuttings quickly form roots in water. A spacing of 30 cm is suitable. This small plant keeps living for many years once established. It can also be grown from seeds. Plants can float on the water. It will not tolerate drying out. Watercress has a high phosphate requirement.

Production: Harvesting can occur 4 to 6 weeks after planting. Regular picking encourages branching and increases production. Tips 5-10 cm long are harvested. This can be repeated every 4-6 weeks.

Use: The leaves and stems are eaten raw or cooked and have a spicy flavour.
Cooking should be used if the water in the stream is not pure and clean.
The seed can be germinated to produce sprouts.
The seeds can be ground to make a mustard flavouring.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	95.0	63	2.4		3.4	960	35	0.1
Seed								
Sprouts								

Insects:

Diseases:

Leaf spot		

Pests:

Importance: It is becoming accepted as an important and popular green in the highlands of Papua New Guinea.

Names

English: Common Comfrey
Tok pisin:
Tok ples:

Scientific name: *Symphytum officinale* L.
Synonyms:
Plant family: Boraginaceae

Description: A low clumpy plant with large long rough leaves. A dense crown of leaves and shoots develops. Plants are 30-90 cm tall. Leaves are 30-60 cm long and 10-20 cm wide. Lower leaves have leaf stalks and are branched. The inner leaves do not have leaf stalks. The flower stalk has many flowers. The flowers are purple, red or yellowish white. The nutlets are black, oval, 3-4 mm across and smooth an shiny



Distribution: It grows satisfactorily from sea level up to at least 2200 m altitude in the tropics. It will grow in very poor soil. In Hobart Botanical gardens. It suits hardiness zones 3-9.

Cultivation: It is grown by breaking up the clump and re-planting a portion of it.

Production:

Use: The young leaves are cooked and eaten.
Caution: In some countries caution has been stressed about this plant because of toxic alkaloids in similar plants. The older leaves are bitter and should be avoided.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

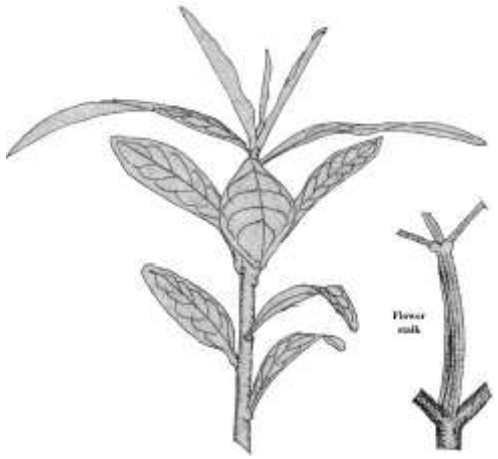
Diseases:
Leaf blotch

Pests:

Importance: It occurs quite widely throughout Papua New Guinea in small amounts and is probably increasing in importance because it grows so easily.

Names

English: Waterleaf
Tok pisin:
Tok ples:
Scientific name: *Talinum triangulare* (Jacq)Willd
Synonyms:
Plant family: Portulacaceae



Description: A small leafy branching herb. It grows up to 35-60 cm high. It can be erect or lie over. The roots are swollen and fleshy. The stems are succulent. The leaves are alternate and have very short stalks and are fairly soft and light green in colour. The leaves can be 7.5 cm long. In the shade they grow larger. The flowers are on a 3 sided stalk at the top of the plant. There is a clump of pale pink flowers with 5 petals. Seeds are very small and black

Distribution: It occurs in coastal tropical areas and up to about 1000 m altitude.
Due to the C4 pathway optimum growth is achieved with high temperatures, high soil fertility, plenty of sunlight and sufficient moisture. The plant will also grow adequately in poorer conditions including some drought and a little shade.

Cultivation: It can be grown from seeds or stem cuttings. There are about 4000 seeds per gram. Seed collection is not easy because the seed capsules split open very easily and the seeds drop out. Also plants don't always produce seeds readily. Growing from seed is easiest by sowing seeds in a small nursery then transplanting the small plants when they are about 5-8 cm high. With very small seeds like these, it is best to mix the seeds with dry sand before sowing. Then a small amount of the seed/sand mixture can be sown and the seeds will not be too close together. Seeds will grow in about 6 days. Often plants once established become self sown from natural seed falling. Alternatively cuttings about 15 cm long of the more mature but not woody stems can be used. The excess leaves should be removed from the cuttings. A spacing of 20 cm is suitable. Plants grow better in fertile soil, but will grow in fairly low fertility soils. They need plenty of moisture.

Production: The leaves and tender stems can keep being produced for up to a year. Older plants can be cut back and allowed to sprout again. Plants start producing 4-6 weeks after planting. Leaf tips may be picked every two weeks for up to a year. Normally the top shoots are picked out first, to let the side shoots grow. A yield of up to 5 kg of edible tips per square metre area of plants over one year can be achieved.

Use: The leaves and tender stems are eaten raw or cooked. They are slightly sour. Steaming the leaves produces less brown discolouration and they are less slimy. Due to oxalates in the leaves, large amounts should not be eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	91.0	105	2.4		5.0		31	

Insects:
Diseases:
Pests:
Importance: At present not widely distributed in Papua New Guinea but being accepted and liked in areas where it occurs.

Names

English: Silver beet
Tok pisin:
Tok ples:

Scientific name: *Beta vulgaris* ssp. *cicla* (L.)Koch
Synonyms: Probably now *Beta vulgaris* Cicla group
Plant family: Chenopodiaceae

Description: A broad leafed annual plant. Stalks are smooth and often white with a dark green leaf. A clump of stalks and leaves are produced from the base. Plants can also be blue. The leaves can be 12-25 cm long.



Distribution: It needs to be over at least 500 m altitude in the tropics. It is mostly grown between 1000 and 2600 m altitude.

Cultivation: It is grown from seeds. Under tropical conditions it is not normally possible to save your own seed. In cold climates plants need to be sown when conditions are warmer so that plants do not go straight to flower. A spacing of 30 cm between plants is suitable. Seed are sown 2.5 cm deep.

Production: The first leaves are ready after 8-10 weeks and can produce for 2 years. Only the outer leaves are picked off.

Use: The leaves and stalks are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	92.7	84	1.9		2.3	314	18	0.3

Insects:

Spoladia recurvalis (Fabricius)	Pyralidae (LEP_	Beet webworm
Oribius destructor Mshl.	Curculionidae (COL)	Shot hole weevils
Oribius inimicus Mshl.	Curculionidae (COL)	Shot hole weevils

Diseases:

Leaf spot	Fungus	*Cercospora beticola* Sacc.
Blossom blight	Fungus	*Choanephora cucurbitarum* (Berk. & Rav.) Thaxt.

Pests:

Importance: It is moderately common in some highland areas in the tropics including Papua New Guinea.

Names

English: Sweet leaf
Tok pisin:
Tok ples:

Scientific name: *Sauropus androgynus* (L.)Merr
Synonyms:
Plant family: Euphorbiaceae

Description: A low growing shrub with small red flowers. It continues to grow from year to year. It grows 0.8-2 m tall. It can grow 6 m tall. It tends to grow upright then falls over due to its weight. It branches little. Compound leaves on the sides of the stems bear flowers along their underside. The fruit are purple. The fruit are about 1 cm across and open and drop their seed at maturity.



Distribution: It occurs commonly in S E Asia. It can grow in partial shade or full sun. It suits the hot humid lowlands. It will grow in heavy clay soils and will grow in acid soils.

Cultivation: It is grown from cuttings. Cuttings grow easily. Pruning encourages more upright shoots. It can also be grown from seed. Seed only remain viable for a few months. It is often grown as a hedge. Cuttings for this are placed 10 cm apart. Adding shade (shade cloth) and fertiliser can be used to force the leaf tips to grow rapidly.

Production: Young leaves can be harvested 4 months after planting. The top 15 cm of young leaf tips are picked. It gives a high yield of leaves. Production continues year round. Shrubs last a long time.

Use: The young tips, young leaves, flowers and small fruit are eaten raw. Older leaves are cooked.
Leaves are often singed before being added to soups.
The fruit can be used to make jam.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	81.0	244	4.8		2.7		85	
Flowers								
Fruit								

Insects:

Diseases:

Pests:

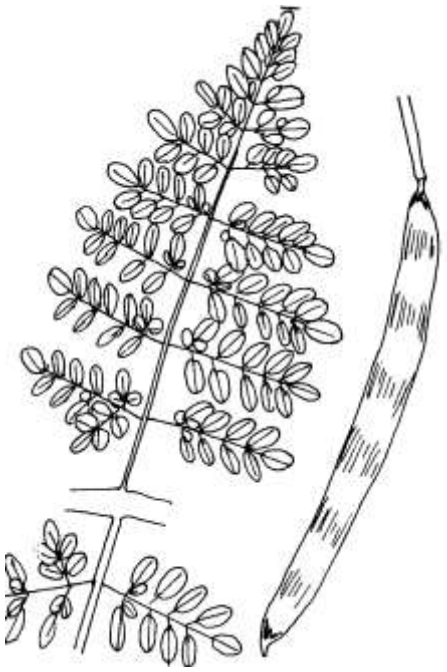
Importance: Only recently introduced into Papua New Guinea and it will probably become a popular vegetable. It is well liked in the Solomon Islands and SE Asia.

Names

English: Horseradish tree, Drumstick Tree
Tok pisin:
Tok ples:

Scientific name: *Moringa oleifera* Lamarck
Synonyms:
Plant family: Moringaceae

Description: A small tree up to 9-12 m high. The trunk is 60 cm across. The wood is soft. It has fern-like divided leaves. The tree loses its leaves during the year. The bark is grey and thick. It is corky and peels off in patches. The leaves are pale green and the leaf is divided 3 times. The whole leaf is 30-60 cm long and the leaflets are usually oval and 1-2 cm long. The leaflets are jointed with a gland near the joint. The flowers are pale yellow and contain both sexes. They occur in long sprays 30 cm long. Each flower has 5 petals and of these one is erect and 4 are bent backwards. The flowers are sweet scented. The fruit is a long capsule 30-45 cm long by 2 cm wide. The seed capsules are up to 45 cm long. They are roughly triangular in shape. They split open when dry. There are 9 dark brown seeds inside. The seeds have 3 wings. Some kinds are better for edible fruit than others, while some are selected for leaves.



Distribution: They suit the dry lowland areas and grow up to 500 m altitude in the tropics. In Nepal it grows up to 1100 m altitude. They are not hardy to frost. They cannot tolerate waterlogging. It suits hardiness zones 9-12.

Cultivation: It is best to grow plants from 1 metre long cuttings but they can be grown from seed. They can be used as a hedge and pruned regularly to produce more leaves. Properly dried seed can be stored for a long time in sealed containers in a cool place.

Production: Trees are fast growing. They can be pruned or topped. The tree flowers continuously.

Use: The young tops and leaves are eaten cooked.
The very young long pods are eaten cooked, especially in curries. They are also pickled.
The young seeds are eaten roasted.
Sometimes the roots are used as a horseradish substitute.
The roots, leaves, flowers and fruits are eaten cooked in water and mixed with salt and chili peppers. The oil expressed from the seeds is used in salads.

Food Value: Per 100 g edible portion

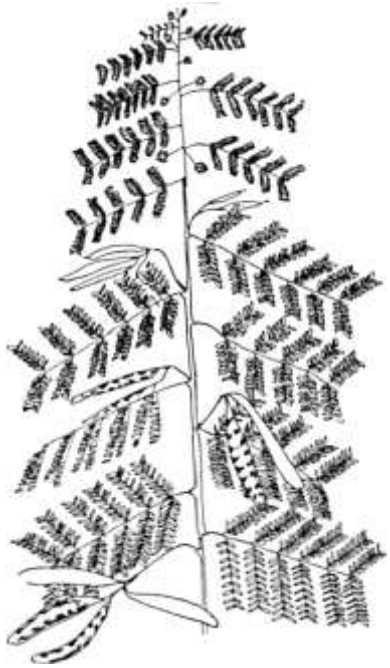
Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	81.7	251	5.3		2.3	701 RE	31.0	0.5
Pods	88.2	155	2.1		0.4	7	141	0.5
Seeds	6.5		46.6					
Roots								

Insects:
Diseases:
Pests:

Importance: It is sold in markets. An introduced tree probably not widely used for food in Papua New Guinea. Its planting and use should be encouraged.

Names

English: Leucaena
Tok pisin:
Tok ples:
Scientific name: *Leucaena leucocephala* (Lam.)de Wit.
Synonyms: *Leucaena glauca* AUCT. non (L.) Benth.
Plant family: Fabaceae/Mimosoideae



Description: A small erect tree. It grows to 6-10 m high. It has fine divided leaves. The leaves have 2 rows of leaflets. The leaves are 15 to 25 cm long and the leaflets 8 to 16 cm long. They are a dark dull green on top and dull greyish green underneath. The flowers are white and in round heads. They are in the axils of leaves or on the ends of branches. The pods are flat and 10-15 cm long and 1.8 cm wide with 15-25 seeds inside. It has shiny brown seeds.

Distribution: It is a tropical plant. It is introduced and common at low and medium altitudes throughout the tropics. It is widespread from sea level up to about 1700 m altitude in the tropics. It is often used as shade for coffee. It is drought resistant. It can grow on dry and poor soils. It can tolerate salt. It needs well drained soil and full sun. In Nepal it grows to 1400 m altitude. It suits hardiness zones 10-12.

Cultivation: It grows easily from seeds. It also regrows from cut stumps and it can be grown from cuttings. Plants are hard to eliminate and can become a weed problem in dry areas.

Production: It grows very quickly.

Use: The mature seeds are toasted and ground and used as a coffee substitute.
The young leaves are sometimes used as a vegetable.
The tender pods and shoots are cooked as a vegetable.
Caution: The leaves contain a chemical which causes hair to fall out.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Pods								

Insects:

Armacia basigera (Walker)	Ricaniidae (HEM)	
Ectropis sabulosa Warr.	Geometridae (LEP)	Cacao looper
Helopeltis clavifer (Walker)	Coreidae (HEM)	Cacao mirid
Orgyia postica (Walker)	Lymantriidae (LEP)	
Parasaissetia nigra (Nietn.)	Coccidae (HEM)	Nigra scale
Planococcus citri (Risso)	Pseudococcidae (HEM)	Citrus mealy bug
Pteroma sp.	Psychidae (LEP)	
Tiracola plagiata (Walker)	Noctuidae (LEP)	Cacao armyworm

Diseases:

Pink disease	Fungus	*Corticium salmonicolor* Berk.& Br.
Thread blight	Fungus	*Corticium solani*
Root rot	Fungus	*Fomes noxius* Corner

Pests:
Importance: It is probably rarely used as an edible plant in Papua New Guinea.

Names

English: Indian spinach
Tok pisin:
Tok ples:

Scientific name: *Basella alba* L.
Synonyms: *Basella rubra* L.
Plant family: Basellaceae



Description: An annual or perennial climbing herb with thick fleshy leaves. The vine is smooth and juicy and can be 10 m long. It branches freely. The vine and leaves can be red or green. The leaves are fleshy and pointed at the tip. They can be 8-18 cm long and 8-10 cm across. They are carried alternately along the vine. Leaves can be heart shaped or oval. It has white, pink or red flowers in short spikes which are in the axils of the leaves. Flowers have both sexes. The fruit are round and soft. They can be red, white or black and are 6-8 mm across. The seeds are round and black. They are 3 mm across. (Often the ones with heart shaped leaves are called *Basella cordifolia*, the ones with red stem *Basella rubra* and the short day flowering dark green kind called *Basella alba*.)

Distribution: It occurs mostly in the tropical lowlands and is best below 500 m but will grow up to about 1600 m. in the equatorial tropics. It will grow quite well in the temperature range 15-35°C. It does not like waterlogging but can survive 4-12 weeks drought once well established. It requires adequate water during the growing season. It grows well in a variety of soils. The best pH is 5.5-7.0. It cannot tolerate salty conditions. Flowering does not occur when day lengths are over 13 hours. It is found throughout the Philippines in waste places.

Cultivation: It can be sown from seeds or cuttings. Seeds germinate in a few days. Normally sticks are provided for support or it is allowed to grow over fences and stumps. If seeds are used, 3 kg of seed will sow one hectare and they are best sown in a nursery and transplanted. A spacing of 1 m is suitable. Plants grown from seed are more productive than from cuttings. When cuttings are used, 20-25 cm long cuttings are suitable. Where the plant grows over light soil it can root at the nodes and continue growing continually. Partial shade, rich fertile soil and adequate moisture favour abundant leaf production. It is responsive to nitrogen fertiliser. Light shade gives bigger leaves.

Production: It is 4-6 weeks until the first harvest. It grows reasonably well on poor soils and is fairly resistant to pest and disease. Leaves will only store for one day at 20-30°C. Yields of 40 kg of leaves from a 10 metre square bed is possible over 75 days.

Use: The young shoots and leaves are eaten cooked. They are somewhat slimy.
In soups and stews the mucilage can be used as thickening.
Fresh leaves can be added to salads.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	85.0	202	5.0		4.0	1800	100	

Insects: **Pests**:
Diseases:

Large leaf spot	Fungus	*Thanatephorus cucumeris* (Frank) Donk
Leaf spot	Fungus	*Curvularia sp.*
Leaf spot	Fungus	*Phyllosticta sp.*

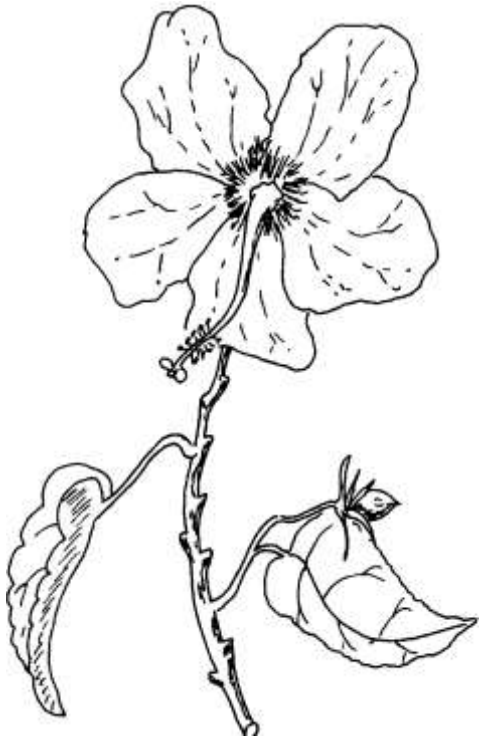
Importance: It has been encouraged and accepted in some coastal areas of Papua New Guinea.

Names

English: Hibiscus
Tok pisin:
Tok ples:

Scientific name: *Hibiscus rosa-sinensis* L.
Synonyms:
Plant family: Malvaceae

Description: A shrubby hibiscus used for hedges. It is a evergreen woody shrub. It grows to 2-5 m tall. The bark is grey and flaky. It has fine stripes. The leaves are bright green. They are oval and the edges of the leaves are entire on the lower leaves. The upper leaves are coarsely toothed. The leaves have long tips. The flowers occur singly in the axils of leaves. Flowers can be single or double. They are bell shaped and 10-15 cm across. There are a range of colours. The fruit are rounded capsules with many seeds inside. The capsules are beaked.



Distribution: A common ornamental throughout the tropics. It originally came from China. It thrives on any type of soil. Different types are adapted to sunny or shady places. They grow where average temperatures are between 15-30°C. They are very sensitive to frost. They grow from sea level to 1000 m altitude. They probably require a minimum rainfall of 700 mm per year. It grows in Nepal to 1400 m altitude. It grows in open, moist places. It suits hardiness zones 9-11.

Cultivation: It is mostly grown from cuttings.

Production:

Use: The leaves are eaten cooked. In some places they are pounded before cooking.
The flowers are eaten raw or pickled. They are also added to drinks.
The fresh flower ovary is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Flowers								

Insects:

Diseases:

Leaf spot	Fungus	*Ascochyta abelmoschi* Hartner
Blossom blight	Fungus	*Choanephora cucurbitarum* (Berk. & BR.) Thaxt.
Leaf spot	Fungus	*Colletotrichum sp.*
White thread blight		
Probably virus		

Pests:

Importance: In Papua New Guinea it is mostly grown as an ornamental but is eaten in some areas.

Names

English: Wandering Jew
Tok pisin:
Tok ples:

Scientific name: *Commelina cyanea* R.Br.
Synonyms:
Plant family: Commelinaceae

Description: A weak straggling herb. It is an evergreen plant. It grows to 30 cm high and spreads to 2 m across. The stems are weak and fleshy, and lie along the ground, and form roots at the nodes. The leaves are green or blue, and sword shaped. They are 3-7 cm long, by 2 cm across. They form a sheath at the base. The flowers are bright blue, with 3 petals. They are 1.5 cm across. The flowers are carried on a branched flower stalk. The flowers open in the morning and collapse by afternoon.

Distribution: It is tropical and subtropical. It grows in moist soil. It suits a sheltered, partly shaded position. It is drought and frost tender.

Cultivation: Plants are grown by dividing the clump or using stem cuttings.

Production:

Use: The leaves are eaten after cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaf bud	86.7		1.6					

Insects:

Diseases:

Pests:

Importance: It is grown and used as a vegetable in a few highland regions.

Names

English: Wandering Jew
Tok pisin:
Tok ples:

Scientific name: *Commelina diffusa* Burm.f.
Synonyms:
Plant family: Commelinaceae

Description: A small leafed, straggling plant, with blue flowers. It continues to grow from year to year. It can grow to 1 m long. The stems are weak. The stem is fleshy, and it roots at the nodes. The leaves are alternate and sword shaped. They are 4-10 cm long. They have short stalks and a stem clasping sheath. The flowers are blue and 2.5-3 cm across. One of the 3 petals is smaller than the others. The seeds have fine patterns on one side. They are angular and about 2 mm long.



Distribution: It grows in moist places. It occurs from sea level up to about 1600 m altitude in the tropics.

Cultivation: It grows easily from stem pieces. It prefers poorly drained soil, in open sunny positions, but can grow quite well in shady places. Plants can also be grown from seed.

Production:

Use: The young leaf tips are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Rust	Fungi	*Phakopsora tecta* Jackson & Holloway
	And	*Uromyces commelinae* Cooke

Pests:

Importance: In Papua New Guinea it is declining in importance as a cultivated crop but still harvested from the wild in a number of places.

Names

English:
Tok pisin:
Tok ples: Kabanga

Scientific name: *Dicliptera papuana* Warb.
Synonyms: May be renamed *Hemigraphis*
Plant family: Acanthaceae



Description: A herb up to 1 m high. It is somewhat similar to *Rungia klossii* but taller and with longer leaves. The stems have grooves along them. The leaves are produced opposite each other. They are oblong and taper at both ends. Leaves can be smooth or finely hairy. The flower clusters occur in the axils of leaves. The flower clusters have 2 wing like bracts below them. Flowers are blue. They occur in pairs. The fruit capsule is small with 2 cells and with 2 seeds in each cell. The seed are round and with pits on the surface.

Distribution: It grows wild in the highlands especially along creeks. It is also cultivated. It grows between at least 700 m and 2600 m altitude.

Cultivation: It can be grown from cuttings. Normally a group of stalks are planted together to produce a clumpy bush.

Production: The young leaf tips are picked at regular intervals.

Use: Leaf tips are eaten cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance: A less popular green cultivated in some areas, harvested from the wild in others and not used in other areas. It is less popular than Rungia.

Names

English: Indian coral tree
Tok pisin: Palpal
Tok ples:
Scientific name: *Erythrina variegata* L.
Synonyms:
Plant family: Fabaceae

Description: A deciduous tree. It grows up to 15-20 m tall and loses its leaves for part of the year. The trunk has blunt spines. The branches are spreading, crooked and armed with sharp black prickles. The leaves have 3 leaflets. The leaflets are broadly oval and 8 to 18 cm long. They are shiny green on top and dull flat green underneath. The flowers appear before the leaves. The flowers are at the ends of branches and are hairy and dense. The flowers are large numerous and hang down. They are red. The pod is about 10 to 25 cm long and 1.5 to 2 cm across. The pod is constricted between the beans. Seeds are dark red.



Distribution: It is native from India to the Philippines and the Pacific. It mostly grows naturally along the dunes very close to the coast but is transplanted as an ornamental. It will grow up to 900 m altitude. It is tolerant to salt. It can tolerate drought. It needs full sun. It suits hardiness zones 11-12.

Cultivation: Trees can be grown from seed. Cuttings also grow easily.

Production:

Use: The young leaves are eaten cooked.
The seeds are eaten after boiling or roasting.
Caution: Some similar coral trees contain alkaloids and are used as medicine. The seeds are poisonous raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Seeds								

Insects:

Diseases:
Leaf spot

Pests:

Importance: The tree occurs in many lowland areas of Papua New Guinea, but the leaves are only eaten by Sepik people at present.

Names

English: Coral tree
Tok pisin:
Tok ples:

Scientific name: *Erythrina variegata* var. *orientalis* L.
Synonyms: *Erythrina indica* Lam.
Plant family: Fabaceae

Description: A tree up to 15 m tall which loses its leaves for part of the year. The trunk has blunt spines. The branches are spreading, crooked and armed with sharp black prickles. The leaflets are broadly oval and 8 to 18 cm long. They are shiny green on top and dull flat green underneath. The flowers are at the ends of branches and are hairy and dense. The flowers are large numerous and hang down. They are red. The pod is about 10 to 25 cm long and 1.5 to 2 cm across. The pod is constricted between the beans. Seeds are dark red.

Distribution: They are found throughout the Philippines at low altitudes especially near the sea coast. It mostly grows naturally along the dunes very close to the coast but is transplanted as an ornamental. It will grow up to 900 m altitude.

Cultivation: Trees can be grown from seed. Cuttings also grow easily.

Production:

Use: The seeds are edible cooked.
The leaves are eaten cooked.
Caution: Some similar coral trees contain alkaloids and are used as medicine. The seeds are poisonous raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Seeds								

Insects:

Diseases:

Pests:

Importance: It is only a minor food.

Names

English:
Tok pisin:
Tok ples:
Scientific name: *Deeringia amaranthoides* (Lmk.) Merr.
Synonyms:
Plant family: Amaranthaceae



Description: A small shrub or climber up to 5 m tall. The stem is woody and it branches. Young shoots are slender and smooth. The leaves are alternate and oval or sword shaped. They are 10 cm long and 2-4 cm wide. They are drawn out to a long point and are bright green with a thin texture. The flowers occur in slender spikes up to 25 cm long. These are in the axils of the upper leaves. Flowers are 0.4 cm across and greenish white. Flowers contain both sexes. Seeds are about 1.2 mm across, smooth and black. They are inside a bright red berry which is carried in clusters on long slender spikes. The fruit are 0.5 cm long with 3 furrows long it.

Distribution: It occurs in the Sepik, Madang, Morobe and Central Provinces. It is often near forest edges near creeks in the rainforest. It occurs up to 1200 m altitude. This plant is also used as food in Fiji, Indonesia and Taiwan. It needs a well drained humus rich soil. It needs a sheltered position and partial shade. It is drought and frost tender. It is a tropical plant.

Cultivation: It grows wild. Plants are grown from seed. The seed need to be sown fresh. Plants can also be easily grown from cuttings.

Production:

Use: The young leaves are eaten.
Caution: This plant is suspected of poisoning cattle.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance: It is only recorded as being eaten in a few areas.

Names

English: Spider flower
Tok pisin:
Tok ples:

Scientific name: *Cleome gynandra* L.
Synonyms: *Gynandropsis gynandra* (L.)Merr.
Plant family: Capparaceae



Description: An annual herb. It grows to 0.6-0.9 m. It has a long tap root. It is erect and somewhat hairy. It usually has purple stems. The leaves occur one after another along the stalk. The leaf stalk is long. There are 5-7 leaflets which are unequal and spread out at the end. They are oblong and about 2.5-6 cm long by 1.4-3.2 cm wide. The leaflets are pointed at the base and a rounder near the tip with a rounder point at the tip. There are fine teeth along the edges of the leaves.
The flowers are white or purple They occur in long flower clusters at the end of branches. These are 30 cm long. The flower clusters are showy with white or purplish flowers and a spidery like appearance. The fruit are a slender capsule with 2 valves and with many small seeds. They are 5-10 cm long and very narrow. The seeds are kidney shaped and rough. They are brown and have fine lines along them. They are 1-1.5 mm across.

Distribution: It commonly occurs as a self sown weed on cultivated land. It grows in warm of tropical regions. It grows at a range of elevations but especially above 600 m altitude. It will grow in semi arid, to wet humid climates. It will grow on many soil types, but needs fertile soil for good leaf production. A temperature of 18-25°C seems best. Plants need plenty of sunlight. They are not drought resistant but can produce a crop with short periods of rain. Plants cannot withstand flooding. A common weed of waste places throughout the Philippines as well as other tropical countries.

Cultivation: The plant is grown from seed. The seed are broadcast. Fertile soil is needed to get plants with good leaf coverage. The seed germinate erratically, because the seed have a rest period after harvest. Seed germinate best 6 months after harvest. Once they are ready to grow, they germinate in 4-5 days. Leaves or whole plants can be harvested when 15 cm high. Picking out the tops encourages side growth and longer leaf production. Removing flowers extends the harvest period.

Production: Leaves can be harvested 4-5 weeks after planting. Seeds reach maturity about 5 months after sowing.

Use: The leaves are eaten. If they are cooked the bitter taste is reduced. They are also used in flavouring sauces.
Young pods are also eaten.
The oil from the seeds is edible without needing to be refined.
The leaves can be candied in vinegar or in salt water, then eaten with fish.
The seeds are used as a spice in curries.

Food Value: Per 100 g edible portion

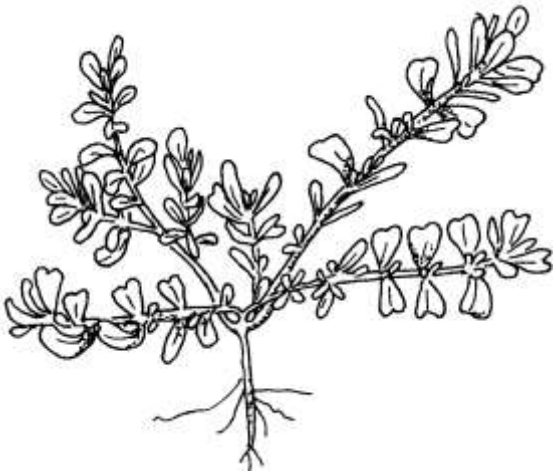
Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	89.6	105	3.1				26	

Insects: **Diseases**: **Pests**:
Importance: This plant is being recognised by scientists as a useful vegetable. It is not known if it is eaten in Papua New Guinea.

Names

English: Purslane, Pigweed
Tok pisin:
Tok ples:

Scientific name: *Portulaca oleracea* L.
Synonyms:
Plant family: Portulacaceae



Description: A spreading branched herb. It lies flat on the ground. It grows each year from seed. The plants spread 10 to 50 cm wide. The stems are purplish. The leaves are fleshy, flat and shaped like a wedge at the base. They are 1.5 to 2.5 cm long and 0.3-1 cm wide. The flowers are yellow and occur in a few rounded heads. They are 0.8-1.5 cm across. They bloom about the middle of the day. The capsules are 0.5 cm long and oval. The seeds are black and shiny.

Distribution: It grows in tropical and temperate regions. They are common in waste places throughout the Philippines.
It is a common self sown plant in lowland areas and up to 1700 m altitude. It prefers sandy well drained places. It can grow on salty soils. It suits hardiness zones 7-12.

Cultivation: It roots easily from broken pieces. It can be grown from seed.

Production: The stems and leaves are cooked and eaten. Usually the skin is scraped off then the plant is boiled and mashed. It thickens stews and other dishes in which it is cooked. It is used as a pot herb.

Use: The fleshy stems are pickled.
In areas where a lot of nitrogen fertiliser is used plants can cause nitrate poisoning. Plants can also have oxalates.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	82.2	108	3.1		0.8	185	20	1.5
Seed	9.1	1405	19.5					
Root	79.0	210	3.5					

Insects:

Diacrisia niceta (Stal.)	Arctiidae (LEP)	
Spoladea (Hymenia) recurvalis Fab.	Pyralidae (LEP)	Beet webworm
Tiracola plagiata (Walker)	Noctuidae (LEP)	Cacao armyworm

Diseases:

White leaf spot	cause unknown	

Pests:

Importance: In Papua New Guinea it is now only very rarely used by some older people in some coastal areas. In many countries it is eaten as a vegetable. They are sold in markets in India.

Names

English: Spinach
Tok pisin:
Tok ples:

Scientific name: *Spinacia oleracea* L.
Synonyms:
Plant family: Chenopodiaceae



Description: An annual leafy vegetable. It grows 60-90 cm high and spreads 30-45 cm wide. The broad leaves are produced in a clump on short stalks. The leaves at the base are large and leaves on the stalk are smaller. Plants are separately male and female. (So both types are needed if seed is to be produced.) Flowers are greenish in spikes.

Distribution: It is a temperate plant. It does not suit the tropical lowlands and grows best where the temperature varies between 10°C and 20°C or above 2000 m altitude. The kind with very prickly seeds is frost resistant. Plants need a deep well drained soil. It is a cool season, short day plant. In Nepal it grows to about 1400 m altitude. It suits hardiness zones 6-9.

Cultivation: It is normally sown directly by seeds. Plants need to be 25 cm apart.

Production: The older leaves are picked off. They can be harvested starting at 8 weeks.

Use: Leaves are cooked in a small amount of water. They are also used in soups and salads. Young leaves are eaten raw and older leaves are cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	92.9	57	2.4		2.9	819	29	0.8

Insects:

Aulacophora spp.	Chrysomelidae (COL)	Pumpkin beetles
Henosepilachna signatipennis Boisd.	Coccinellidae (COL)	Leaf eating ladybirds
Lygaeus hospes Fab.	Lygaeidae (HEM)	A leaf sucking bug
Psylliodes sp.	Chrysomelidae (COL)	
Spoladia recurvalis (Fab.)	Pyralidae (LEP)	Beet webworm

Diseases:

Leaf spot	Fungus	*Cercospora beticola* Sacc.

Pests:

Importance: Not often seen in Papua New Guinea.

Names

English: Striped cucumber
Tok pisin:
Tok ples: Kongakonga

Scientific name: *Diplocyclos palmatus* (L.) C Jeffrey
Synonyms: *Bryonopsis affinis* (Endl.) Cogn.
Plant family: Cucurbitaceae

Description: A slender climbing plant with angular stems. The stems are weak but the lower part can be somewhat woody. It can climb to 2-4 m high. The stems are angular and grooved. The rootstock is fleshy. The leaves have 3 or 5 lobes divided like fingers on a hand and are 10-15 cm wide by 6-17 cm long. There are fine teeth on the top edges of the leaves and the leaves are angular. The leaves are rough on top but smooth underneath. The leaf stalks are 3-9 cm long. The stem has tendrils which have 1 or 2 branches. Flowers are small and yellow or green. Male and female flowers are separate but often together near a leaf. Often one or two female flowers are surrounded by several male flowers. The fruit is 4 cm long and green with pale streaks along it. The leaves and stems give off a bad smell when damaged.



Distribution: It is a tropical plant. It occurs on the coast in PNG and grows up to about 1000 m above sea level. It needs a well drained soil and can grow in a sunny or partial shady position. The plant also grows in Africa, India, Malaysia, China and Australia. There are a couple of subspecies.

Cultivation: Plants can be grown from seeds or cuttings.

Production:

Use: The leaves are eaten, cooked.
Caution: The fruit are claimed to be poisonous.
It is considered to be poisonous in Australia, but is eaten in India.

Food Value: Per 100 g edible portion

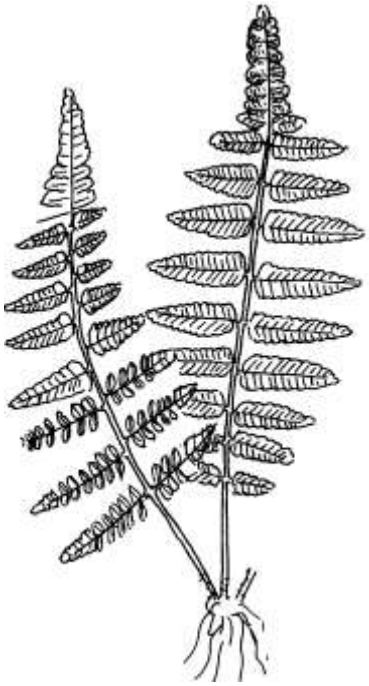
Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

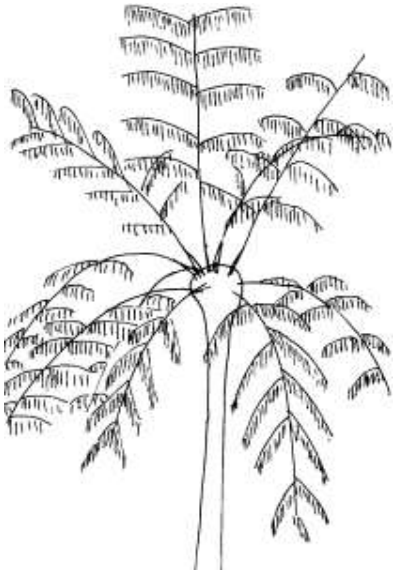
Insects:

Diseases:

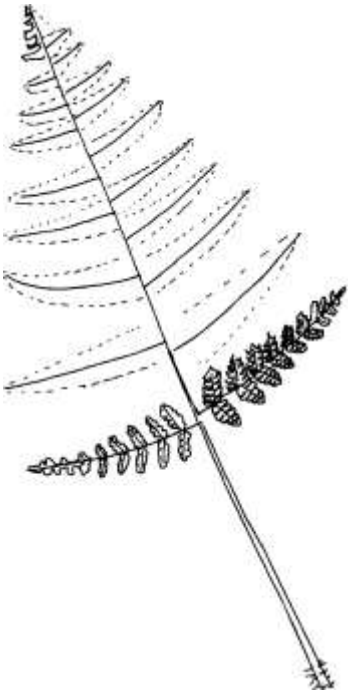
Pests:

Importance: A reasonably common wild creeper in coastal areas of Papua New Guinea and many tropical countries. Leaves are used in the Gazelle Peninsula.





Edible ferns





Edible ferns

English name	Tok Pisin	Scientific name	Page
Vegetable fern		*Diplazium esculentum*	**135**
		Diplazium cordifolium	**136**
		Diplazium asperum	**137**
Tree fern		*Cyathea angiensis*	**138**
		Cyathea contaminans	**139**
		Cyathea hornei	**140**
		Cyathea lunulata	**141**
		Cyathea rubiginosa	**142**
		Cyclosorus interruptus	**143**
Climbing swamp fern		*Stenochlaena palustris*	**144**
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Giant Creek fern		*Pneumatopteris sogerensis*	**146**
Golden mangrove fern		*Acrostichum aureum*	**147**
Ladder fern		*Nephrolepis biserrata*	**148**
Mangrove fern		*Acrostichum speciosum*	**149**
Hairy sword fern		*Nephrolepis hirsutula*	**150**
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King fern		*Angiopteris evecta*	**152**
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Bird’s nest fern		*Asplenium nidus*	**154**
		Microsorum scolopendria	**155**
Adder’s tongue		*Ophioglossum reticulatum*	**156**
Bungwall		*Blechnum orientale*	**157**
Parsley fern		*Botrychium australe*	**158**
	Kumugras	*Callipteris prolifera*	**159**
Water fern		*Ceratopteris thalictroides*	**160**
Rock fern		*Drynaria quercifolia*	**161**
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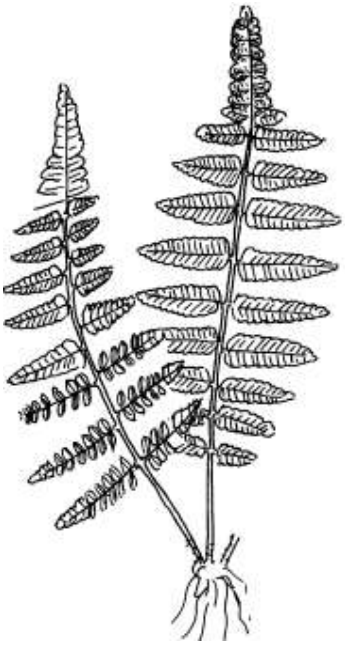
Flowering fern		*Helminthostachys zeylanica*	**163**
Climbing maidenhair fern		*Lygodium microphyllum*	**164**
		Marattia sp.	**165**

Names

English: Vegetable-fern
Tok pisin:
Tok ples:

Scientific name: *Diplazium esculentum* Swartz
Synonyms: *Athyrium esculentum* (Retz.)Copel
Plant family: Aspleniaceae/Athyriaceae



Description: A large fern with an upright stem. It forms tufts. It can be 1 m high and 1 m wide. It usually grows as a large clump. It spreads by underground runners. They have feather like fronds which are 50 to 80 cm long and divided 2 or 3 times. The leaf stalks are black near the bottom. The secondary leaflets are pointed at the tip. The end sections of the leaf are many, about 8 cm long and 1 cm wide. The leaflets are notched like a saw and about 2 to 5 cm long.

Distribution: It grows in moist tropical places. It mostly occurs in coastal areas. It is common in wet areas. It also occurs in Malaysia, Indonesia, Philippines and Fiji and is used as a food there. They are widely distributed in the Philippines on areas of gravel and the banks of streams. Plants are frost tender.

Cultivation: Plants can be grown from spores. They need to be in a well drained potting medium and kept with a high humidity. The spores need a temperature of 21°C and sown as soon as ripe. Plants should be transplanted into a moist well drained soil with partial shade. Plants can also be grown by separating out the underground runners.

Production:

Use: The fronds are cooked and eaten as a vegetable.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	91.8	88	3.6		4.4		25	

Insects:

Diseases:

Pests:

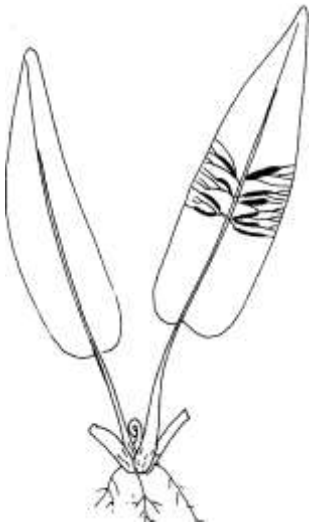
Importance: One of the commonly used and popular ferns of the Asian tropical lowland areas. Young freshly uncurled fronds are common in markets.

Names

English: Fern
Tok pisin:
Tok ples:

Scientific name: *Diplazium cordifolium* Blume
Synonyms: *Athyrium cordifolium* (Bl.) Copel
Plant family: Aspleniaceae

Description: A fern with a tufted rhizome covered with brown or black scales. It has a tufted rootstock. The fronds are up to 50 cm long and 12 cm wide and stick straight up. The fronds are entire and not divided. They are long and thin and rounded at the base. The tip comes to a point. The spore bodies are long and narrow and can be straight or curved.



Distribution: It is a tropical and subtropical plant. It grows in small areas of the tropical rainforest. It is temperature sensitive needing a minimum temperature over 10°C. It likes a moist protected situation. It suits a shady position.

Cultivation: It can be grown from spores.

Production:

Use: The fronds have been recorded as eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

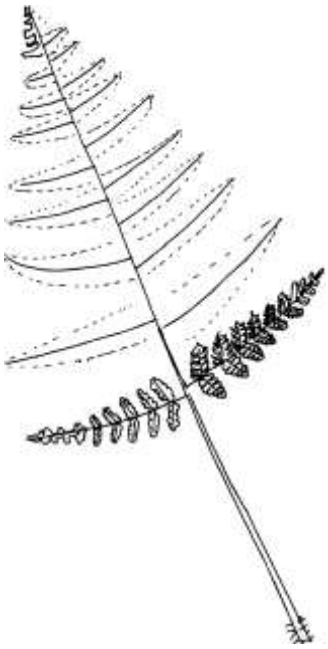
Importance: A minor food in Papua New Guinea.

Names

English: Fern
Tok pisin:
Tok ples:

Scientific name: *Diplazium asperum* Blume
Synonyms: *Athyrium asperum* (Bl.) Copel
Plant family: Aspleniaceae

Description: A fern which grows on land, with fronds 3 metres high. The stem is mostly underground and densely covered with roots. The leaves are crowded and have long stalks. Leaves can be 3 m long. The leaf stalk is rough.



Distribution: These ferns mostly occur between 250 and 1500 metres above sea level. They grow best in humid, moist and lightly shaded places near creeks and on forest edges.

Cultivation: They grow wild.

Production:

Use: The young, not quite unfolded leaves are eaten cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

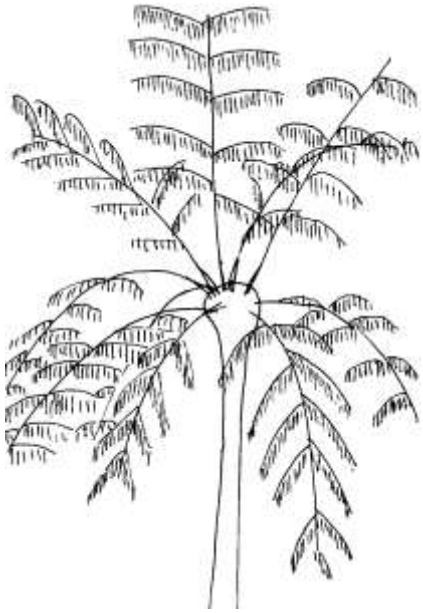
Importance: A wild edible leaf eaten occasionally in mid altitude areas of Papua New Guinea.

Names

English: Tree fern
Tok pisin:
Tok ples:

Scientific name: *Cyathea angiensis* (Gepp.) Domin
Synonyms: *Alsophila angiensis* Gepp in Gibbs
Plant family: Cyatheaceae

Description: A tree fern. It has about 12 fronds. They are divided 2 or 3 times. The fronds can be 1-2 m long. There are 3 rings of fronds with 4-5 fronds in each. The old fronds drop off.



Distribution: They require abundant moisture and do best in part shade. They grow in open forest often near streams. They are most common in Papua New Guinea between 600-2200 m. They are frost tender.

Cultivation:

Production:

Use: The fronds are eaten with meat.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English: Tree fern **Scientific name:** *Cyathea contaminans* (Wallich ex Hooker) Copeland
Tok pisin: **Synonyms:** *Alsophila contaminans* Wall. ex Hook.
Tok ples: **Plant family:** Cyatheaceae

Description: A tree fern. It has erect trunks 5-8 m tall. The trunks can be 20 m tall. The trunks are 12-15 cm thick. It has many roots. These make the base thick. The fronds are 2-3.5 m long and have scales on all surfaces. The fronds are divided 2 or 3 times. The fronds have many side leaflets. These are 50-75 cm long. The secondary leaflets are 8-12 mm long. The spore bodies are on the under surface of the fronds. They are near the rib. The covering over these falls off early. The old fronds fall off.

Distribution: A tropical plant. They require abundant moisture and do best in part shade. They grow in open forest often near streams. It mostly grows between 200-1600 m. They are frost tender.

Cultivation: These ferns mostly grow naturally. They are preserved when bush is being cleared for gardens. They can easily be raised from spores on the back of fronds. They can be transplanted if some roots are included and the fronds are trimmed.

Production:

Use: The young fronds are cooked and eaten with meat.
Caution: Leaves of Cyathea ferns are known to contain chemicals called flavenoid glycosides.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea, a very common and important green leafy vegetable, especially at pig feasts.

Names

English: Tree fern
Tok pisin:
Tok ples:

Scientific name: *Cyathea hornei* (Baker) Copel
Synonyms: *Alsophila hornei* Baker
Plant family: Cyatheaceae

Description: A tree fern. It is rather slender in the trunk and 3-4 m high. The stem of the frond is 25 cm long and very dark. The part near the base has pale edged scales. The lower leaflets on the stalk are reduced and narrow. The largest leaflets are 40-50 cm long. There fertile and sterile leaflets have different shapes. The fertile ones are 50-60 mm long by 11-17 mm wide. (It is smaller in size than other tree ferns and rhizomes or suckers which produce new plants. The ferns therefore occur in a clump.)



Distribution: It is a tropical plant. It grows in wet forest and stunted mossy forest. It grows between about 700 and 2,000 m altitude.

Cultivation: The young fronds are occasionally cooked and eaten.

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples: Balabala

Scientific name: *Cyathea lunulata* (J.Forster) Copeland
Synonyms: *Alsophila lunulata* R.Br.;
Plant family: Cyatheaceae

Description: A large tree fern. The trunk is erect and can be 8-10 m high. The fronds are divided 3 times. They can be 6 m long.



Distribution: It grows in tropical and subtropical locations. They grow from sea level to 100 m altitude. They grow in the rainforest.

Cultivation:

Production:

Use: The young fronds are eaten in times of scarcity.
The white pith of the stem is cooked in an earth oven and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Pith								

Insects:

Diseases:

Pests:

Importance: A famine food.

Names

English: Tree fern
Tok pisin:
Tok ples:

Scientific name: *Cyathea rubiginosa* (Brause) Domin
Synonyms: *Alsophila rubiginosa* Brause
Plant family: Cyatheaceae

Description: A tree fern. The trunk is erect. It grows 5 m tall. The fronds are divided 2 or 3 times. The fronds are 2-3 m long. The stalk is purple and has many small spines. There are a few large scattered scales. The spore groups are near the mid vein of fertile smallest leaflets. They have a very thin fragile covering.

Distribution: They require abundant moisture and do best in part shade. They grow in open forest often near streams. It mostly grows between 110-2840 m altitude. They are frost tender

Cultivation:

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: fern
Tok pisin:
Tok ples:

Scientific name: *Cyclosorus interruptus* (Willd.) H. Ito
Synonyms: *Pteris interruptus* Willd.
Plant family: Thelypteridaceae

Description: A medium sized fern. It forms extensive spreading patches. The rootstock is creeping and has many branches. The fronds are erect, leathery and dark green. They can be 1 m long. The segments of the fronds are lobed and sword shaped. They are largest at the base of the frond. The largest leaflets are 8-15 cm long by 1-1.8 cm wide. They are leathery. There are hairs on the veins underneath the leaf. The stalk has papery scales on it. The fruit spot of spores are under the leaf in a zigzag line along the edge of the leaf.



Distribution: It grows in swamps. It can grow in wet clay soil and sunny locations. It can stand frost. In Papua New Guinea it grows from sea level to 1,500 m altitude but mostly it is at low altitudes below 50 m.

Cultivation: It can be grown from division of the rhizome or from spores.

Production:

Use: The young growing point and young fronds have been recorded as eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

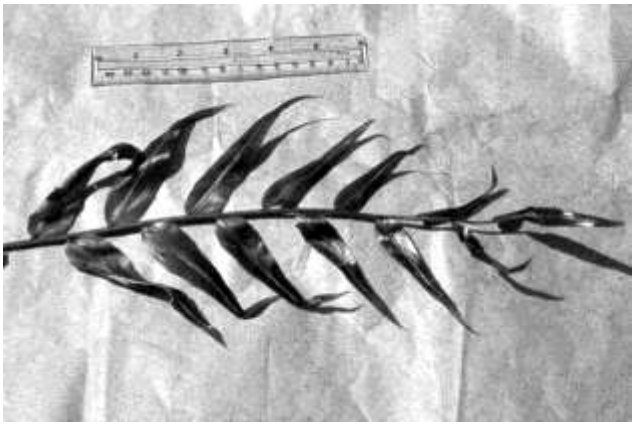
Importance:

Names

English: Climbing swamp fern
Tok pisin:
Tok ples:

Scientific name: *Stenochlaena palustris* (Burm.f.) Bedd
Synonyms: *Polypodium palustre* Burm.
Plant family: Blechnaceae

Description: A climbing or scrambling fern with a thin smooth rhizome which climbs up sago palms and tree trunks. The stems are brown smooth and less than 1 cm across. They are only sparingly branched. The fronds are up to 80 cm long and have leaflets. The fronds droop. The fronds have several leaflets and are often red in colour when young. Fertile fronds when they occur, are at the top and are thin.



Distribution: It is a tropical plant. It is widely distributed in areas of shrub especially in swampy coastal areas. It likes warm, waterlogged partly cleared forest sites. It is frost sensitive.

Cultivation: It is easily grown.

Production:

Use: The young shoots are eaten raw or cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance: A common fern in lowland areas and eaten in several different places in Papua New Guinea. Also eaten in other countries.

Names

English: Fern
Tok pisin:
Tok ples:

Scientific name: *Stenochlaena milnei* Underw.
Synonyms:
Plant family: Blechnaceae

Description: A scrambling creeping fern. It has its base rooted to the ground but climbs up trees. The fronds are widely spaced and come out horizontally but then hang down. The rhizome is 10-15 mm across and pale green. Sometimes it is covered with a bluish bloom. The rhizome is smooth but with dark small circular scales. The fronds are 100 - 150 cm long and 3-5 cm wide. The fertile segments of the divided fronds are 4-7 mm wide and 15-30 cm long. They occur higher on the plant.

Distribution: They occur in well drained lowland rainforest. They can occur in sago swamps and near rivers. They occur between sea level and 300 m altitude. They occur in the Philippines, Papua New Guinea and the Solomon Islands. Often they occur with *Stenochlaena palustris* but tends to be more robust and in less swampy conditions.

Cultivation:

Production:

Use: The young leaves are probably occasionally eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: Giant Creek Fern **Scientific name:** *Pneumatopteris sogerensis* (A. Gepp.) Holttum
Tok pisin: **Synonyms:**
Tok ples: **Plant family:** Thelypteridaceae

Description: A fern which grows on dry land. It forms large clumps. The rootstock forms a short slender trunk. The fronds are 50-200 cm long by 40-60 cm across. They are dark green and soft or fleshy. The side leaflets (pinnae) spread at right angles and are 20-30 cm long by 2.5-3 cm wide. The lowest 5 or 6 pairs occur as small lobes.

Distribution: It occurs in Indonesia, Papua New Guinea and the Solomons as well as Australia. It grows near streams and on gentle slopes. It is in rainforests often at medium to high altitudes above sea level. It can grow in temperate regions. It does best in a sheltered position where there is adequate moisture and a well drained soil. It grows better if kept well watered and improves when fertilisers are applied.

Cultivation: It is grown from spores.

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: Golden Mangrove fern
Tok pisin:
Tok ples:

Scientific name: *Acrostichum aureum* L.
Synonyms:
Plant family: Pteridaceae/Adiantaceae

Description: A fern with a short to medium creeping rhizome. The rhizome is up to 3 cm thick. It has large fleshy roots. The fronds are erect and up to 4 m long. The leaflets are large, thick and leathery. They are only divided once. They have blunt tips. They often have a yellowish colour. It grows in clumps or spreads out over the ground. Under the uppermost leaves there is often a mass of spores in a brown sugary mass.

Distribution: A tropical plant. Usually found in open swampy or mangrove situations. It cannot tolerate saltwater. It grows in Australia in the Northern Territory and Queensland. It is eaten in the Solomon Islands. It occurs throughout the tropics. It is very frost tender. It occurs in brackish pools and swamps and creeks near the beach.

Cultivation: It is slow to re-establish if transplanted. Often transplanted plants die. The best option is to transplant young plants growing from spores. It can be grown from spores.

Production:

Use: The young leaves (fronds) are eaten in salads.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

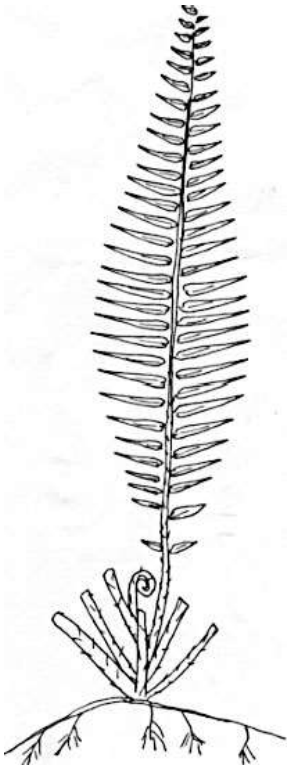
Pests:

Importance: It is used as food in Australia, but it is not known if it is used for food in Papua New Guinea.

Names

English: Ladder fern
Tok pisin:
Tok ples:

Scientific name: *Nephrolepis biserrata* (Sw.) Schott
Synonyms:
Plant family: Davalliaceae/ Nephrolepidaceae/ Oleandraceae



Description: A tufted fern with slender runners. The rhizomes have scales. The fronds can be up to 2.5 m long, erect and bright green. They are divided once. It is a coarse woody fern that grows in tangled colonies. These small plants grow from the branched wiry runners. The spore bearing bodies are round and lie in a row between the midrib and leaf edge.

Distribution: It is a tropical plant. It prefers open or lightly shaded areas often along rocks. It can grow as an epiphyte on the trunks of palms. It is very frost tender. It probably grows up to about 1000 m altitude. It can tolerate some salt. Often it is in wet areas in soil with a high humus content.

Cultivation: The ferns are easily grown in warm areas, but they are not easily transplanted. They can be grown from spores or more commonly by separating off the small plants.

Production:

Use: The young shoots and rhizomes are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Shoots								
Rhizome								

Insects:

Diseases:

Pests:

Importance:

Names

English: Mangrove fern
Tok pisin:
Tok ples:

Scientific name: *Acrostichum speciosum* Willd.
Synonyms:
Plant family: Adiantaceae



Description: A coarse clumpy fern. It grows 1.5 m tall and has a creeping underground stem (rhizome) forming clumps. The stem is 5 cm across and 10 cm high. It is covered with brown scales. The leaves are erect fronds. The leaflets are on either side of the leaf stalk. The stalk of the frond is 50 cm long and 0.3-0.8 cm thick. The fronds are 1.5 m long. The leaflets are 20 cm long by 3.5 cm wide. They are somewhat thick and leathery. They are dull dark green. They taper to a narrow tip.
The stalks for these leaflets are 1 cm long. The spores are produced on the upper fertile fronds. These are smaller than the sterile fronds. The spores cover the entire under surface as a dark brown mass. In Australia fertile fronds are produced in June.

Distribution: It grows in coastal flats and tidal areas. It is associated with mangroves. It can stand being flooded frequently by saltwater. This is the only fern found growing with mangroves. It occurs in Australia and Asia. It is very frost tender.

Cultivation: Plants are very difficult to transplant. Plants can be grown from young spores.

Production:

Use: The root is used for food. The starch is extracted and eaten.
Also the young curled shoots can be cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Starch								
Leaves								

Insects:

Diseases:

Pests:

Importance: It is used as food in Australia, but it is not known if it is used for food in Papua New Guinea.

Names

English: Hairy Sword Fern
Tok pisin:
Tok ples:

Scientific name: *Nephrolepis hirsutula* (Forst.)Presl.
Synonyms:
Plant family: Davalliaceae



Description: A coarse fern with creeping rootstocks. It keeps growing from year to year and forms dense colonies. The stem is erect producing a tuft of fronds. The stalks are 10-40 cm long and pale brown. The fronds are narrow with leaflets. The fronds are 0.3 to 1.2 m long and 8 to 15 cm wide. They are erect or arch over. The leaflets are 5-10 cm long by 1-2 cm wide. The base has a narrow, triangle shaped lobe. There are rounded teeth along the edge. The plant grows both on the ground and on other plants.
It is smaller than *Nephrolepis biserrata.* The fertile leaflets are more narrow than the sterile ones. The spore bodies or sori are near the edge of the leaf.

Distribution: A tropical plant. Widely distributed in low and medium altitudes in the Philippines. Common in Asia and the Pacific. It is normally in lowland areas near rainforest. It is very frost tender.

Cultivation: It is easily grown but not easily transplanted. Plants can be grown from spores or from small plants produced on runners.

Production:

Use: The young shoots are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English: Fern
Tok pisin:
Tok ples:

Scientific name: *Microsorum linguaeforme*
Synonyms: *Polypodium musifolium* Bl.
Plant family: Polypodiaceae

Description: A fern with a thin rhizome. It is long and creeping. They creep on high trees. The fronds are 15-40 cm long. The fronds do not have stalks. They have expanded bases which surround the stem. They are broadly oval but constricted near the base. The leaflets are sword shaped in the upper part and taper to the tip. The roots form soft masses covered with broad hairs. The spore producing bodies are few and are scattered.



Distribution: Plants grow on trees in primary and secondary rainforest.

Cultivation:

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: King fern, Giant fern
Tok pisin:
Tok ples:

Scientific name: *Angiopteris evecta* (G. Forst.) Hoffm.
Synonyms:
Plant family: Angiopteridaceae/ Marattiaceae



Description: A tree fern. It grows to 6 m high. The crown can be 12 m across. The erect rhizome or trunk can be 1 m high and 80 cm across in older plants. This trunk is fleshy with thick fleshy roots. It can just have a tuft of leaves coming from near ground level. Because there is no hard tissue, the water pressure inside the stalk keeps the leaves erect. This frond will therefore collapse in dry weather. Where the stem of the frond joins the trunk is a large ear-shaped leafy structure (stipule). The leaves are 2-7 m long and 1-2.5 m wide.
The leaves can be divided 2 to 4 times. The small leaflets are 13 cm long and finely toothed around the edge. There are 3-7 pairs of spore bearing organs in double rows along the veins. The fronds are very fleshy and contain a lot of starch.

Distribution: A tropical plant. It is a lowland forest plant. They grow naturally on fertile, moist soil in the rainforest. Often they are near streams and waterfalls. They commonly grow in partial shade. They grow from sea level to 700 m altitude. They can survive some frost once plants are 3-4 years old. They cannot tolerate dry conditions. It suits hardiness zones 10-12.

Cultivation: They are normally grown from the stipules or leafy structure at the base of the leaflet. It may take 12-18 months for the shoots to form. It is difficult to grow this fern from spores. Small plantlets already developing from the base of the fronds can be removed and planted.

Production: Plants grow quickly. They grow slowly in cool areas.

Use: The young fiddle heads or unopened young fronds are eaten.
Flour can be made from the stalks and rhizomes.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fronds								
Flour								

Insects:

Diseases:

Pests:

Importance: Occasionally used in Papua New Guinea to extract starch. It has been used in the Society Islands.

Names

English: Fern
Tok pisin:
Tok ples:

Scientific name: *Asplenium affine* Sw.
Synonyms:
Plant family: Aspleniaceae

Description: A fern which grows to 50 cm high. The leafy fronds are 25 cm long. They are twice divided. The segments of the leaflets are not the same shape on both side of the midrib. The spore cluster under the leaf is about 5 mm long.

Distribution:

Cultivation:

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: Bird's Nest Fern
Tok pisin:
Tok ples:

Scientific name: *Asplenium nidus* L.
Synonyms: *Neottopteris nidis* J.Smith
Plant family: Aspleniaceae



Description: An evergreen fern. It grows to 1.5 m high and spreads 3 m across. It can grow by feeding on other plants. It forms nest like bowls on the upper side of branches. The underground thickened horizontal stem is dark brown and short. It is covered with blackish scales. The roots are hairy. The fronds grow out from a central point so that the fern forms rounded tussocks. The fronds are simple and entire and sword shape. The fronds can be 2 m long and up to 20 cm wide. They are dark or yellowish green. They have a raised, bluntly rounded mid vein.

Distribution: It is a tropical plant. It grows in well drained moist soils. It prefers a well protected partly shaded position but not heavy shade. It is drought and frost tender. It suits hardiness zones 10-12.

Cultivation: Plants can be grown from spores.

Production:

Use: In the Caroline Islands and Marshall Islands young leaves are eaten. Also in India.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance: It is not known if it is used for food in Papua New Guinea.

Names

English: Fern
Tok pisin:
Tok ples:
Scientific name: *Microsorum scolopendria* (Burm.f.) Copel
Synonyms:
Plant family: Polypodiaceae

Description: This fern has a rhizome which is long and creeping. The fern grows to 65 cm high. The rhizome is fleshy, green and up to 8 mm across. It is sparsely covered with light brown scales. The fronds are light green and up to 10-60 cm long and 25-30 cm wide. The base of the frond is swollen. They have a variable number of lobes which are 4-15 cm long. The sori are 2-3 mm across and situated near the mid vein. They form 2 or 3 rows on each side of the rib.

Distribution: It is a hardy tropical species often found on trees or rocks in protected places near the edges of rainforest. They are frost tender. It grows best in light shade.

Cultivation: Plants can be grown from spores or division of the rhizome. They are easily grown or transplanted.

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: Adder's Tongue
Tok pisin:
Tok ples:

Scientific name: *Ophioglossum reticulatum* L.
Synonyms:
Plant family: Ophioglossaceae

Description: A fern. It is a herb. It grows 5-35 cm high. The rhizome is like a cylinder with many thin roots. The stalk of the frond is 3-8 cm long. The fronds are distinct. The sterile fronds are 3.5 cm long by 2 cm wide. They are oval and the base is heart shaped. The fertile frond is 2-2.5 cm long and on a slender stalks coming from the base of the sterile frond.

Distribution: It grows amongst grass in open forest. In Nepal it grows up to 1400 m altitude. It grows in moist, shady places.

Cultivation: Plants are grown from spores. They can also be grown from parts of the roots.

Production:

Use: The fronds are cooked as a vegetable. They are also used in salads.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English: Bungwall
Tok pisin:
Tok ples:

Scientific name: *Blechnum orientale* L.
Synonyms:
Plant family: Blechnaceae

Description: A medium to tall fern. It grows 0.3-1.2 m tall. It forms round clumps. The stem is short and has brown scales with very small teeth. The fronds can be 1 m high. The fronds are spreading or erect, forming a rosette. They often droop at the tips. The side leaflets are thin and long, with a long pointed tip. They do not have teeth along the edge. They are about 20-25 cm long and 0.8-1.8 cm wide. They are attached directly to the stalk. The youngest leaflets are pink. The leaf segments are rounded and smallest at the base. The fronds are dark green and shiny. The spore bodies are produced under the fertile fronds which have an appearance similar to the other fronds. These spores occur in a long continuous line along both sides of the midrib.

Distribution: A tropical plant. It occurs in rainforest and swampy areas. It grows best with regular water but can tolerate some sun and dryness. It grows in forest clearings and along roadsides. It is frost tender. It can grow on rocky edges of waterfalls.

Cultivation: Plants are grown from spores.

Production:

Use: The rhizome is eaten after cooking and pounding.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A μg	proVit C mg	Zinc mg
Rhizome								

Insects:

Diseases:

Pests:

Importance: It is not known if it is used for food in Papua New Guinea.

Names

English: Parsley fern, Austral moonwort
Tok pisin:
Tok ples:

Scientific name: *Botrychium australe* R.Br.
Synonyms:
Plant family: Ophioglossaceae

Description: A tufted fern which grows to 40 cm high. It continues to grow from year to year and grows on dry land. The rhizome or underground stem is thick and fleshy. It does not have scales or hairs. Both fertile and sterile leaves occur from a common stem which is 2-5 cm long. The sterile leaves are 5-45 cm long and 5-20 cm wide. They are triangular shaped. They are divided up to 5 times. They are bright green and resemble parsley leaves. The fertile stalk is 10-20 cm long and branched 2 or 3 times. The spore bodies occur in rows and crowded on either side. The new frond is not curled when a bud.

Distribution: It grows in open forests and near the edges of rainforests. It needs light shade. It requires an acid soil. The soil should be well drained but moist.

Cultivation: It can be grown from offshoots. It needs a good supply of organic material.

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance: It is not known if it is used for food in Papua New Guinea.

Names

English: Fern
Tok pisin: Kumugras
Tok ples:

Scientific name: *Callipteris prolifera* (Lam.)Bory
Synonyms:
Plant family: Aspleniaceae, Athyriaceae



Description: A fern with a tufted, woody, black rhizome covered with black scales. The trunk is short. The plant forms rounded clumps. The stem of the fronds is triangular in cross section. It is spiny. The fronds are erect and up to 2 m long. They arch over. They are fleshy and pale green. The leaflets are in one row with the base ending abruptly. These leaflets are curved and with a scalloped edge. The top end has a tail.
The spore or fruit spots are brown in double rows between the ribs. The spore groups are arranged in long V shaped pairs under the fronds. Small plantlets often grow along the fronds on the upper half.

Distribution: It occurs in the tropical lowlands. It likes hot humid places. It occurs in East and West New Britain and Manus in Papua New Guinea. It often grows along creeks. It grows in rainforest. The fronds are brittle and easily damaged by the wind. It can grow in shady places.

Cultivation: It can be grown from the small plantlets on the fronds. It is best to grow it in soil, in gardens. It can be grown from spores.

Production:

Use: The fronds are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance: A commonly used fern in New Britain and Manus in Papua New Guinea.

Names

English: Swamp fern, Water sprite
Tok pisin:
Tok ples:

Scientific name: *Ceratopteris thalictroides* (L.) Bronin
Synonyms: *Acrostichum thalictroides* L
Plant family: Parkeriaceae

Description: A fern which grows in water. It is an annual plant. It grows 10-35 cm tall. It has soft upright stalks with light green soft fronds. The rhizome is short and sticks up. There are thin, clear, scales on the rhizome. The leaves vary from simple leaves, to leaves which are divided 3 times. The stem is anchored in mud. It grows as tufted clumps. Leaves are like carrot tops. The stem of the frond is spongy and air filled. It can grow under the water or be free floating. It produces small plants on the fronds. The fertile fronds which produce the spores, are longer and more finely divided, than the other fronds. They are more stiff and erect and turn brown when mature. The plant only lasts a few months.



Distribution: A tropical plant. It grows in still or slow flowing fresh water in the tropics. It occurs in swamps up to 1300 m altitude in Papua New Guinea, but it is mostly below 500 m. It can float. It is found in all tropical countries. It is very frost tender. They occur throughout the Philippines near sea level on mud and are able to thrive in shallow water.

Cultivation: It is grown as an aquarium plant. Small pieces of plant will root in mud. Spores can also grow.

Production:

Use: The plant is edible. It can be used raw or cooked.
The young uncurled fronds can be eaten raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English: Rock fern, Oak leaf fern
Tok pisin:
Tok ples:

Scientific name: *Drynaria quercifolia* (L.) J. Smith
Synonyms: *Polypodium quercifolia* L
Plant family: Polypodiaceae

Description: A large fern which grows attached to other plants. It climbs on trees. It can be 1 m high. It forms large spreading clumps. The rootstock is thick and fleshy. There are two kinds of fronds. One forms the "nest" and these do not have a stem and the others which are more like leaves and have a stem. The second ones have stems which are 30 cm long. The frond is one m long by 40 cm wide. It has deep lobes. The first kind of fronds have lobes and teeth around the edge. These turn brown with age but do not fall off the fern. The young fronds of this fern are different shape from the mature fronds on established ferns.

Distribution: It is a tropical plant. It grows in lowland rainforest. It does best in warm humid conditions. It can tolerate cool temperatures. It can grow on rocks and trees in open forests in the tropics.

Cultivation: Pieces of the thick rhizome can be planted in soil or attached to wood. They should be in light shade while getting established. In cool weather the roots should be allowed to dry out. Plants can loose all their fronds and then regrow in the wet season. Plants can also be grown from spores. These should be sown fresh.

Production:

Use: The rhizome is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: Fern
Tok pisin:
Tok ples:

Scientific name: *Dryopteris sparsa* (D. Don) O. Kuntze
Synonyms: *Nephrodium sparsa* D. Don
Plant family: Aspleniaceae

Description: A fern up to 80 cm tall. It forms clumps. The rootstock is erect and becomes tufted. It has large papery scales. The stalks of the fronds are erect, brown and smooth and shiny. The fronds are 30-80 cm tall. They are broadly triangular and divided 2 or 3 times. They are dull green, thin and break easily. The spore bodies are round and have a cover over them.

Distribution: It grows in cool shady positions in tropical rainforests. It is easily damaged by wind.

Cultivation: It can be grown from spores which should be sown fresh.

Production:

Use: The fronds are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English: Flowering fern
Tok pisin:
Tok ples:

Scientific name: *Helminthostachys zeylanica* (L.)Hook.
Synonyms: *Osmunda zeylanica* L.;
Plant family: Ophioglossaceae

Description: An erect fern with short creeping underground stout rhizomes. The plant is up to 60 cm high. They bear solitary or sometimes several fronds. The stalk of the leaf frond is up to 25-35 cm long and 12-20 cm wide. At the tip it has 3 segments of the sterile frond. The fertile part is like a spike and comes from the stalk. The spores are yellow in brown spore bodies which are 0.8 mm across.

Distribution: A tropical fern. They grow in shady sites in the forest. They are found throughout the Philippines in open bushy places near sea level and on damp ground.

Cultivation: Plants are grown by splitting the rhizomes.

Production:

Use: The young fronds of this fern are eaten raw as a salad or cooked as a vegetable.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English: Climbing maidenhair fern
Tok pisin:
Tok ples:

Scientific name: *Lygodium microphyllum* (Cav.)R.Br.
Synonyms: *Ophioglossum scandens* L.
Plant family: Schizaeaceae

Description: A climbing fern which keeps growing from year to year. It grows 1-3 m long and spreads 30-90 cm wide. It has slender twining stems. The leaf is the climbing part. The stalk branches and produces 6-10 small fronds. The leaves are smooth fronds. They are divided into leaflets along the stalk. The leaflets are light green with short stalks. The leaflets are 6 cm long. The edges have fine teeth. The spores are produced on fertile leaflets which are smaller than the others. These ones have lobes on the edge. The slender, horizontal, underground stems are fleshy and brittle.

Distribution: It is a tropical plant. It can grow in warm temperate regions. It grows naturally in monsoon forest near freshwater streams. It grows naturally in mountain forest. It can form thickets in swampy coastal country. It suits hardiness zones 10-12.

Cultivation: Plants are grown from layers or less commonly from spores.

Production:

Use: The fleshy underground stems have been recorded as eaten.
The young leaves are cooked and eaten as a vegetable.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Stems								
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English: Fern
Tok pisin:
Tok ples:

Scientific name: Marattia sp.
Synonyms:
Plant family: Marattiaceae

Description: A fern with a short creeping starchy rhizome. The rhizome is large like a tuber. The fronds are large and shiny. When cut the surface of the rhizome stains purple.

Distribution:

Cultivation: It grows wild. It can be cultivated.

Production:

Use: The starchy rhizome has been processed for starch which is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Starch								

Insects:

Diseases:

Pests:

Importance:

Palms

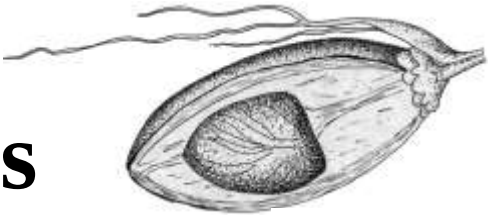


Coconut
Cocos nucifera



Salak
Salacca zalacca





Buai
Areca catechu

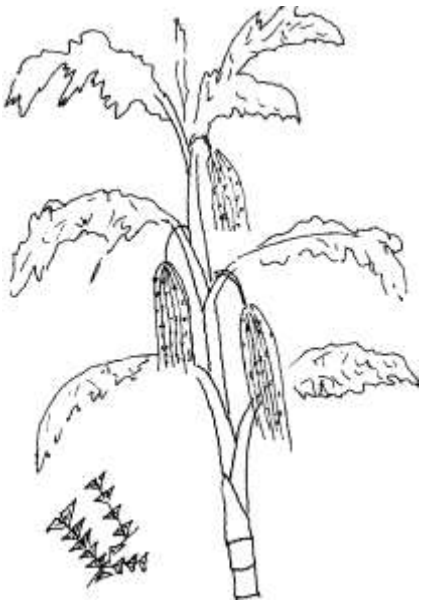


Bactris gasipaes

Caryota rumphiana



Nipa
Nipa fruticans





Kambibi
Areca macrocalyx

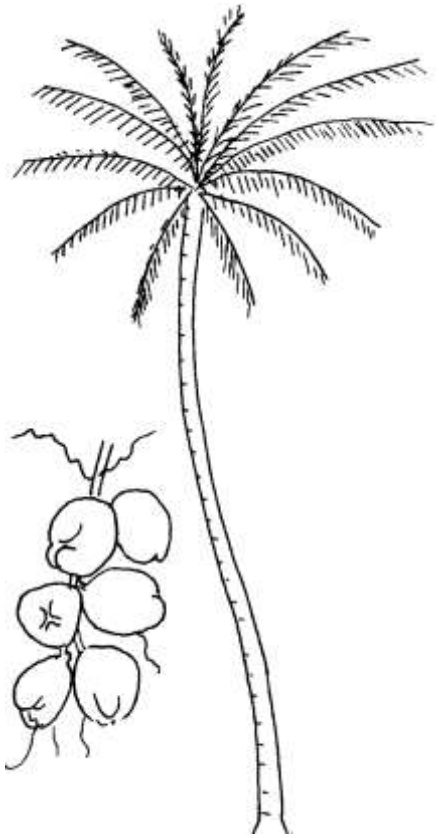
There are about 32 palms in Papua New Guinea that can be used in some way as food

English name	Tok Pisin	Scientific name	Page
Coconut	Kokonat	*Cocos nucifera*	**169**
Betel nut	Buai	*Areca catechu*	**172**
Highlands betel nut	Kambibi	*Areca macrocalyx*	**174**
		Areca guppyana	**175**
		Areca jobiensis	**176**
Arenga palm		*Arenga microcarpa*	**177**
Peach palm		*Bactris gasipaes*	**178**
Palmyra palm		*Borassus flabellifer*	**180**
Palmyra like palm		*Borassus heineana*	**181**
Papua white rattan		*Calamus hollrungii*	**182**
Fishtail palm		*Caryota rumphiana* var. *papuana*	**183**
Corypha palm		*Corypha utan*	**184**
Oil palm		*Elaeis guineensis*	**185**
		Gronophyllum chaunostachys	**187**
		Gulubia cylindrocarpa	**188**
Minor walking stick palm		*Linospadix minor*	**189**
Fan palm		*Livistona benthamii*	**190**
Dwarf fan palm		*Livistona muelleri*	**191**
Black palm		*Normanbya normanbyi*	**192**
Date palm		*Phoenix dactylifera*	**193**
Solitaire palm		*Ptychosperma elegans*	**194**
Grey cane palm		*Ptychosperma macarthurii*	**195**
Traveller’s palm		*Ravenala madagascariensis*	**196**
Cuban royal palm		*Roystonea regia*	**197**
Claudie River Lawyer vine		*Calamus warburgii*	**198**

Names

English: Coconut
Tok pisin: Kokonat
Tok ples:

Scientific name: *Cocos nucifera* L.
Synonyms:
Plant family: Arecaceae



Description: A palm with an unbranched trunk. The trunk has ring-like leaf scars along it. At the base it is swollen and surrounded by a mass of roots. They grow to about 25 m tall. The fronds are 2-6 m long. They are divided along the stalk into strap shaped leaflets. The leaflets are 60-90 cm long. They are narrow and tapering. Clusters of large fruit develop beneath the fronds. Male and female flowers are separate on the one stalk. Female flowers are near the base. Flowers are cream. The flowers are covered by boat shaped bracts. About 10-12 fruit/stalk is a good crop. Leaves are up to 5 m long. Fruit can be 25 cm across. The fruit are fibrous. The hard shell inside is filled with coconut milk and the white copra layer.

Distribution: Mainly in coastal areas but occasionally up to 1000 m in the tropics. Temperatures of 27°-32°C are best. They need a minimum temperature of over 18°C to bear fruit. They need over 1000 mm of rain/year preferably 1500 mm. Soils need to be well drained. It requires plenty of sunlight. It is salt tolerant. In Nepal plants grow to 500 m altitude. Coconuts are normally confined to within 26° of the equator. It suits hardiness zones 12.

Cultivation: Selected nuts are sprouted in a nursery, then planted out. Seedlings are ready for transplanting when they have 3-4 leaves (about 1 year). The nut should be planted in a hole 0.6 x 0.6 m. A spacing of about 7-8 m is suitable. Temperatures need to be above 15°C for nuts to germinate.

Production: Early germinating nuts, give early production in the field. They can commence production after 6-8 years. The best yeilds are often produced between 12 and 60 years of age. Trees can live for 100 years. Palms can produce 15-30 nuts per year. Fruit take about 1 year to be mature. Tapping the flower stalk can give 1 kg sap/day for 6 months.

Use: The liquid of fresh nuts is drunk.
The flesh is eaten, and the "apple" in sprouting nuts is eaten.
The flesh is grated and used in cooking as "coconut" milk.
The young shoots at the top of the palm can be eaten.
The sap from the flower stalk can be tapped for the sugary juice.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Flesh	80.9	119	1.1		0.2			0.2
Milk	84.9	1004	3.7		1.3		8	0.4
Shoots								
Sap								

Insects:

Agapophyta bipunctata Boisd.	Pentatomidae (HEM.)	
Aleurodicus destructor (Mackie)	Aleyrodidae (HEM)	Coconut white fly
Amblypelta cocophaga China	Coreidae (HEM)	Green coconut bug
Amblypelta costalis szentivanyi Brown	Coreidae (HEM)	
Amblypelta gallegonis Lever	Coreidae (HEM)	
Amblypelta lutescens papuensis Br.	Coreidae (HEM)	Papuan tip wilt bug
Amblypelta theobromae Brown	Coreidae (HEM)	Tip wilt bug
Aspidiotus destructor Sign.	Diaspididae (HEM)	Coconut scale
Astacops dorycus Boisd.	Lygaeidae (HEM)	
Axiagastus cambelli Dist.	Pentatomidae (HEM)	Coconut spathe bug
Brontispa longissima Gestro	Chrysomelidae (COL)	Coconut hispid
Brontispa palmivora Gres	Chrysomelidae (COL)	Coconut hispid
Brontispa simmondsi Mlk.	Chrysomelidae (COL)	Coconut hispid
Cephrenes mosleyi (Butl.)	Hesperiidae	Coconut skipper
Ceroplastes rubens Mask.	Coccidae (HEM)	Pink wax scale
Chrysomphalus aonidum (L.)	Diaspididae (HEM)	Florida red scale
Coccus hesperidium L.	Coccidae (HEM)	Soft brown scale
Darala rubeola Feld.	Lasiocampidae (LEP)	
Diocalandra frumenti (F.)	Curculionidae (COL)	
Diocalandra taitense (Guer.)	Curculionidae (COL)	Lesser coconut borer
Dynastes gideon (L.)	Scarabaeidae (COL)	Elephant beetle
Dysmicoccus brevipes (Cockerell)	Pseudococcidae (HEM)	Pineapple mealy bug
Erionota thrax (L.)	Hesperiidae (LEP)	Banana skipper
Eumossula gracilis Willemse	Tettigoniidae (ORTH)	Coconut tree hopper
Ischiosopha ignatipennis Boisd.	Cetoniidae (COL)	
Lophotectes penicilliger (Heller)	Curculionidae (COL)	
Meredolus cocotis Marshall	Curculionidae (COL)	
Microtermes biroi Desneaux	Rhinotermitidae (ISOP)	
Oryctes centaurus Sternb	Scarabaeidae (COL)	
Oryctes rhinoceros (L.)	Scarabaeidae (COL)	Asiatic rhinoceros beetle
Oxya japonica (Thnb.)	Acrididae (ORTH)	
Papuana spp.	Scarabaeidae (COL)	Taro beetles
Promecotheca papuana Csiki	Hispidae (COL)	Coconut leaf miner
Psammoecus sp.	Silvanidae (COL)	
Pseudoligota sp.	Staphylinidae (COL)	
Rhabdoscelus obscurus Boisduval	Curculionidae (COL)	Cane weevil borer
Rhynchophorus bilineatus (Montr.)	Curculionidae (COL)	Black palm weevil
Rhynchophorus ferrugineous (Oliv.)	Curculionidae (COL)	Red palm weevil
Scapanes australis grossepunctatus Sternb.	Dynastidae (COL)	N G rhinoceros beetle
Scapanes australis australis (Boisd.)	Dynastidae (COL)	
Segetes cornelii Willemse	Tettigoniidae (ORTH)	Coconut treehoppers
Segestidea defoliatria defoliatria Ulvavov	Tettigoniidae (ORTH)	Coconut treehoppers
Segestidea gracilis (Willemse)	Tettigoniidae (ORTH)	Coconut treehoppers
Segestidea hanoverana Willemse	Tettigoniidae (ORTH)	Coconut treehoppers
Segestidea insulana Willemse	Tettigoniidae (ORTH)	Coconut treehoppers
Segestidea montana Willemse	Tettigoniidae (ORTH)	Coconut treehoppers
Segestidea novaeguineae Brancsik	Tettigoniidae (ORTH)	Coconut treehoppers
Sparganobasis subcruciatus Marsh	Curculionidae (COL)	Coconut bole weevil
Thosea sinensis (Walker)	Limacodidae (LEP)	Coconut cup moth
Tirathaba ignevena Hmps.	Pyralidae (LEP)	Coconut spathe moth
Tirathaba rufivena Walker	Pyralidae (LEP)	Coconut spathe moth
Trichogomphus excavatus Mohinke	Scarabaeidae (COL)	
Trichogomphus semmelinki Rits	Scarabaeidae (COL)	Rhinoceros beetle
Xyleborus exiguus Walk.	Scolytidae (COL)	Island pinhole borer
Xyleborus perforans (Wollastan)	Scolytidae (COL)	Coconut shot-hole borer
Xyleborus potens Schedl.	Scolytidae (COL)	

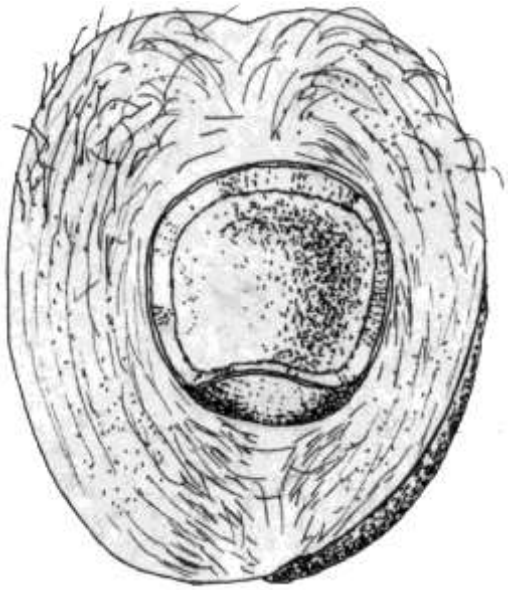
Zophiuma lobulata Ghauri	Lophopidae (HEM)	Lophopid treehopper

Diseases:

Sooty mould	Fungi	*Capnodium sp.*
		Chaetothyrium sp.
		Meliola sp.
Stem bleeding	Fungus	*Ceratocystis paradoxa*
Black leaf mould	Fungi	*Clasterosporium cocoicola* M B Ellis & D Shaw
	And	*Sporidesmium macrurum*
White thread blight	Fungus	*Corticium penicillatum* Petch
Leaf spots	Fungi	*Bipolaris incurvata*
	And	*Pestalotiopsis palmarum*
		Pseudoepicoccum cocos (F.L.Stev.) M.B.Ellis
Root rot	Fungus	*Ganoderma lucidum*
	And	*Rigidoporus microporus*
Brown root rot	Fungus	*Phellinus noxius*
Bud rot	Fungus	*Phytophthora palmivora*

Pests:

Importance: A common and popular snack food and supplement in all coastal areas of Papua New Guinea. Coconuts are normally eaten everyday.

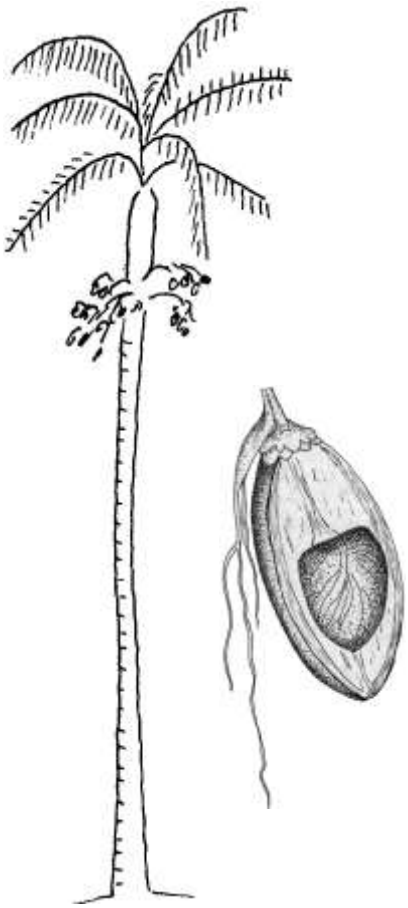


Names

English: Betel nut
Tok pisin: Buai
Tok ples:

Scientific name: *Areca catechu* L.
Synonyms:
Plant family: Arecaceae

Description: A straight slender palm up to 30 m tall. The leaves can spread 5 m across. The trunk is slender and erect. The trunk has rings around it and is about 10 to 15 cm across. The fronds or leaves are divided into leaflets along a stalk. The leaves are a dark green and 1.5 m long with leaf divisions about 25 cm long. The leaves arch over. The ends of the leaflets have irregularly placed teeth. A much branched flower cluster develops below the sheath. This can be 60 cm long with pale yellow flowers. The female flower occurs on its own at the base surrounded by small, white, sweet smelling male flowers. The fruit are egg shaped and up to 7 cm long. They change from green to red or yellow as they ripen.



Distribution: A tropical plant. They occur from sea level up to 900 m altitude in the tropics. It does best in rich moist soils in a shady, sheltered position. It needs soils of reasonable depth for good production. Plants are drought and frost tender. The seed needs to be sown when temperatures are 24-27°C. Plants can tolerate temperatures down to a minimum of 13-15°C. Found in settled areas throughout the Philippines. It grows in Nepal up to 400 m altitude. It suits hardiness zones 11-12.

Cultivation: Trees are grown from seed. The seedlings are transplanted at 1-2 years of age. A spacing of 3 m between plants is the best spacing. Bananas can be used to provide temporary shade while betel nut palms get established. Holes 50 cm across and deep need to be dug. The seedlings should be planted 20 cm below ground level. As emerging prop roots develop the hole should be filled in.

Production: The palm commences bearing fruit after about 7 years. The fruit take 6-8 months to ripen.

Use: The nut is chewed (with lime and betel pepper) as a masticatory.
The heart of the palm is edible and eaten raw or cooked.
Caution: Chewing betel nut is associated with cancer of the mouth and throat. It contains alkaloids and tannins.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut								
Cabbage								

Insects:

Planococcus citri (Risso)	Pseudococcidae (HEM)	Citrus mealy bug
Rhabdoscelus obscurus Boisd.	Curculionidae (COL)	Cane weevil borer

Scapanes australis australis Boisd.	Dynastidae (COL)	Rhinoceros beetle
Zophiuma lobulata Ghauri	Lophopidae (HEM)	no damage noted.

Diseases:

Black leaf mould	Fungus	*Acroconidiellina arecae* (Berk & Broome) M.B.Ellis
Leaf spots	Fungi	*Guignardia kcalami*
	And	*Glomerella cingulata*
	And	*Graphium sp.*

Pests:

Importance: occurs as an important social nut and masticatory in all lowland areas of many Asian and Pacific countries. It is traded into the highland regions.

Names

English: Highland Betel nut palm
Tok pisin: Kambibi
Tok ples:

Scientific name: *Areca macrocalyx* Zipp. ex Blume
Synonyms:
Plant family: Arecaceae



Description: This is a small palm up to 2-10 m high. It has a thick dark green crown. The trunk is straight. It is green in its younger parts. There are widely spaced white rings of leaf base scars along the trunk. The crownshaft is long and narrow. It is 1.2 m long. The leaves are 2 m long. They stick upwards and do not arch over. The leaflets are pleated. They vary in width and spacing. They are dark green above and pale underneath. It has dead male spikes between the rows of nuts. It has dense club-like clusters of fruit. The fruit can be round or elongated. They are deep orange when mature.

Distribution: It grows in the highlands of Papua New Guinea mostly between 1000 m and 1900 m.. It grows in tropical and subtropical areas.

Cultivation: Plants can be grown from seed.

Production:

Use: The nuts are used as a substitute for betel nut.
The palm heart is edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								
Cabbage								

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples: Bua Lau

Scientific name: *Areca guppyana*
Synonyms:
Plant family: Arecaceae

Description: A palm with a thin solitary trunk. It grows to 3 m tall. It has stilt roots at the base. The crownshaft is slender and smooth. The crown has short fronds. Each frond has about 5 pairs of widely spaced broad pinnae. The fruit are bright red.



Distribution: It grows in tropical rainforests.

Cultivation:

Production:

Use: The nut is used as betel substitute.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut								

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples: Kumul

Scientific name: *Areca jobiensis* Becc.
Synonyms: See *Areca macrocalyx* Becc.
Plant family: Arecaceae

Description: A slender palm. The flower stalk is 30-40 cm long and 20-30 cm wide. It has many thickly crowded twigs. The female flowers are at the base of the flower cluster and many male flowers surround it. The many fruit are clustered around the stalk and the bunch is 15-25 cm long.

Distribution: A tropical plant. It occurs in New Britain in Papua New Guinea.

Cultivation: Palms are grown from seed.

Production:

Use: The nuts or seeds are used as a substitute for betel nut.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

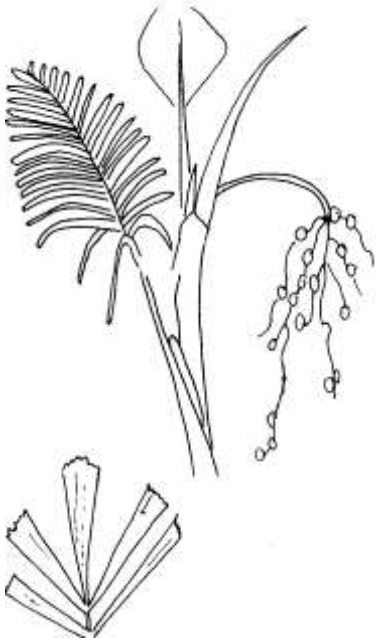
Importance:

Names

English: Arenga palm
Tok pisin:
Tok ples:

Scientific name: *Arenga microcarpa* Beccari
Synonyms:
Plant family: Arecaceae

Description: A small clumpy palm with several stems. The palm is 8 m tall and the stems are 10 cm across. It has leaves which are once branched (unipinnate) and with narrow, long, leaflets along the leaf stalk. The leaflets form a V shape along the midrib. The leaflet at the end is often triangular. The leaf fronds arch over. The flower stalk is like fishtail palm but smaller. This stalk is produced from among the leaves. The flower stalk is large and with simple branching. The highest flowers are female and the lower ones can be male or of both sexes. The fruit spikes hang over and are densely clustered with fruit. The fruit are red and juicy. They are 1.5 cm across. There are 2-3 seeds inside a fruit.



Distribution: They are widespread and common in the lowlands of Papua New Guinea. It occurs on rocky shores and in lowland forest. It is a tropical plant.

Cultivation: They normally grow wild. Plants can be grown from seeds.

Production:

Use: The shoots are eaten.
It is probable that the male flower could be cut off and the sap collected and boiled to concentrate the sugar.
Sago starch can probably also be processed from the trunk.
Caution: The juice of the fleshy fruit irritates the skin.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Cabbage								
Sap								
Sago								

Insects:

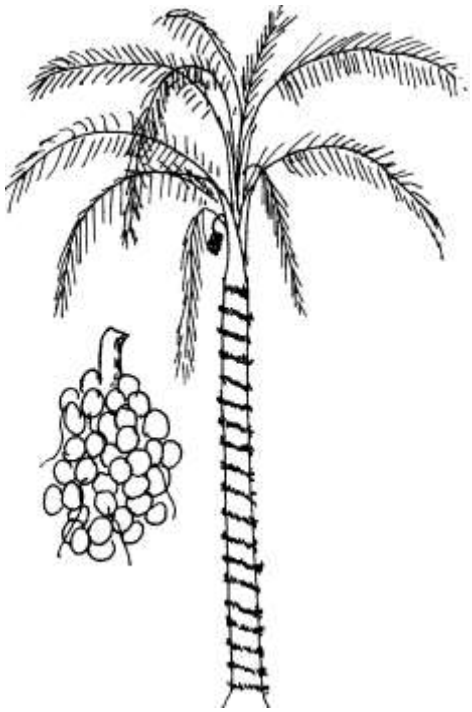
Diseases:

Pests:

Importance: A common palm used for edible shoots in several areas of Papua New Guinea.

Names

English: Pejibaye, Peach palm
Tok pisin:
Tok ples:
Scientific name: *Bactris gasipaes* Kunth.
Synonyms: *Guilielma gasipaes* (Kunth) L. H. Bailey
Plant family: Arecaceae



Description: A tall slender palm with thorny trunk and suckers at the base. It often has between 1 and 13 stems. The stems are straight and unbranched. They are 6-24 m tall, 12-26 cm in diameter, with nodes 2-9 cm long and internodes 7-27 cm long at breast height. The canopy has 10-30 pinnate leaves which are spineless. The petiole-sheath is 49-179 cm long, the rachis is 179-396 cm long, and has 180-386 leaflets. The leaflets are twice forked and leaflets are 58-115 cm long, 3-6 cm wide. Flowers are separately male and female on the same stalk of the same palm. Female flowers are irregularly arranged among male flowers. Fruit are orange when ripe. and about 5-8 cm across. They have yellow oily flesh. Fruit without seeds often occur.

Distribution: A tropical plant. These palms have good wind resistance. They have a moderate tolerance of drought. They grow from sea level to 1200 m altitude in regions near the equator. It suits the wet tropics.
It is grown from approximately 17°N to 16°S of the equator. It is most productive on deep well drained soils in the tropics below 800 m altitude and with a well distributed rainfall of 2000-5000 mm per year and a temperature above 24°C. It suits hardiness zones 11-12.

Cultivation: Plants can be grown from seeds or suckers. Normally only 4 suckers per plant are kept and others removed. Before taking the suckers it is best to partly cut them off and allow roots to develop more strongly. A spacing of 5-6 m apart is suitable. Under subsistence conditions palms are often widely spaced but for intensive agriculture it is planted at 400-500 plants/ha for fruit and 3000 to 20 000 plants for heart-of-palm. Plants are pollinated by insects but can be pollinated by wind. Small beetles are attracted to the flower and pollinate the plant in Central America.

Production: Seeds normally germinate in 30-90 days under normal conditions. Palms grow rapidly under the best conditions. Palms commence bearing after 5-8 years and may produce for 70-80 years. Fruit is produced in large clusters of 50-100 fruit. Four or five clusters are produced per year. Fruiting is seasonal. Fruit takes 6 months to mature and keeps well on the tree. The number of mature fruits per inflorescence (commonly referred to as raceme or bunch) varies from 0 to 764, with total fruit weight 0-20 kg.

Use: The fruit are used cooked or in preserves. The fruit is also dried and ground into flour.
The flesh of the fruit is eaten raw.
The fruit is boiled in salt water for 3 hours, the seeds removed then eaten.
The kernel of the seeds is also edible.
The palm cabbage is edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	50.5	820	0.5		1.5	280	35	

Kernel								
Cabbage								

Insects:

Diseases:

Pests:

Importance: It has been introduced to Papua New Guinea. An important food in South America. In Papua New Guinea it occurs mostly only on research farms and knowledge of how to use the food is lacking.

Names

English: Wine palm, Palmyra Palm
Tok pisin:
Tok ples:

Scientific name: *Borassus flabellifer* L.
Synonyms:
Plant family: Arecaceae



Description: A small evergreen palm. It grows to 10-20 m tall. It can be 40 m high. It spreads to 5 m across. The stem is stout and it may be 1 m across. It is often swollen at the base. It has a crown of leaves shaped like the fingers on a hand or spreading out like a fan. There can be 30-40 of the fan like leaves at the crown. The leaves are large with short stout leaf stalks. There can be 80 slender leaflets which are pointed, folded and rich green. Younger trees are covered with dead leaves or leaf bases. Leaves can be 1-2 m across. The flowers occur in flower stalks up to 1.5 m long. The male and female flowers occur in different trees. The females spikes are larger and have a boat shaped spathe. The fruit are borne in bunches like coconuts. The fruit are 10-12.5 cm across and slightly flattened at the ends. They have dark purple skin. Green bracts occur at the base. Each fruit has 3 seeds. The flesh resembles the flesh of a coconut.

Distribution: It prefers a well drained soil. It needs a protected sunny position. It is drought and frost tender. Seed need to have a temperature of 24-29°C to grow. Trees need a temperature above 15-18°C. It does better in the drier tropics than in the humid tropics. Trees are very sensitive to cold. It suits hardiness zones 11-12.

Cultivation: Plants are grown from seed. Seed take 2-6 months to germinate. Seedlings are difficult to transplant so seed should be sown where they are to grow. To extract the sap, male flower stalks give more sap than female. The unopened flower stalk is tied with a string then banged with a mallet for short times over 3 days before the end being sliced off and the sap collected. A small slither is cut off the end each day to keep the sap flowing.

Production: One flower stalk can yield 2 litres per day of sap. Tapping normally begins when a palm is 20 years old but then may continue for 30 years.

Use: The flesh and the water of the fruit are edible. They can be eaten fresh or made into ice-cream. Edible starch can be extracted from the stem. The palm heart is edible.
The palm can be tapped for sugary sap. This can be drunk, boiled and concentrated or fermented.
The seeds are germinated and the young shoots eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Cabbage								
Sap								
Seeds								

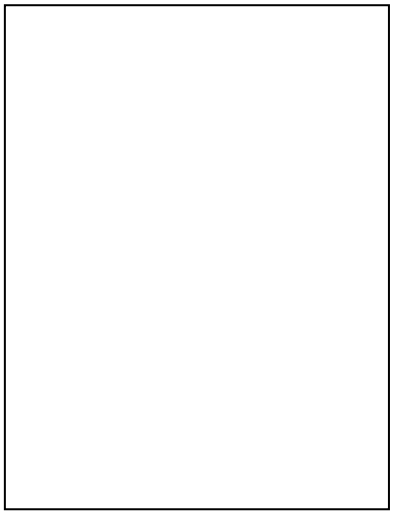
Insects: **Diseases**: **Pests**:

Importance: In some countries the fruit are sold in markets. It is not known if it is used for food in Papua New Guinea. The young seeds are preserved in heavy sugar syrup and sold in jars or cans.

Names

English: Palmyra like palm
Tok pisin:
Tok ples:

Scientific name: *Borassus heineana* Becc.
Synonyms:
Plant family: Arecaceae



Description: A large palm which has separate male and female trees. The fruit is in 3 sections.

Distribution: It occurs in Papua New Guinea in groves in headlands projecting into the Sepik River and also occurs along the Sepik plain.

Cultivation: It grows from seed.

Production: Fruit get too dry when old, so are eaten when young.

Use: The young fruit are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: Papuan white rattan
Tok pisin:
Tok ples:

Scientific name: *Calamus hollrungii* Becc.
Synonyms:
Plant family: Arecaceae



Description: A vigorous climbing palm 10-15 m tall. The stems are 2.5 cm wide. It can be 26 m long. It produces side roots at the nodes and can have stilt roots at the base. The stalk usually ends with a tendril like structure up to 1 m long. The fronds are 3-4 m long and usually without a leaf stalk. The sheath around the stem is armed with spines up to 4 cm long. The leaflets are 20-40 in number and are broad, long, smooth and dark green. They are 25 cm long. They have small spines along the main veins towards the base of the leaflet. The flower branch is a large hanging branched flower stalk. The fruit are 0.8-1.2 cm across and cream in colour.

Distribution: A tropical plant. It is very frost sensitive. It is mostly found growing in lowland rainforest. It needs a shady position and well-drained soil. It is often along stream banks.

Cultivation: Plants can be grown from seed. Seed germinate in 3-4 months. Seed should be sown fresh.

Production:

Use: Unknown what part is edible. Possibly flesh of fruit.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

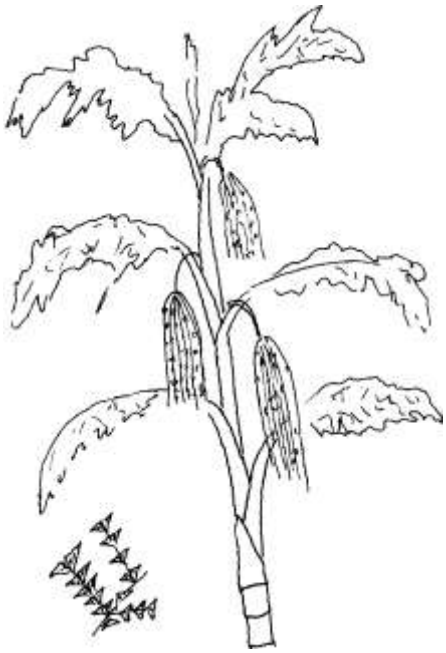
Pests:

Importance:

Names

English: Fishtail palm
Tok pisin:
Tok ples:

Scientific name: *Caryota rumphiana* var. *papuana* Becc.
Synonyms:
Plant family: Arecaceae



Description: A spineless palm with delta shaped leaflets. It grows to a height of 18 m and spreads to 5 m across. The stem is slender and erect. The leaflets are bipinnate (Two branches on the leaves) and the whole leaf is up to 5-6 m long and 3-4 m wide. The leaves have irregular teeth on the edges towards the top. The leaves arch over. The flowers are purple and yellow-green. They occur on long spikes. These can be 3 m long. These fruiting stalks are stout. Long chains of fruit hang from near the leaves along this stalk. The fruit are bluish. The fruit irritate the skin of people.

Distribution: A tropical plant. The palm is common and widespread at low elevations in Papua New Guinea. It grows up to at least 1200 m altitude. It will grow on most soils. It needs a protected, warm, moist position. It is sensitive to frost. It suits hardiness zones 10-12.

Cultivation: It grows wild. It can be grown from seeds. Seed need to be sown while fresh. Seed can take 6-12 months to germinate.

Production:

Use: The pith of the young trunk is eaten (Heart cabbage)
The trunk is sometimes used to pound for sago starch.
The trunk is also used to cultivate sago grubs.
Caution: The juice of the fruit can irritate the skin.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Cabbage								
Starch								
Sago grubs								

Insects:

Diseases:

Pests:

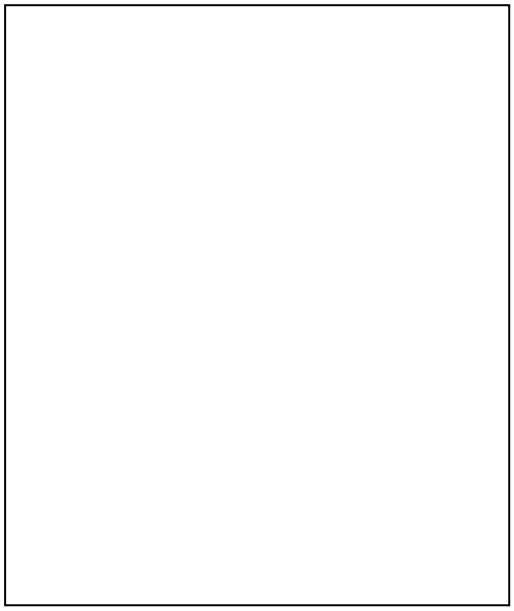
Importance: A common palm in lowland areas of Papua New Guinea but only of minor importance as a food. It has cultural significance in some areas e.g. Kaluli near Mt Bosavi.

Names

English: Corypha palm
Tok pisin:
Tok ples:

Scientific name: *Corypha utan* Lam.
Synonyms: *Corypha elata* Roxb.
Plant family: Arecaceae

Description: The largest and most stately member of the palm family. It is tall and single stemmed. It grows to 20 m high. The trunk can be 1 m across. The bark is smooth, grey, and has rings around it. The leaves are very large and fan shaped. The leaves are rounded, and the blade can up to 3 m long by 3 m across. The leaf is deeply divided from about half way up, into many pointed lobes. The leaf stalk is 2-4 m long. The leaf stalks and leaf edges are armed with very hard, large, black spines. The flowers are small and cream-green. They are about 5-8 mm across. They occur in groups of 6-20, in flower clusters 2-5 m long near the top of the palm. The fruit are smooth and almost round. They are 2-3 cm across. They are green, and turn brown when ripe. The fruit contain a single, hard-shelled, seed. The palm flowers once, then dies.



Distribution: It is a tropical plant. It grows along the edges of tidal rivers. They are often on heavy soils on flood plains which flood. It grows best with access to ground water. They are very common and widely distributed at low and medium altitudes from northern Luzon to Sulu in the Philippines. It is frost tender when young. It needs a warm sunny position and a well drained soil. It suits hardiness zones 11-12.

Cultivation: Plants are grown from seed. Seed can take 18 months to germinate. Fresh seed germinate more quickly. Seedlings are difficult to transplant.

Production: Seedlings are very slow growing. After 40-50 years it flowers, then the leaves and palm die.

Use: The starch extracted from the stem is edible.
The palm cabbage or bud can be eaten raw or cooked.
The sap can be collected from the flower stalk and made into sugar or toddy.
The kernels of the young fruit can be eaten raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Starch								
Cabbage								
Kernels								
Sap								

Insects:

Diseases:

Pests:

Importance:

Names

English: Oil palm
Tok pisin:
Tok ples:

Scientific name: *Elaeis guineensis* Jacq.
Synonyms:
Plant family: Arecaceae



Description: An unbranched palm with a stout erect stem. The stem is rough due to the leaf bases which remain attached. It grows to 20-30 m tall. The trunk is about 75 cm across. The crown consists of about 40 open leaves. These hang downwards. The leaves develop from the bud as a tightly rolled shoot which later opens. The palm crown spreads 5-9 m across. Casual roots grow from the lower 1 m of the base of the trunk. Many roots also grow just under the soil and spread out for 20 m around the palm. The leaves are about 7.5 m long. The leaves have spines along the leaf stalk. These leaves are made up of many leaflets (100-160 pairs). These are slender, long and thin and rich green. These are held at different levels along the midrib (Almost two rows). The flowers are of one sex only. The male flowers occur with a spiny tip. The female flowers are on long stalks. They are 30-45 cm long. The fruit is a large round bunch of small fruits. These are 4 cm long by 2 cm across. There can be 200 fruit in a bunch.

Distribution: They are tropical plants. They need a temperature above 18°C. They suit the hot humid tropics. They grow between 16°N and 15°S in Africa. These palms do well in rich moist soil. A rainfall above 2,000 mm is needed for good production. They need a sunny position. They are drought and frost tender. Plantations are established in West New Britain in Papua New Guinea and palms occur in some other areas of the country. It suits hardiness zones 10-12.

Cultivation: They are normally grown from seed in a nursery then transplanted. The seed are soaked for 7 days then sown into warm ground. Seeds are slow to germinate. Heat treatment is often used to ensure even germination. Seed germinate in 2-5 months under hot conditions. Seed are sown in plastic bags and sometimes a second nursery transplant is used before eventually planting in the field 1.5 to 2 years later.

Production: The early growth of seedlings is slow. Palms commence bearing after about 4-6 years. When mature they produce 2-6 bunches per year. The flower bud does not develop until about 9 months after the leaf containing it has opened. Bright sunny weather helps the development of female flowers. Male flowers are more common in wet cloudy weather. Fruit matures 5-9 months after flowering. A bunch can weigh 18-25 kg. Palms live for many years. Individual trees can live for 200 years.

Use: The outer layer of the fruits yields an orange cooking oil.
The kernel also produces oil.
The palm cabbage is edible.
The sap tapped from the male flower is used to make wine.
The oily fruit are sometimes eaten but can cause nausea.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	28.0	2247	1.6		4.0	18	9	
Cabbage								
Sap								

Insects:

Oryctes spp.	Scarabaeidae (COL)	Rhinoceros beetle
Segetes gracilis	Tettigoniidae (ORTH)	Coconut tree hoppers

And several others.

Diseases:

Black leaf mould	Fungus	*Brooksia tropicalis* Hansf.

Pests:

Importance: A major cash crop but also significant as a food by farmers in many areas.

Names

English: Palm cabbage

Scientific name: *Gronophyllum chaunostachys* (Burret) H.E. Moore

Tok pisin:

Synonyms:

Tok ples:

Plant family: Arecaceae

Description: A solitary palm. It is tall. It grows 20 m high. The trunk is slender, ringed and grey. The trunk can be 20-39 cm across. It has a long crownshaft. This can be 1-1.3 m long. The crownshaft is covered with woolly brown hairs. The crownshaft is slightly thicker than the trunk at its base and tapers upwards. The fronds arch over. The leaves are 2.6-3 m long with a 12-25 cm long stalk. The leaves have leaflets along the stalk. The leaflets are 50 cm long and deep green. These can be erect and spreading forming a V shape. The leaflets are slender. The flowering stalk arises below the crownshaft. The fruit are small and bright red. They occur in dense clusters. These clusters are about 1 m long. Each fruit contains a single seed.

Distribution: It grows in the highlands of Papua New Guinea. It suits tropical and subtropical regions. It grows between 1760-2170 m altitude.

Cultivation: Plants are mostly selfsown.

Production:

Use: The growing tip or palm cabbage is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Cabbage								

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples: Niniu

Scientific name: *Gulubia cylindrocarpa*
Synonyms:
Plant family: Arecaceae

Description: A tall palm. It grows 35 m high. The trunk is less than 25 cm across. The trunk is light grey to white. It has closely spaced rings of leaf scars. The trunk is expanded at the base. The crownshaft is 1 m long and light or silvery green. It is slightly bulged at the base. The leaf crown is rounded with 15-18 leaves. The leaves are 2.3 m long with 25 cm long stalks. The leaves arch over and curve back at the tips. The leaflets are 1 m long and narrowly sword shaped. They are olive green above and greyish-green underneath. They are stiff and divide at the tips. They grow at an angle forming a V shape. The fruit are 2 cm long by 0.7-0.8 cm wide. They are orange or yellow.

Distribution: It grows in mountainous rainforest. It grows between 100-1,060 m altitude.

Cultivation:

Production:

Use: The fruit is eaten.
The palm heart is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Cabbage								

Insects:

Diseases:

Pests:

Importance: The fruit are eaten especially by children.

Names

English: Minor Walking-stick Palm
Tok pisin:
Tok ples:

Scientific name: *Linospadix minor* (F. Muell.) Burrett
Synonyms:
Plant family: Arecaceae

Description: An evergreen palm. It forms clumps by suckering. It grows to 2 m high and spreads to 2 m across. The stems are erect, woody and slender. It has a sparse crown of short fronds. The leaves are 60-100 cm long and consist of pairs of leaflets of unequal size. There are 12-14 leaflets. The end pair of leaflets are fish-tail like. The flowers are greenish and hang down on long spikes. The fruit are orange, pink or red berries. They occur on long spikes which can be 20-40 cm long. The fruit are 12-18 mm long. The fruit are yellow, pink or red. They have one seed inside. The seed is 1-1.6 cm long. The flesh of the fruit is edible.



Distribution: A tropical palm. It grows naturally in the rainforest. It suits a shady position. They need a well-aerated loamy soil. It benefits from mulch and regular watering.

Cultivation: The plants are grown from seed. Seed should be sown fresh. Seed germinate slowly. They can be grown by division of the clump. Seedlings transplant easily.

Production: In Australia, flowering occurs August to October and the fruiting season is December to July.

Use: The fruit have a thin layer of edible flesh.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English: Fan palm
Tok pisin:
Tok ples:

Scientific name: *Livistona benthamii* Bailey
Synonyms:
Plant family: Arecaceae



Description: An evergreen palm. It grows to 15 m high and spreads to 3 m across. The stem is erect and heavily armed with spines. The trunk is 30-40 cm across. The trunk is grey to black. It has a single stem and fan leaves. It has a densely leafy crown which is rounded and drooping. The leaves are 1-1.5 m long and 1-1.5 m across. They are shiny and dark green. Leaves are divided into narrow segments with strong thorny leaf stalks. The leaf stalks are 1.5 m long. The leaf bases are persistent on the trunk. The flowers are cream or yellow in elongated heads. The flowers are 1-1.2 cm across and the heads can be 2.5 m long. The fruit are berries. They are 1 cm across. They are purple black when ripe. They have a powdery covering. They contain a single hard shelled seed.

Distribution: A tropical palm. It does best on light to medium soils. It needs moist soils and a protected partly shaded position. It is damaged by drought and frost. It grows naturally on monsoon forest often near streams. It can stand seasonal flooding.

Cultivation: Plants are grown from seed. The seed need to be planted fresh. Seed germinate in 3-4 months. Seedlings are difficult to transplant.

Production:

Use: The central growing tip is eaten raw or lightly roasted.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Cabbage								

Insects:

Diseases:

Pests:

Importance:

Names

English: Dwarf Fan Palm
Tok pisin:
Tok ples:

Scientific name: *Livistona muelleri* Bailey
Synonyms:
Plant family: Arecaceae

Description: A fan palm. It is a sturdy palm. It grows to 12-20 m high. It is often smaller. The trunk is 25 cm across. The trunk has rings of old leaf base scars. The crown is dense. The leaves are stiff and dark green. The leaf stalks are 1 m long. The leaves are circular and flat. The flowers are dull yellow on a dense flower arrangement that is in the centre of the crown. The fruit are oval and 1.5 cm long. They are deep brown to black.



Distribution: It grows naturally in open forest in NE Queensland in Australia. It suits tropical and subtropical locations. It requires an open position and well drained soil. It grows in monsoonal savanna. It suits hardiness zones 11-12.

Cultivation: Plants are grown from seed. Seed take 4-8 months to germinate.

Production: It is very slow growing.

Use: The growing tip or palm cabbage is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Cabbage								

Insects:

Diseases:

Pests:

Importance:

Names

English: Black Palm
Tok pisin:
Tok ples:

Scientific name: *Normanbya normanbyi* (W.Hill.) I.H.Bailey
Synonyms: *Ptychosperma normanbyi*
Plant family: Arecaceae



Description: A tall solitary palm. It grows about 20 m high. The trunk is light grey and 10-15 cm across. It has distinct rings. The crownshaft is mealy white. The crown is round and made up of 9-12 arching fronds. It is a feather leafed palm with leaflets in a radiating arrangement. The leaves are 2-2.5 cm long. The leaflets are dark green above and white underneath. The leaflets are wedge shaped. The flowering stalk arises below the crownshaft. They are 50 cm long. Flowers are of one sex but both sexes occur on the one stalk. Single plants can produce fertile seed. The fruit are 4-5 cm long by 3 cm across. The fruit are deep pink to red. Each fruit contains one seed.

Distribution: They grow in tropical and subtropical locations. It grows naturally in rainforests often near swamps in NE Queensland. It needs warm, humid conditions. Plants are damaged by frosts. They are sensitive to sunburn from the first 3-5 years.

Cultivation: Plants are grown from seed. Seeds germinate sporadically. Seeds take 2-3 months to germinate with some taking 12 months. Seedlings transplant easily.

Production: It grows quickly.

Use: The growing point of palm cabbage is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Cabbage								

Insects:

Diseases:

Pests:

Importance:

Names

English: Date palm
Tok pisin:
Tok ples:

Scientific name: *Phoenix dactylifera* L.
Synonyms:
Plant family: Arecaceae

Description: A tall unbranched evergreen palm. It grows to 30 m high. The trunk can be 30-40 cm across. The trunk is covered with fibres and has the bases of old leaves along it. It produces suckers on the trunk and at the base. The fronds are grey-green. The leaves are 6-7 m long. The leaflets are 20-40 cm long. They are spaced in two iregular rows along each side of the stalk. Male and female flowers are produced on separate trees. The flowers spadices ar yellow-brown. The fruit is small, brown and very sweet. It has one grooved seed. The fruit is 2.5-5 cm long. When ripe the fruit is dull yellow and the flesh soft. The skins of the fruit darken when dried. Strands of fruit have 25-35 dates. The fruit are edible.





Distribution: They suit dry subtropical climates. It needs hot, dry arid climates while fruit mature. It can tolerate salty or brackish water. In cold temperate regions the palm grows but rarely flowers. It suits plant hardiness zones 9-12.

Cultivation: Plants are grown from seed. Seed take 4-5 months to germinate. They begin bearing 5-6 years after planting and reach full production by 15 years. A palm lasts about 80 years. Female plants need to be pollinated before they bear fruit. A single male is sufficient for 50 females. Taking suckers from good producing plants is a more reliable means or growing new plants.

Production: There can be 45-70 kg of fruit per tree.

Use: The fruit is eaten fresh or dried. They are also used for jams and preserves.
The date stones can be fermented or roasted and used as a coffee substitute.
Dates are also pressed for juice.
The sap is used for jaggery and sugar.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	58.5	598	0.9		1.3	50	6	
Fruit dry	22.5	1151	2.0		1.2	5	0	0.3

Insects:

Diseases:

Pests:

Importance: A major food in Mediterranean countries. Probably only a casual introduction in Papua New Guinea.

Names

English: Solitaire palm, Alexander Palm
Tok pisin:
Tok ples:

Scientific name: *Ptychosperma elegans* (R.Br.)Bl.
Synonyms:
Plant family: Arecaceae



Description: A palm which grows to 10 m high. The trunk is slender and grey. The trunk has rings along it. The crownshaft is whitish-green. The leaves are bright green and arching. The leaves are compound. They are 1-2.5 m long. There are 40-60 leaflets which are 50-60 cm long. They are smooth. The fruit is 15-20 mm long. They occur in bunches below the crownshaft. The fruit are bright red. There is one seed which is about 15 mm long. The flesh of the fruit is edible.

Distribution: It grows in the rainforest in NE Queensland, in Australia. It is a tropical plant. They will grow in the subtropics. It needs well drained soil. It can grow in part shade or full sun. It suits seasonally moist and dry climates. They are sensitive to frost. It suits plant hardiness zones 10-11.

Cultivation: Plants are grown from seed. Seed is produced in large quantities and grows readily. Seed germinate in 5-6 months. They need protection from direct sunlight for the first 2-4 years. Seedlings transplant easily.

Production: They can be very fast growing. It flowers in warm, wet months.

Use: The fruit and the palm heart of cabbage are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Cabbage								

Insects:

Diseases:

Pests:

Importance:

Names

English: Grey Cane palm

Scientific name: *Ptychosperma macarthurii* (H.Wendl.ex Veitch)H.Wendl. ex Hook.f.

Tok pisin:

Synonyms:

Tok ples:

Plant family: Arecaceae



Description: An evergreen palm. It grows to 3-10 m high and spreads to 2-4 m across. The stems are erect, slender and form clumps. They have rings of scars on the trunk. The leaves are dark green and divided along the stalk. They are 1-1.5 m long. They are feather like. The leaves arch in a loose crown. The leaflets are narrow, bright green and with ragged teeth near the tips. The flowers are in branching sprays 30-45 cm long. These come from below the crownshaft. The flowers are greenish-yellow and 8 mm across. The fruit are bright red berries. They are 1.5 cm across. They are waxy. The fruit contains a seed which has 5 ridges along its length.

Distribution: It is a tropical plant. It does best in moist, well-composted, well-drained soils. It needs a protected, partly shaded position. It is damaged by drought and frost. It needs a temperature above 16°C. In full sunlight the fronds can become bleached. It suits hardiness zones 10-11.

Cultivation: Plants are grown from seed. Seed germinate in 2-3 months. It planted fresh in moist peat and with warmth and humidity seed germinate easily and wuickly. Plants can also be grown by division of the clump.

Production: In Australia, flowering is from August to October.

Use: The growing point or palm cabbage is edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Cabbage								

Insects:

Diseases:

Pests:

Importance:

Names

English: Traveller's palm
Tok pisin:
Tok ples:

Scientific name: *Ravenala madagascariensis* Sonn
Synonyms:
Plant family: Strelitziaceae



Description: Although called a palm, it is not a palm. It is an evergreen shrub. It grows to 10-16 m high and spreads to 3-6 m across. The stem is erect, formed by the bases of the old leaves. It is palm like. The leaves are arranged in 2 opposite rows on long leaf stalks which form sheaths around the stem. They are 5 m long, are closely overlapping and open like fans. They are paddle shaped. The flowers are white and have 3 petals. They occur in long spikes and have boat shaped bracts in the axils. The fruit capsules contain seeds with a bright blue seed covering (aril). The seeds are edible.

Distribution: It is a tropical plant. It does best in rich, moist soil. It needs a protected, sunny, warm position. It is damaged by drought and frost. It grows from sea level to 1,000 m altitude in Madagascar. It needs a temperature above 16-18°C. It suits hardiness zones 10-12.

Cultivation: Plants can be grown from seed or by division of suckers. Seeds grow slowly.

Production:

Use: The fat found in the seeds is used in cooking.
Sugar is extracted from the sap.
The seeds are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds								
Sap								

Insects:

Diseases:

Pests:

Importance: It has been introduced as an ornamental and is probably not used for food in Papua New Guinea.

Names

English: Cuban royal palm
Tok pisin:
Tok ples:
Scientific name: *Roystonea regia* (Knuth) O.F.Cook
Synonyms:
Plant family: Arecaceae



Description: An single stemmed, evergreen palm. It grows to 30 m high and spreads 5-10 m wide. The stem is erect and smooth. It is white. It is stout and unbranched. The trunk is usually thickened near the base and in the middle before thinning towards the top. The trunk can be 0.5-0.6 m across. It has ring like markings. The leaves are divided along the stalk. The leaves are 6 m long and the leaflets are long and narrow. They are arranged in several ranks. The base sheaths the trunk below the crown. The flowers are small and white and cup-shaped. They are clustered in spikes which hang downwards. These stalks can be 1 m long. These come from just below the crown shaft. The flowers occur in 3-4 clusters with 2 boat shaped spathes. The male cluster is longer than the female. The fruit are round berries which are deep purple in colour.

Distribution: It suits tropical and subtropical conditions. It does best with warmth and humidity.
It does best with rich, moist soil. The soil needs to be well drained. It needs a protected, sunny position. It is damaged by drought and frost. They need temperatures above 15°C. In Cuba it grows on fertile soils up to 1000 m altitude. It suits plant hardiness zones 10-12.

Cultivation: Plants are grown from seed. Seed should be sown at 27°C. Plants respond to heavy fertiliser application especially nitrogen.

Production:

Use: The central bud or cabbage is edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Cabbage								

Insects:

Diseases:

Pests:

Importance: A magnificent introduced palm. It would not be sensible to cut down the palm to eat the growing tip!

Names

English: Claudie River Lawyer Vine
Tok pisin:
Tok ples:

Scientific name: *Calamus warburgii* Schumann.
Synonyms:
Plant family: Arecaceae

Description: A climbing palm with many thorns. It forms large clumps. The stems are 35 m long and 2.5 cm wide. The leaves are 2.6 m long. The leaves climb upwards but arch over. The leaves have 80-100 shiny-green leaflets. The leaflets are 25 cm long and 2 cm wide. The leaf sheath has spines about 5 cm long. The leaflets are limp and regularly spaced. They taper towards the tip. There are 4 m long stalks at the ends of many leaves which helps the plant climb.

Distribution: A tropical plant. It is very frost sensitive. They need a well-drained soil. Seedlings need to be in the shade.

Cultivation: Plants are grown from seed. The seed germinate in 3-4 months. Seed need to be sown fresh. Seedlings are difficult to transplant.

Production:

Use: The green juicy flesh layer under the skin but around the seed is eaten raw.

Food Value: Per 100 g edible portion

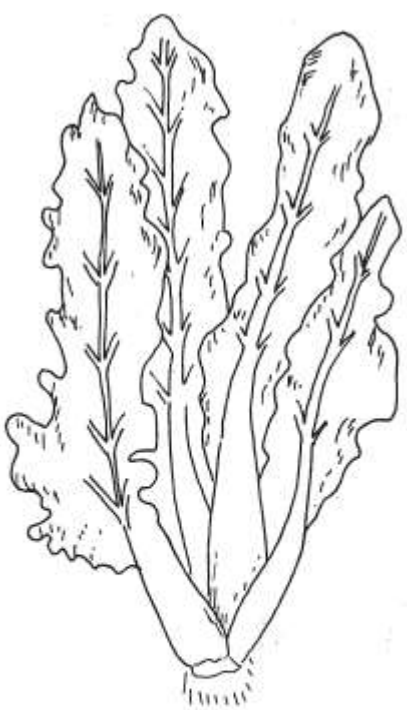
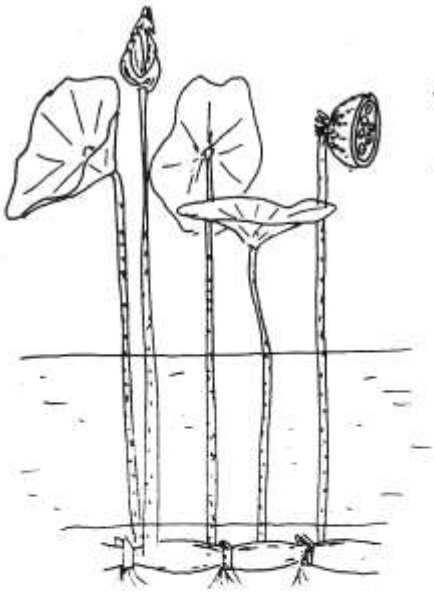
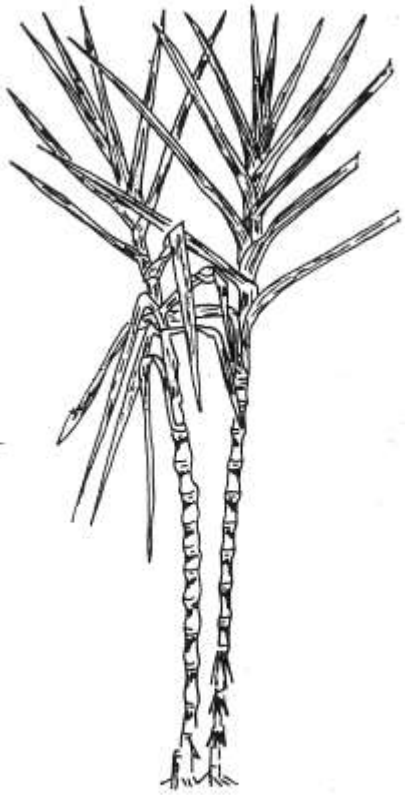
Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

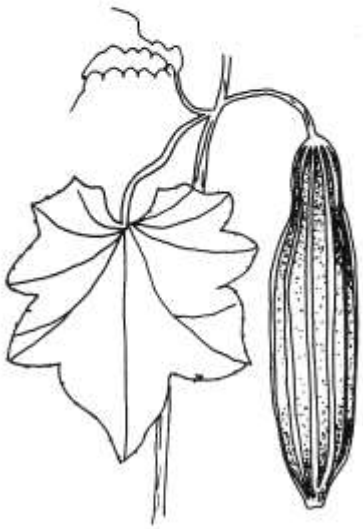
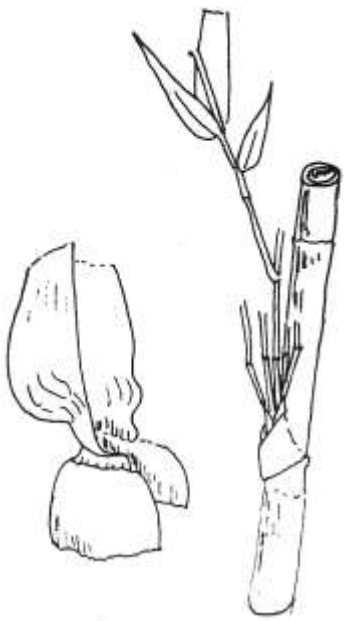
Diseases:

Pests:

Importance:


Vegetables

Vegetables

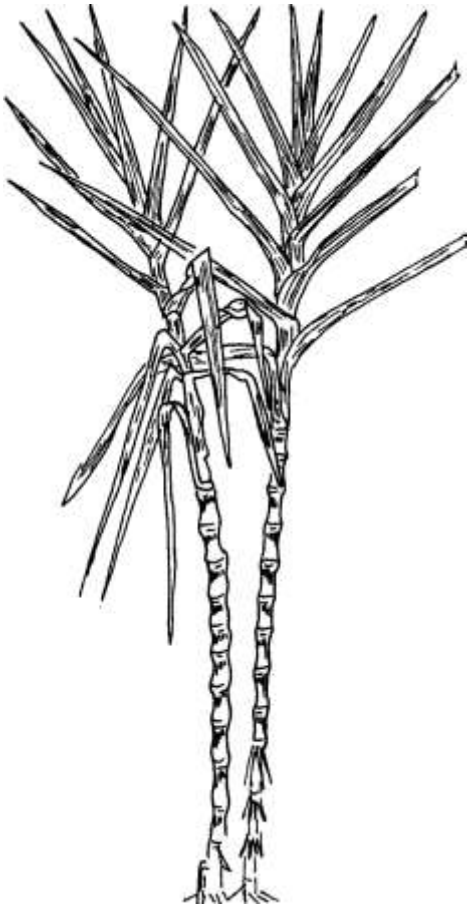
English name	Tok Pisin	Scientific name	Page
Long pitpit	Pitpit	*Saccharum edule*	**201**
Short pitpit	Pitpit	*Setaria palmifolia*	**203**
Corn	Kon	*Zea mays*	**205**
Snake gourd		*Trichosanthes cucumerina*	**208**
		Trichosanthes pulleana	**209**
		Trichosanthes tricuspidata	**210**
Choko		*Sechium edule*	**211**
Pumpkin	Pamkin	*Cucurbita moschata*	**213**
Pumpkin	Pamkin	*Cucurbita maxima*	**214**
Cucumber	Kukamba	*Cucumis sativus*	**216**
Marrow		*Cucurbita pepo*	**218**
Melon, Cantaloupe		*Cucumis melo*	**219**
Bottle gourd	Botel	*Lagenaria siceraria*	**220**
Angled loofah		*Luffa acutangula*	**221**
Smooth loofah		*Luffa cylindrica*	**222**
Wax gourd		*Benincasa hispida*	**223**
Bitter gourd		*Momordica charantia*	**224**
Spiny bitter cucumber		*Momordica cochinchinensis*	**226**
Cabbage	Kebis	*Brassica oleracea* var. *capitata*	**227**
Bok-choy Celery cabbage		*Brassica rapa* var. *chinensis*	**228**
Brussels sprouts		*Brassica oleracea* var. *gemmifera*	**229**
Kohl Rabi		*Brassica oleracea* var. *gongylodes*	**230**
Cauliflower		*Brassica oleracea* var. *botrytis*	**231**
Broccoli		*Brassica oleracea* var. *italica*	**232**
Turnip		*Brassica rapa*	**233**
Chinese kale		*Brassica oleracea* var. *albiflora*	**234**
Swede		*Brassica napus* var. *napobrassica*	**235**
Petsai		*Brassica rapa* var. *glabra*	**236**
Leaf mustard		*Brassica juncea*	**237**
Chinese radish		*Raphanus sativus* var. *longipinnatus*	**238**
Radish		*Raphanus sativus*	**239**
Bulb onion	Anian	*Allium cepa* var. *cepa*	**240**
Shallots		*Allium cepa* var. *aggregatum*	**241**
Chives		*Allium schoenoprasum*	**242**
Garlic		*Allium sativum*	**243**
Leek		*Allium ampeloprasum* var. *porrum*	**244**
Chinese chives		*Allium tuberosum*	**245**
Celery		*Apium graveolens* var *dulce*	**246**
Okra		*Abelmoschus esculentus*	**247**
Asparagus		*Asparagus officinalis*	**248**
Capsicum, Bell peppers		*Capsicum annuum* var. *annuum*	**249**
Eggplant		*Solanum melongena*	**251**
Pea eggplant		*Solanum torvum*	**252**
Tomato		*Lycopersicon esculentum*	**253**
Carrot		*Daucus carota*	**255**
Lettuce		*Lactuca sativa*	**256**

Names

English: Long pitpit
Tok pisin:
Tok ples:

Scientific name: *Saccharum edule* Hasskarl
Synonyms:
Plant family: Poaceae

Description: A plant in the sugarcane family grown for the edible unopened flower. Plants grow 2-3 m tall and have thinner canes than sugarcane. It produces suckers near the base so that normally a clump of stalks is produced. At one season of the year it produces a seed head or flower which remains inside the top of the plant and is the part that is eaten. Several cultivars occur which differ in colour, height and season of flowering.



Distribution: It is common in coastal areas and will grow up to about 1800 m altitude in the tropics. It is commonly grown in old gardens before they return to forest. It is common in coastal areas in Asian and Pacific countries including the Solomon Islands, Vanuatu, and Fiji and also in Indonesia.

Cultivation: It is grown from cuttings of the stalks. In fertile soil, cut plants will re-shoot from the base. The cuttings need adequate moisture at planting. Cuttings about 30 cm long are used. To avoid cuttings drying out they need to be planted soon after cutting. Coastal pitpit stalks can be planted at any time of the year. It takes 6-9 months from planting till a crop is ready to harvest. But the time of flowering is coastal pitpit is controlled by the sun. Early in the year about February to March most plants develop a thickened clump of leaves at the top. When these are broken off and opened by removing the outside leaves the very fine yellow unopened flower is seen. It is this flower which is eaten.

Production: It takes 6-9 months to maturity. In most cultivars, flowering is seasonal.

Use: The unopened flower is eaten raw or cooked. Often it is cooked in coconut milk.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Flower								

Insects:

Acauloplacella immunis	Tettigonidae (ORTH)	
Agromyza papuensis	Agromyzidae (DIPT)	
Anomala anoguttata Burm.	Rutelidae (COL)	
Ataenius spinator Harold	Scarabaeidae (COL)	
Aulacaspis tegalensis (Zhnt.)	Diaspididae (HEM)	Sugarcane scale
Bothrogonia sp.	Cicadellidae (HEM)	
Cannococcus ikshu William	Pseudococcidae (HEM)	
Euconocephalus sp.	Tettigoniidae (ORTH)	
Parastasia guttulata Fairmaire	Scarabaeidae (COL)	

Saccharicoccus sacchari (Cockerell)	Pseudococcidae (HEM)	Pink sugarcane mealybug
Spodoptera exempta (Walker)	Noctuidae (LEP)	African armyworm

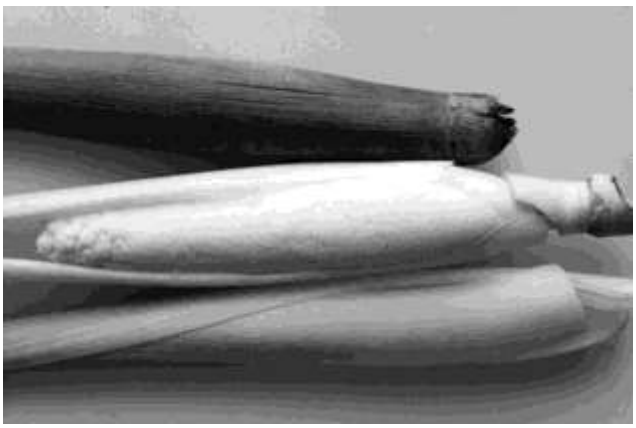
and probably other sugarcane insects

Diseases:

Leaf spot	Fungus	*Beniowskia spaeroides*
Leaf spot	Fungus	*Cercospora longipes*
Leaf blight	Fungus	*Colletotrichum falcatum*
Leaf spot	Fungus	*Cytoplea sp.*
Leaf spot	Fungus	*Diplodia sp.*
Veneer blotch	Fungus	*Deightoniella papuana* D.Shaw
Leaf spot	Fungus	*Drechslera sacchari*
Pokkah boeng	Fungus	*Gibberella fujikuroi*
Red rot	Fungus	*Glomerella tucumanensis* (Speg)Ark & Mull.
Yellow spot	Fungus	*Mycovellosiella koepkei*
Tar spot	Fungus	*Phyllachora sacchari* P.Henn
Downy mildew	Fungus	*Peronosclerospora sp.*
Rust	Fungus	*Puccinia kuehnii* (Kruger)Butler
Fiji disease	Virus	
Mosaic	Virus	

Pests:

Importance: A very important vegetable in Papua New Guinea and grown in most lowland areas and up to 1600 m.





Names

English: Short pitpit
Tok pisin:
Tok ples:
Scientific name: *Setaria palmifolia* (Koenig)Stapf.
Synonyms:
Plant family: Poaceae

Description: A grass with a broad leaf blade. A plant grows from 60 cm to one metre tall. It has a knotty rhizome or underground stem. The leaves are 2 to 8 cm wide, 30-40 cm long and folded along their length. The leaf blade is folded like a fan and is hairy. The plant forms a clump of shoots and is about 1 m high. The shoots are thickened near the end in cultivated types. The flower is a loose open grass flower. A range of different varieties occur. These have different amounts of red, green and white colouring on the leaf and also where the leaves wrap around the stem. The seeds are about 3 mm long and borne in large numbers on shoots at the ends of the stalks. Normally a plant produces a clump of shoots due to both suckers near the base and buds growing from the side of the short stem.



Distribution: They are common and widely distributed from Luzon to Palawan and Mindanao in the Philippines. It grows from near sea level up to about 2400 m. It can grow in shady places and suits wet climates. This grass occurs as a wild plant, insignificantly used for food in several countries. These include Taiwan, Philippines, Malaysia, Indonesia, Papua New Guinea, Solomons, and Hawaii. Sometimes either the shoots or seeds of this wild plant are used as a famine food reserve. In Papua New Guinea, and to a smaller extent in other places, this species reaches significance as a domesticated, cultivated food plant. A number of named cultivars occur.

Cultivation: Wild plants grow from seed. Garden types grow from pieces of the shoots.
Plants are normally propagated by planting shoots. The young shoots are broken off the side of the plant. Shoots near the ground often have roots already growing on them so these shoots start growing more quickly. Portions of the stem can be planted because buds near the joints along the stem can produce new shoots. Wild plants are seed propagated. Cultivated types exist as fully domesticated plants independently of the weedy grass. It needs a reasonably fertile soil and is often planted on steep sides and edges of gardens. Its optimum altitudinal range is 1200m to 2400m. It can tolerate light shade. Plant spacings of about 1 m apart are used. Harvesting commences about 5 months after planting and may continue for up to 2 years.

Production: Harvesting commences about 5 months after planting and may continue for up to 2 years. A yield of 4.8 kg per plant in a year, of the stripped edible shoots has been recorded.

Use: The fattened shoots are eaten.
The seeds are used as a substitute for rice in times of shortage.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Shoots		113	0.5					

Insects:
Borers in the shoots

Diseases:

Leaf spot	Fungus	*Bipolaris panici-miliacei* (Nisik.)Shoem
Rust	Fungi	*Uredo palmifoliae* Cummins
	And	*Uromyces setariae-italicae* Yosh
Tar spot	Fungus	*Phyllachora minutissima* (Welv.& Currey)

Pests:

Importance: An important vegetable in Highland areas of Papua New Guinea. It is used for food in China.

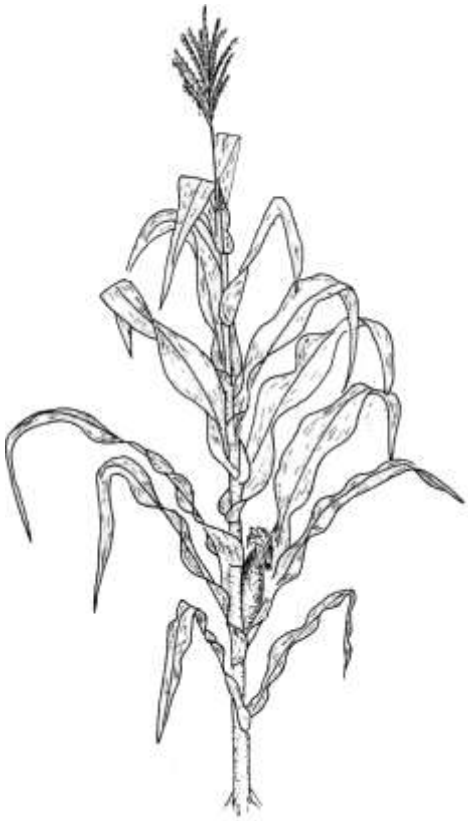


A market bundle

Names

English: Corn, Maize
Tok pisin: Kon
Tok ples:

Scientific name: *Zea mays* L.
Synonyms:
Plant family: Poaceae



Description: An annual plant 2-3 m high. It has a single stem. The stem is solid. It can be 2-3 cm across. Usually there are 14 internodes but this can vary from 8-21. It is a large grass family plant with prop roots near the base. Some forms produce tillers near the base. Seed roots feed the plant initially then casual side roots develop from the lowest node on the plant and continue supplying the plants nutrients. Roots can go sideways for 1 m or downwards for 2-3 m. It is a very variable plant and due to cross pollination variation continues and all forms hybridize. Leaves are produce one after another along opposite sides of the stem and there are between 8 and 21 leaves. The leaf sheath wrapsa round the stem but opens towards the top of the sheath. The leaf blade is 30-150 cm long and 5-15 cm wide. The leaf blade has a pronounced midrib and is often wavy along the edge. The female flower is called the ear. It is on a short stalk in the axils of one of the largest leaves about half way down the stem. In the axils of the leaves it produces a large cob wrapped in leaves. The kernels develop in an even number of rows carrying 4-30 grains along the length of the cob. Cobs commonly have 300-1,000 grains. Normally only one or two cobs develop per plant. The male flower or tassel is at the top.

Distribution: Seeds need a soil temperature more than 10°C to germinate. It grows best at less than 1800 m altitude in the equatorial tropics. It is grown in most areas of Asia. Plants have been grown from sea level to 3,300 m in the Americas. It tends to be in areas too dry for rice but wetter than for millets. Maize must have over 120 days frost free. In Nepal it grows up to 3000 m altitude. It suits hardiness zones 8-10.

Cultivation: It is grown from seeds. It is normal to plant one seed per hole at 1-2 cm depth. A spacing of about 30 cm between plants is suitable. For saving seed, it should be from gardens of over 200 plants and the seed from several cobs mixed to avoid inbreeding depression.

Production: In warm moist soil seeds geminate in 2-3 days after planting. Cobs are harvested when the grains are full and the tassel is just starting to turn brown. This is normally about 50 days after fertilization. It is sweetest eaten soon after harvesting. Drought and unfavourable weather can result in the silks of the female flowers emerging after the pollen has been shed. This results in poorly pollinated cobs.

Use: The cobs are eaten cooked.
The dried grains can be crushed and used.
Pancake like Tortillas from corn have been a staple food in Central America.
Maize is cooked and prepared in many different ways.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds mature	10.4	1528	10.0		4.9	100	4	

Insects:

Creatonotus gangis (L.)	Arctidae (LEP)	
Heliothis armiger (Hubner)	Noctuidae (LEP)	Corn earworm
Locusta migratoria (Linnaeus)	Acrididae (ORTH)	Migratory locust
Orthaca cincticornis Walk.	Lygaeidae (HEM)	
Ostrinia furnacalis (Guen.)	Pyralidae (LEP)	Corn borer
Rhopalosiphum maidis (Fitch)	Aphididae (HEM)	Corn leaf aphid
Spodoptera mauritia (Boisduval)	Noctuidae (LEP)	Lawn armyworm
Tiracola plagiata (Walker)	Noctuidae (LEP)	Cacao armyworm

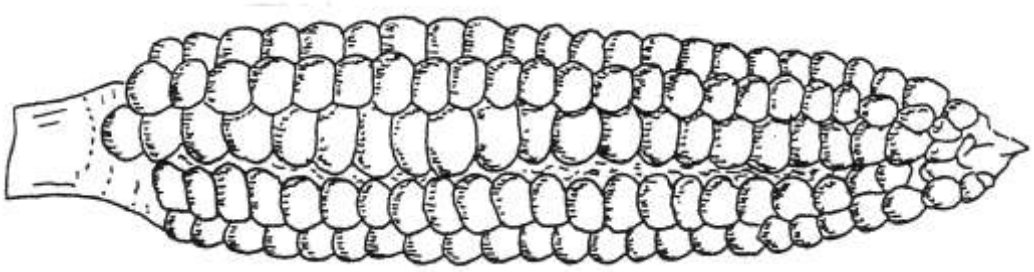
and others

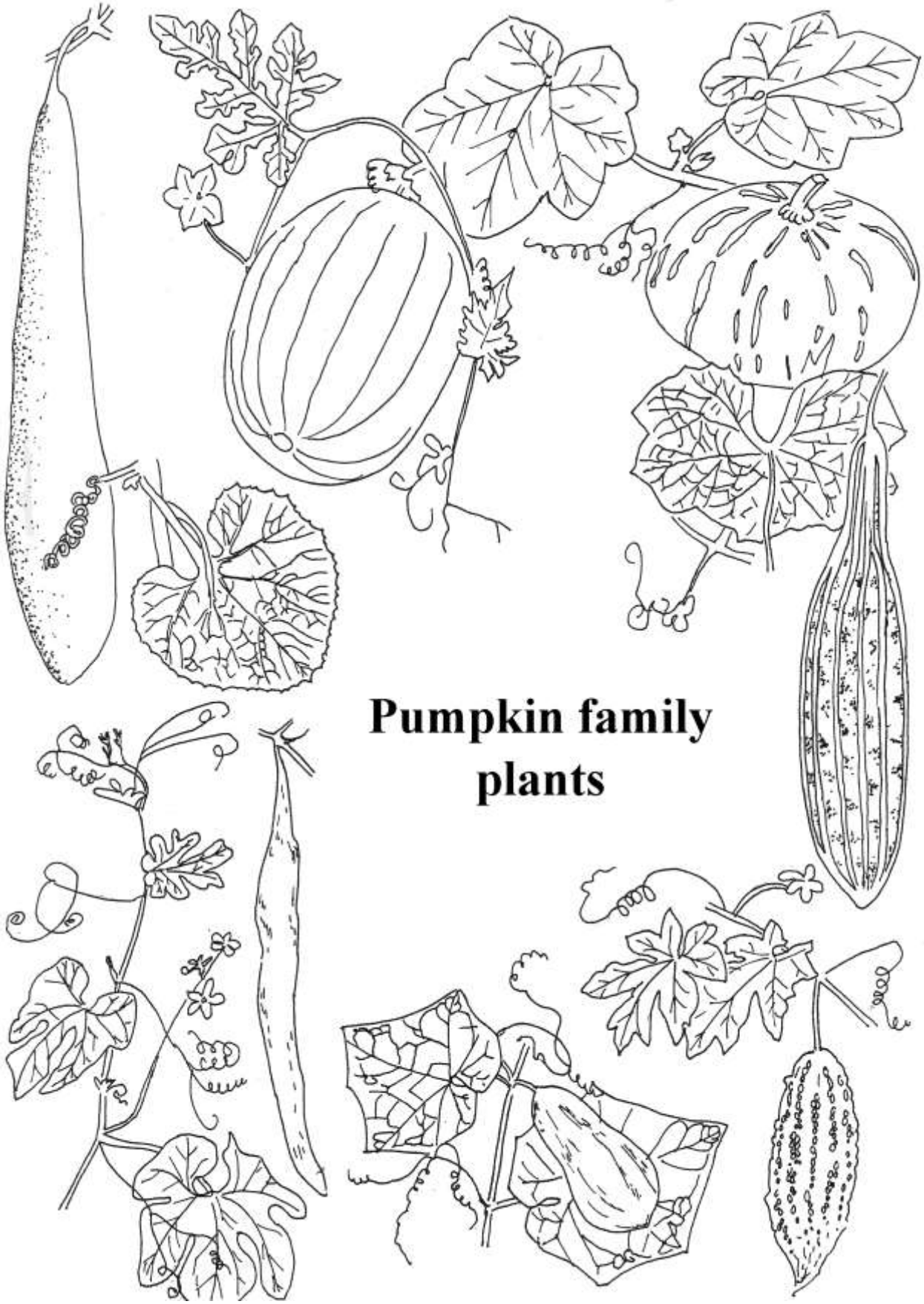
Diseases:

Leaf spot	Fungus	*Bipolaris zeae*
Leaf spot	Fungus	*Curvularia lunata*
Tropical rust	Fungus	*Puccinia polysora* Underw.
Rust	Fungus	*Puccinia sorghi* Sehw.
Downy mildew	Fungi	*Peronosclerospora sacchari*
	and	*Peronosclerospora sorghi*
Leaf spot	Fungus	*Phoma sorghina*
Leaf blotch	Fungus	*Setosphaerica turcica* (Luttrell)Leon. & Sugg
Leaf spot	Fungus	*Cercospora sorghi* Ell.& Ev.
Leaf blight	Fungus	*Cochliobolus heterostrophus*
Blister smut	Fungus	*Ustilago zeae*
Head smut	Fungus	*Sphacelotheca reiliana*
Irregular bleached areas	Fungus	*Thanatephorus cucumeris*
Collar rot	Fungus	*Pythium butleri*

Pests:

Importance: Common in most areas of Papua New Guinea but never as a staple food. It is a major staple food of Central and East Africa.




Pumpkin family
plants

Names

English: Snake gourd
Tok pisin:
Tok ples:

Scientific name: *Trichosanthes cucumerina* L.
Synonyms: *Trichosanthes anguina* L.
Plant family: Cucurbitaceae



Description: A climber in the pumpkin family with tendrils. It grows 2.4-6 m high and spreads 1.5-3 m wide. The vine has furrows along it. The leaves have 3 to 7 lobes and a tooth like edge. The flowers are white. The male flowers are without a bract and the female flowers are produced singly. The flowers have long stalks. The long fruit tend to curve. They can be 1-2 m long. When ripe they turn orange or red, but are grey and green when young.

Distribution: It is common in the humid tropical lowlands up to 500 m. It does not tolerate dry soil and requires a good moisture reserve in the soil, but is sensitive to waterlogging. The optimum temperature for growth is 30-35°C with a minimum of 20°C. It occurs throughout the Philippines at low and medium altitudes up to 1200 m. It suits hardiness zones 10-12.

Cultivation: Snake gourd is grown from seed. It requires 4-6 kg/ha. Seed can be sown in a nursery and transplanted at the 2 true leaf stage. More commonly plants are sown where they are to grow. A spacing of 60 - 100 cm is suitable. Plants need supports to climb. Often in home gardens this is a natural support such as a house. Plants respond to fertiliser but excessive nitrogen can produce too much vegetative growth. Pruning can improve the female to male flower ratio.

Production: Flowering starts 5 weeks after planting. Male flowers appear first then female flowers 3 days later. Pollination is normally by insects. Harvesting of fruit starts 6-7 weeks after planting and continues for 1 or 2 months. Fruit are picked 12-20 days after fruit set when they are 30-60 cm long. Fruit do not store well but can be stored for 10-14 days at a temperature of 16-17°C and relative humidity of 85-90%. By the time the fruit turn orange they are too mature to eat.

Use: The long immature fruit are eaten cooked. Sometimes a bitter taste occurs but this disappears with boiling. Fruit are inedible when ripe.
The young leaves are eaten cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed	97.0		0.2		0.2			0.1
Fruit	95.0	76	0.9		1.0	810	6	
Leaves								

Insects:

Diseases:

Associated with leaf spots	Fungus	*Colletotrichum orbiculare* (Berk.& Mont.) v Arx
Leaf spot	Possibly bacteria	

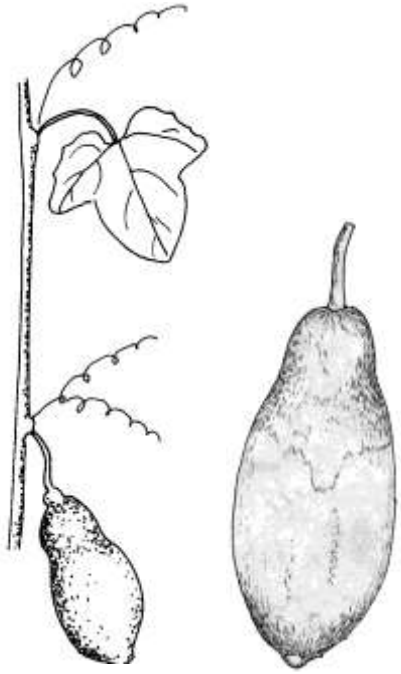
Pests:

Importance: In Papua New Guinea it is most commonly seen in the Sepik or in gardens of Sepik people.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Trichosanthes pulleana* Cogn ex Harms
Synonyms: *Trichosanthes papuana* Pulle
Plant family: Cucurbitaceae



Description: A creeping plant in the pumpkin family. It has tendrils. The vines can become long and woody. It bears green fruit which turn orange when ripe. Inside it is filled with seeds in a bright red pulp. Leaf shape varies considerably.

Distribution: It occurs in many areas of the country but is probably more common in the highlands. It occurs up to at least 2200 m altitude.

Cultivation: It grows wild in highland areas but better types are also sown from seed. It is normally allowed to climb up trees.

Production: Fruiting is somewhat seasonal.

Use: The seeds are eaten cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds								

Insects:
Fruit fly maggots

Diseases:

Pests:

Importance: In Papua New Guinea it is a minor but widely distributed vegetable.

Names

English:
Tok pisin:
Tok ples:
Scientific name: *Trichosanthes tricuspidata* Lour.
Synonyms:
Plant family: Cucurbitaceae

Description: A soft climber. It can grow 5-6 m long.
The flowers are white, The fruit are round or oval.

Distribution:

Cultivation:

Production:

Use: The young leaves are edible.
Caution: The fruit are poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

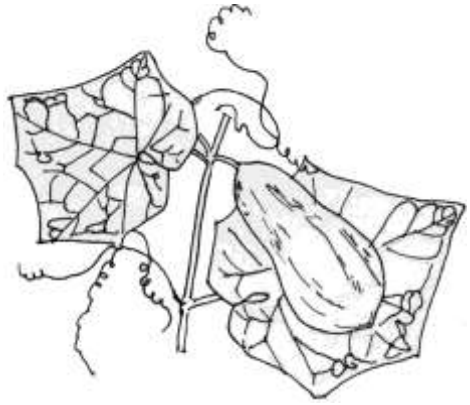
Importance:

Names

English: Choko
Tok pisin:
Tok ples:

Scientific name: *Sechium edule* (Jacquin) Swartz
Synonyms:
Plant family: Cucurbitaceae

Description: A vigorously growing climber in the pumpkin family that can last for several years. The vine can be up to 15 m long. It has strong tendrils which can attach to fences and trees so that the plant can climb well. The choko leaves are about 15-20 cm across and have a rough feel. The fleshy fruits contain only one large seed. The stems have furrows along them. The choko fruit is produced in the angle where the leaf joins the vines. Fruit can be up to 20 cm long and they are rough or irregular shaped on the outside. There are white and green fruited varieties. Some fruit have sharp spikes on the skin. Inside the fruit there is one seed about 4 cm long. The flowers are separate. Male flowers are in clusters and female flowers are on their own. A choko plant produces a large thickened root tuber and the plant can regrow from this tuber and go on growing year after year. Fruit can be green or white and can have soft spines.



Distribution: Choko requires relative humidity of 80-85%, annual rainfall of at least 1500-2000 mm and average temperatures of 20-25°C with limits of 12-28°C. In equatorial tropical regions chokos will grow from sea level to about 2200 m altitude, but do best between 350 and 1000 m altitude. In Nepal they grow to about 2000 m altitude. In the lowlands it is best in shade. Chokos need a reasonably well drained soil. It suits hardiness zones 9-12.

Cultivation: The entire fruit is planted as the seed cannot withstand drying out. It is planted flat and thinly covered with soil. Often chokos start to develop shoots and roots while they are still attached to the original plant. These eventually fall off and continue growing if they fall on soft moist dirt. A spacing 2 m apart along a fence is suitable. Trellis support is required. A well drained fertile soil is needed. Cuttings can be used for planting. Plants do not breed true and a large variability of fruit types can occur.

Production: Fruit can be picked starting 3-5 months after planting and continued for many months. The fruit can be stored for several weeks. Tips can be picked regularly. Annual yields of 75-300 fruit per plant are possible. Fruit can weigh 400 to 500 grams. Tubers of 5 kg weight have been recorded. These are normally produced during the second year of growth and after a time of arrested development such as a dry season.

Use: The fruit are edible cooked.
The young leaf tips are eaten.
The seeds can be eaten cooked.
The fleshy root can be eaten cooked. Starch can be extracted from it.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	93.4	100	0.6		0.2	5	8	0.3
Leaves	91.0	105	4.0		1.4	1515	24	
Root		34	0.2		0.1		4	

Insects:

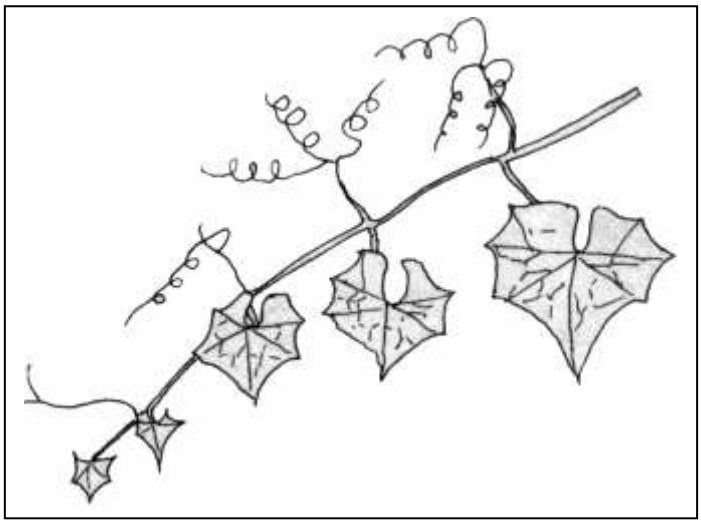
Amblypelta lutescens papuensis Brown	Coreidae (HEM)	Papuan tip wilt bug
Apirocalus terrestris Thompson	Curculionidae (COL)	Horned weevil
Oribius inimicus Mshl.	Curculionidae (COL)	Shot hole weevil

Diseases:

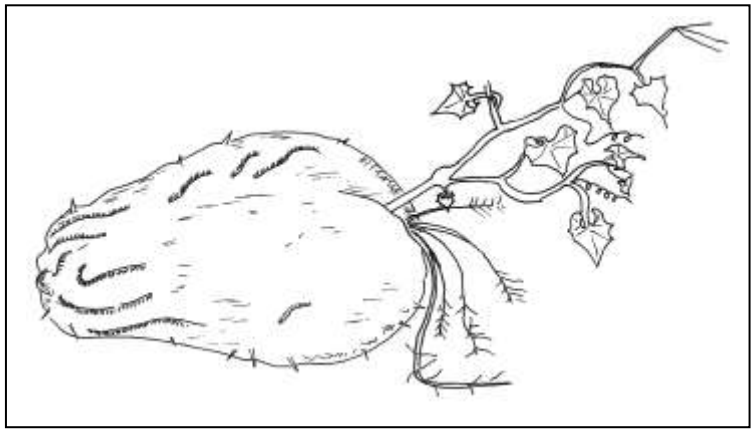
Leaf blotch	cause unknown	
Leaf spot	Fungus	*Ascochyta sp.*
Soft rot	Bacteria	*Erwinia carotovora*

Pests:

Importance: Moderately common throughout the country of Papua New Guinea but most important in mid altitude areas.



Choko tips



Sprouting choko fruit

Names

English: Pumpkin, Winter squash

Scientific name: *Cucurbita moschata* (Duchesne ex Lam) Duchesne ex Poir.

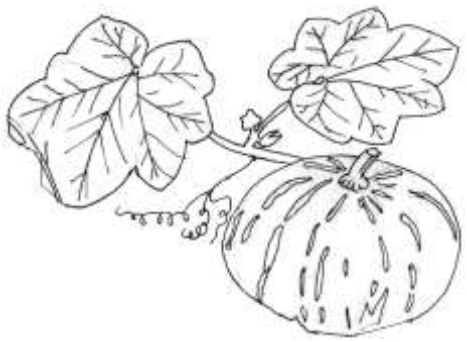
Tok pisin:

Synonyms:

Tok ples:

Plant family: Cucurbitaceae

Description: A creeping plant with long creeping stems and softly hairy but without prickly hairs. The stem are rounded or 5 angled and moderately hard. They can grow 15-20 m long. The leaves are large and shallowly lobed and divided like fingers on a hand. Occasionally the leaves have white blotches. They have rounded lobes. They are 20 cm by 30 cm. The leaf stalk is 12-30 cm long. The flowers have male and female flowers separately on the same plant. The fruit stalk is distinctly expanded there it joins the fruit. The fruit are not hard shelled and are dull in colour. The flesh is yellow. Often the flesh has fibres through it. The seeds are plump and white to brown. They separate easily from the pulp of the fruit. The edge of the seed is scalloped and irregular in outline.



Distribution: It suits the wet tropics. It will thrive in humid as well as in very hot climates. In Bolivia it grows up to 2000 m altitude. It suits hardiness zones 8-11.

Cultivation: Plants are grown from seed.

Production:

Use: The fruit are eaten cooked.
The young leaves are edible.
The seeds are eaten roasted.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	90.0	151	1.0		0.8	210	15	0.1
Leaves	93.6	88.2	3.0		2.1		10	
Seeds								

Insects:

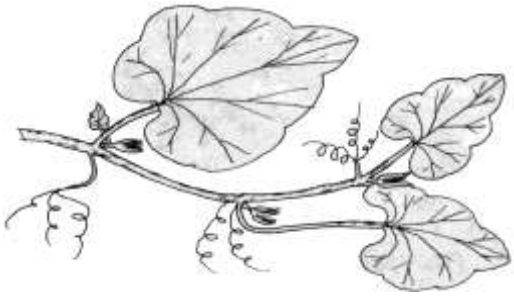
Diseases:

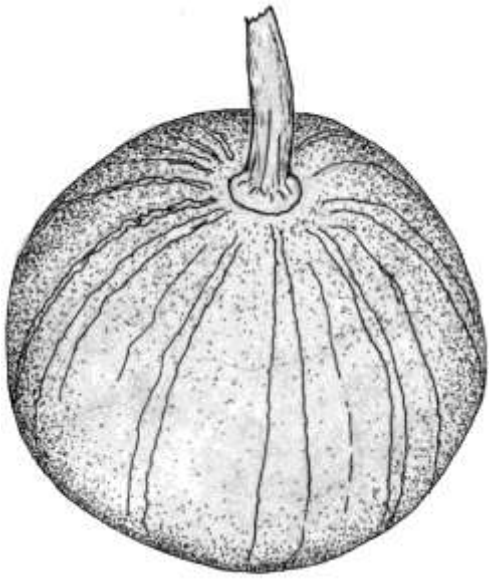
Pests:

Importance: This is the more tropical of the pumpkins. In Papua New Guinea it is used more for leafy tips than fruit.

Names

English: Pumpkin, Winter squash
Tok pisin:
Tok ples:
Scientific name: *Cucurbita maxima* Duch ex Lam.
Synonyms:
Plant family: Cucurbitaceae





Description: A creeping vine with tendrils. It is an annual plant. The stems are soft and round in cross section. The leaves are large and hang loose. They are dark green and kidney shaped. The edges of the leaves are entire. There are large nodes at the base of the leaf. The tendrils are fairly stout and are divided half way along their length into many branches. Male flowers are carried on long upright stalks. The 5 petals are united into a long yellow tube. The female flowers are larger than the male and are fewer in number and carried on shorter stalks. The fruit varies in size, colour and patterns on the skin. They can be round, oval or flattened, with yellow, orange or green skin. The surface can be smooth and rough and warty. The flesh is yellow and edible. The seeds are in the centre. The seeds are white or brown. They are flattened but plump and have a slanting scar at the top. The seeds are edible. (C. moschata does not have hairy stems but has fruit with a stalk thickened near where it joins the fruit.)

Distribution: They are grown throughout the country from sea level to 2400 m altitude. They need a fertile soil. C. moschata is better suited to coastal areas. They are frost sensitive but better suited to cooler areas than C. moschata. It suits hardiness zones 8-11.

Cultivation: They are grown from seed. Usually 2 or 3 seeds are planted together in a mound. The distance apart depends on the cultivar. Some kinds are better for leaf tips. It is good to save seed of adapted kinds.

Production: Fruit are ready for harvest after about 3-4 months. Seed can be saved from fruit for re-sowing but as pumpkins cross pollinate different types become mixed.

Use: The young leaf tips are eaten cooked.
The fruit can be eaten cooked.
The seeds are edible, roasted.
The male flowers are eaten after removing the stamen and calyx.

Food Value: Per 100 g edible portion per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	89.0	113	4.0		0.8	247	80	0.2
Flowers	88.7	107	1.4		0.8	173	14	0.1
Seeds dry	6.9	2264	24.5		14.9	38	1.9	7.5
Fruit								

Insects:

Aphis gossypii Glover	Aphididae (HEM)	Cotton aphid
Aulacophora spp.	Chrysomelidae (COL)	Pumpkin beetles

Bactrocera strigifinis atritus May	Tephritidae (DIPT)	Fruit fly
Henosepilachna signatipennis (Boisd.)	Coccinellidae (COL)	Ladybird
Leptoglossus australis (Fabricius)	Coreidae (HEM)	Passion vine bug
Leptothea csikii Weise	Coccinellidae (COL)	Cotton aphid

Diseases:

Storage rot	Fungus	*Colletotrichum orbiculare*
Sooty mould	Fungus	*Epicoccum sp.*
Powdery mildew	Fungus	*Erysiphe cichoracearum*
Downy mildew	Fungus	*Pseudoperonospora cubensis*
With storage rot	Fungus	*Rhizoctonia sp.*
Mosaic	Virus	Melon mosaic virus

Pests:

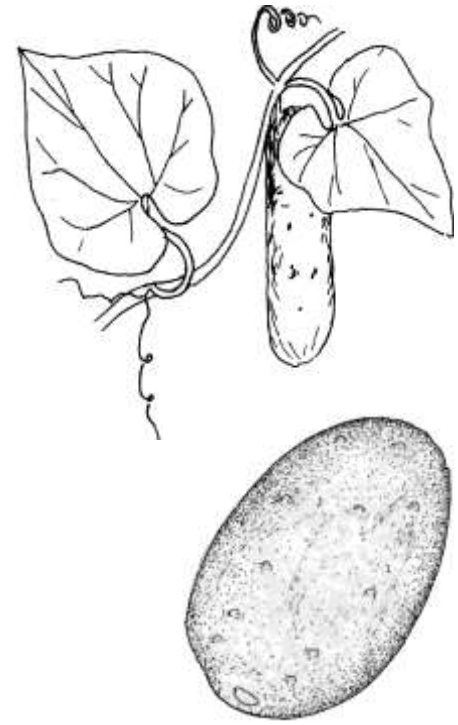
Importance: In Papua New Guinea, a widely distributed and popular vegetable especially for leaf tips.

Names

English: Cucumber
Tok pisin: Kukamba
Tok ples:

Scientific name: *Cucumis sativus* L.
Synonyms:
Plant family: Cucurbitaceae

Description: A hairy annual climber with tendrils and yellow flowers. It grows to 0.5 m high and spreads to 2 m wide. The stem is trailing and has bristles. The leaves are heart shaped and the lobes taper. Leaf shape varies with different varieties. The tendrils are not branched. The flowers are yellow and funnel shaped. They occur in clusters in the axils of leaves. Male and female flowers are separate but on the same plant. Male flowers are normally in groups of 2-3 and develop first and female flowers are borne singly and open later. Fruit are long and often with a slightly lumpy skin. The flesh inside is greenish white. The fruit are edible. The fruit contain many seeds. Fruit 20-100 cm long are called cucumbers and fruit which are much smaller and darker green are called gherkins.



Distribution: It occurs from sea level up to at least 2200 m in the tropics. It is a traditional vegetable in the highlands of Papua New Guinea. Protection from wind is needed. It is killed by frost. In Nepal they grow to 1600 m altitude. It suits hardiness zones 9-11.

Cultivation: Batches of 2-3 seeds are normally sown together during the dry season and in new gardens. A spacing of 1 m apart per plant is suitable.

Production: Harvesting can commence 6-8 weeks after sowing. Up to 10 fruit per plant can be produced.

Use: Usually unripe fruit are eaten raw.
Young stem tops and leaves are edible.
The kernels of the seeds are edible.
Cucumbers are normally eaten fresh while gherkins are pickled in vinegar.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	96.4	43	0.6		0.3	Tr	8	0.1
Leaves								
Seeds								

Insects:

Aphis gossypii Glover	Aphididae (HEM)	Cotton aphid
Aulacophora spp.	Chrysomelidae (COL)	Pumpkin beetles
Bactrocera atrisetosus Perkins	Tephritidae (DIPT)	Fruit flies
Bactrocera cucurbitae Coq	Tephritidae (DIPT)	Melon fruit fly
Homona coffearia Nietn.	Tortricidae (LEP)	Coffee leaf roller
Leptoglossus australis (Fab.)	Coreidae (HEM)	Passion vine bug
Monolepta semiviolacea Fab	Chrysomelidae (COL)	

Diseases:

Leaf spot	Fungus	*Alternaria alternata*
Leaf spot	Fungus	*Corynespora cassiicola*
With fruit rot	Fungus	*Choanephora cucurbitarum*
Powdery mildew	Fungus	*Oidium sp.*
Downy mildew	Fungus	*Pseudoperonospora cubensis*
Leaf spot	Fungus	*Phyllosticta sp.*
Damping off	Fungi	*Pythium butleri*
	And	*Pythium deliense*
Fruit rot	Bacteria	*Erwinia carotovora*
Storage rot	Fungus	*Colletotrichum sp.*
	And	*Fusarium sp.*
	And	*Phoma exigua*
	And	*Pythium sp.*

Pests:

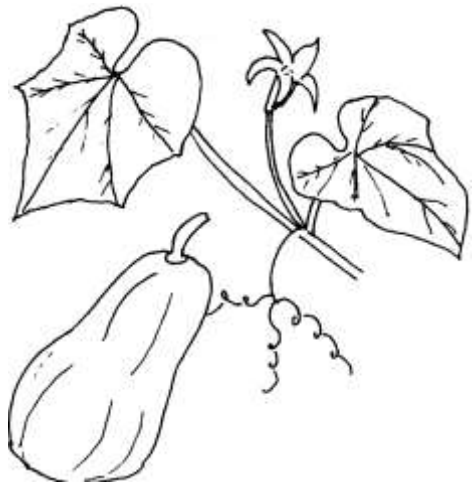
Importance: A common and well liked vegetable throughout Papua New Guinea.

Names

English: Marrow, Pumpkin
Tok pisin:
Tok ples:

Scientific name: *Cucurbita pepo* L.
Synonyms:
Plant family: Cucurbitaceae

Description: A bristly hairy annual vine in the pumpkin family. It has branched tendrils. The stems are angular and prickly. The leaves are roughly triangular. The leaves have 5 lobes which are pointed at the end and are toothed around the edge. Male and female plants are separate on the same plant. Male flowers are carried on long grooved flower stalks. Female flowers are borne on shorter more angular stalks. The fruit stalks have furrows along them but are not fattened near the stalk. The fruit vary in shape, size and colour. Often they are oval and yellow and 20 cm long by 15 cm wide. The seeds are smaller than pumpkin and easy to separate from the tissue. The scar at their tip is rounded or horizontal, not oblique.



Distribution: They are more suited to drier areas. They are frost sensitive. It suits hardiness zones 8-11.

Cultivation: They are grown from seeds. The seeds germinate after one week. They can be grown from cuttings. They are best planted on mounds. A spacing of 2-3 m between plants is needed. Hand pollination assists fruit setting. Plants can also be grown from cuttings as plants root at the nodes.

Production: The first usable immature fruit are ready 7-8 weeks after planting.

Use: The young fruit are cooked and eaten.
The young leaves and the ripe seeds can also be eaten.
The seeds are dried, salted and toasted and eaten as a snack food.
The seeds can also be pressed to produce oil.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	91.3	102	1.1		0.8		12	0.2
Leaves	89.0	113	4.0		0.8	3600	80	
Seeds								

Insects:
Probably similar to pumpkin

Diseases:
Probably similar to pumpkin

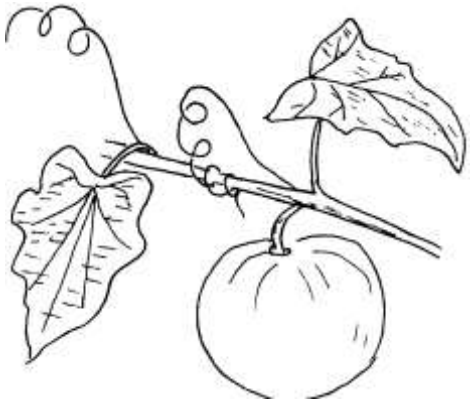
Pests:

Importance: Not widely distributed in Papua New Guinea. Not as common as pumpkins.

Names

English: Melon, Canteloupe,
Tok pisin:
Tok ples:

Scientific name: *Cucumis melo* L.
Synonyms:
Plant family: Cucurbitaceae



Description: An annual climber with tendrils. It grows to 0.5 m high and spreads to 1.5 m across. The stems are soft and hairy and often angled. The leaves have lobes and often a wavy or toothed edge. They are on long leaf stalks. The leaves are often hairy underneath. The tendrils are not branched. The flowers are yellow and funnel shaped with expanded lobes. The male flowers occur in clusters and are produced before the female flowers. The fruit is round, mostly with a rough or streaky skin. It is green or yellow inside. The fruit is edible. Different kinds of melons occur. Some have a hard warty scaly skin. Others have a network of fine ridges over the surface.

Distribution: It is not suited to places with high rainfall. They suit hot dry places with a fertile well drained soil. It needs a sheltered sunny position. It is drought and frost tender. A temperature range of 24-28°C is best but much higher temperatures is tolerated. Mostly they are grown below 500 m altitude in the tropics. A pH of 6-6.7 is best. Acid soils are not suitable. It suits hardiness zones 9-12.

Cultivation: They are grown from seed. The seeds are planted about 1-4 cm deep. Plants need to be 1-2 m apart. Seedlings can be transplanted when about 10-15 cm high.

Production: Plants are ready 3-4 months after planting. Yields of 20 kg per10 sq m is average.

Use: The ripe fruit are eaten raw.
The seeds are sometimes eaten.
Sometimes the immature fruit are cooked as a vegetable.
The seeds contain an edible light oil.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	93.0	109	0.5		0.4	300	30	0.2
Leaves	85.0	172	4.2					
Seeds								

Insects:

Leptoglossus australis (Fabricius)	Coreidae (HEM)	Black leaf footed bug

Diseases:

Powdery mildew	Fungus	*Oidium sp.*
Downy mildew	Fungus	*Pseudoperonospora cubensis* (Berk. & Curt.) Rostow
Black rot	Fungus	*Mycosphaerella melonis*

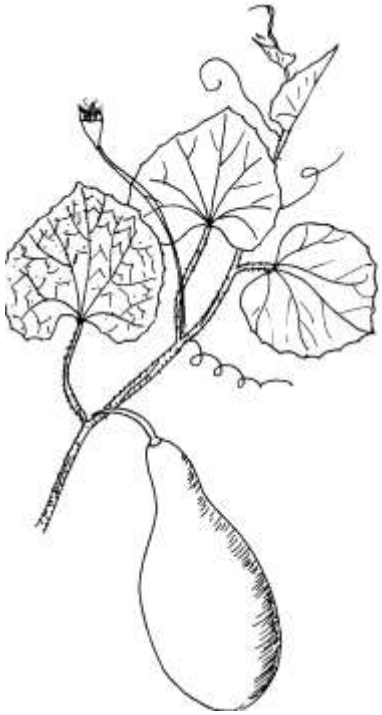
Pests:

Importance: Only occasionally seen in Papua New Guinea. They are common in Africa both wild and cultivated.

Names

English: Bottle gourd
Scientific name: *Lagenaria siceraria* (Molina) Standley
Tok pisin:
Synonyms:
Tok ples:
Plant family: Cucurbitaceae

Description: A pumpkin family plant. It is an annual vine with large leaves. It can grow 3-9 m long and spread 3-6 m wide. The thick stems have furrows along them. It can climb over logs by attaching the tendrils which grow out of the stem near the leaf. The leaves are large and have soft hairs especially underneath. Flowers of both sexes are borne in the same plant. The plant produces male flowers first and these are on long stalks. Next it produces female flowers on short stalks. Flowers are large and white. They can be 10 cm across. They are mainly pollinated by insects. Fruit vary in shape. The fruit can be 8-90 cm long. They have brown seeds in a whitish green pulp.



Distribution: It grows from sea level up to 2700 m altitude in the tropics. It grows best in a warm humid climate. It is sensitive to frost. It prefers full sunlight. In Nepal it grows to about 2200 m altitude. It suits hardiness zones 10-12.

Cultivation: To achieve fast and uniform emergence, seed should be soaked overnight. Seeds are best sown in raised beds. Seedlings emerge in 5-7 days. Seedlings can be transplanted is required. Because plants cross pollinate, plant and fruit types vary. Removing the young fruit to use as a vegetable will prolong the life of the plant. Large fruit can be obtained by removing some of the small fruit. A spacing of 1- 2 m is suitable. It prefers a trellis to climb. Because it is shallow rooted weeding needs to be done carefully.

Production: It is fast growing and flowers 2 months after seeding.

Use: The young fruit are boiled as a vegetable. The skin and seeds are removed.
Young tips and leaves are edible.
(Old fruit are used as containers, and seeds are not normally edible.)
The seeds are sometimes eaten. They yield an edible oil.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	93.0	88	0.5		2.4	25	10	
Leaves	83.0	180	4.4		7.4			
Seeds								

Insects:

Diseases:

Powdery mildew	Fungus	
Anthracnose	Fungus	*Colletotrichum orbiculare*

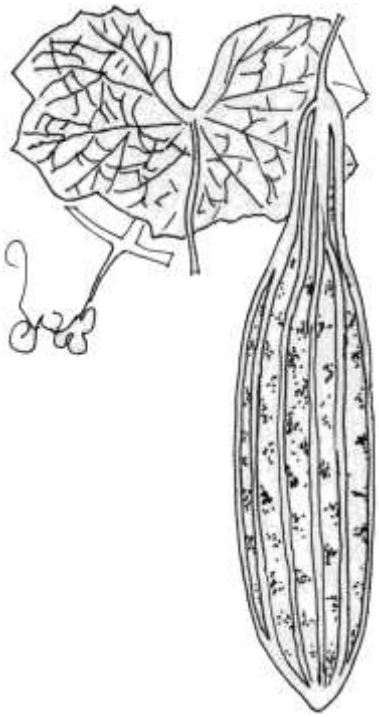
Pests:

Importance: In Papua New Guinea, it occurs occasionally in many areas for containers. As a vegetable it is only important in some areas eg Mendi.

Names

English: Angled loofah
Tok pisin:
Tok ples:

Scientific name: *Luffa acutangula* (L.)Roxburgh
Synonyms: *Cucumis acutangula* L.;
Plant family: Cucurbitaceae



Description: An annual climber with square stems. They have 4 to 7 branched tendrils which attach to objects helping the plant to have a climbing habit. Leaves are pale green, hairy and shallowly five lobed. The leaves have a bad smell when rubbed. Male and female flowers are separate. Male flowers are in clusters, female flowers singly. (Ratio 43:1) Flowers open late in the afternoon and stay open during the night. The flowers are yellow. Fruit can be up to 40 cm long and with 10 long ridges. It is green-brown outside and white inside.

Distribution: It grows from sea level to 500 m altitude in the hot humid tropics. It won't tolerate excessive rainfall so does best in drier areas or in the dry season in wetter areas. Day temperatures above 25 °C are suitable. Some varieties require short day length. Adding additional nitrogen fertiliser can stimulate female flower formation in short day varieties. In Nepal it grows between 1000-1600 m altitude.

Cultivation: Seeds are sown direct at 40 x 80 cm spacing and need stakes to climb. Because seeds can have a hard coating soaking seed in water for 24 hours before planting can assist. 5 kg of seed per hectare are required. The plant benefits from full sunlight. Good soil fertility is beneficial. The soil needs to be well drained and adequate organic matter helps. Pinching out the growing tips when plants are 1.5 to 2 metres long can promote fruit development. Hand pollination once female flowers develop helps fruit set. This is best done in the evening.

Production: Immature fruit are ready 6 - 10 weeks after planting. On maturity the fruit become bitter and inedible. Fruit do not store well so are harvested when they are to be used.

Use: The immature fruit are cooked and eaten as a vegetable. The ridges are removed with a vegetable peeler.
The leaves are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Leaves								

Insects:

Diseases:

Downy mildew	Fungus	*Pseudoperonospora cubensis* (Berk.& Curt.)Rostov.
Leaf spot	Fungus	*Cercospora citrullina* Cooke

Pests:

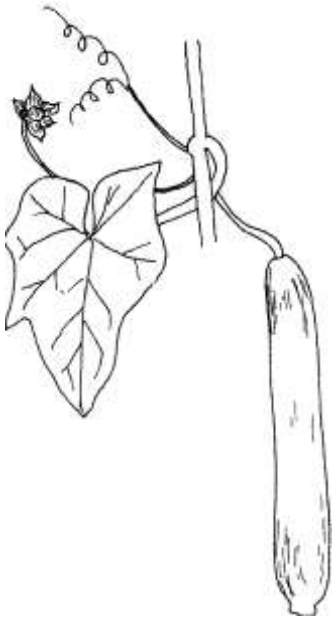
Importance: In Papua New Guinea it is a vegetable of minor importance in some coastal areas.

Names

English: Smooth loofah
Tok pisin:
Tok ples:

Scientific name: *Luffa cylindrica* (L.) M.Roemer
Synonyms: *Luffa aegyptiaca* Miller
Plant family: Cucurbitaceae

Description: An annual climber up to 10 m long. The stem is five angled and slightly hairy. The tendrils have 2 or 3 branches. Leaves are 10-20 cm across with five to seven lobes. Male and female flowers are separate and yellow. The male flowers occur as 4 to 20 flowers together while female flowers are solitary in the leaf axils. Flowers open in the early morning. The fruit is fairly smooth and cylindrical and can be 30 - 60 cm long. The seeds are black, flat and smooth and 10-15 mm long.



Distribution: It grows well in the tropical lowlands but will also grow in more temperate places. It is better suited to the drier season as too heavy a rainfall during flowering and fruiting is harmful. Soils should be well drained and moderately rich. It suits hardiness zones 9-12.

Cultivation: Plants are grown from seed. Seed are collected from ripe fruit. Seed are sown 4-5 cm deep and plants are put 1 metre apart. They can be sown in seed boxes and transplanted when 15 cm high. It is best to have a trellis for the plant to climb on or be left to climb over trees. They are often pollinated by insects but can be hand pollinated in the early morning.

Production: Fruit are harvested for sponges when fully mature. Young fruit are ready 2-3 months after planting while fruit mature 4-5 months after planting. For eating, young fruit are used.

Use: The young fruit are eaten as a vegetable. They are skinned and have the centre removed. The seeds yield an edible oil after extraction.
The young leaves and flowers are edible. They are blanched by covering to make them white.
Caution: Older fruit are bitter and fibrous and contain poisonous substances.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Leaves								
Flowers								

Insects:

Diseases:

Downy mildew	Fungus	*Pseudoperonospora cubensis* (Berk.& Curt.) Rostov.
Leaf spot	Fungus	*Cercospora citrullina* Cooke

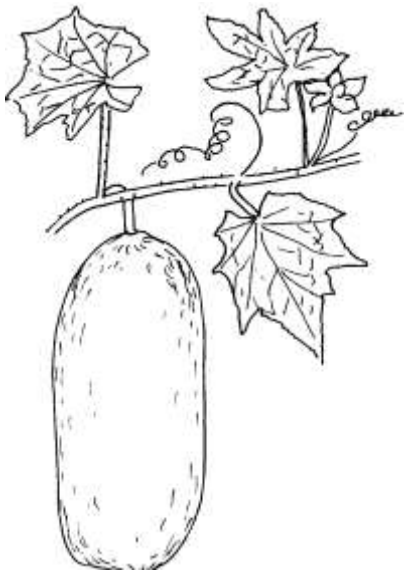
Pests:

Importance: In Papua New Guinea a minor vegetable seen in several coastal areas.

Names

English: Wax gourd
Tok pisin:
Tok ples:

Scientific name: *Benincasa hispida* (Thunb.) Cogn.
Synonyms:
Plant family: Cucurbitaceae



Description: A long vined (3 m), climbing, pumpkin family plant. The plant re-grows from seed each year. The vines are thick, furrowed and hairy. The leaves are heart shaped with 5 to 7 lobes. They are rough to touch. Flowers are yellow. The immature fruit can have skin of various colours depending on variety. The fruit is up to 30 cm long and 20 cm across and green with a waxy covering when mature. This waxy layer enables the fruit to be stored for a long time. Fruit shape and size can vary with variety. The flesh is firm and white. The fruit are heavy - up to 8-45 kg

Distribution: It is suited to warm, lowland, tropical conditions. It does better in dry areas or drier seasons. They are reasonably drought tolerant. The best temperature for growing is 23-28°C. They need a well-drained soil. They do best with a pH of 6.5. It grows in Nepal up to 1400 m altitude.

Cultivation: It is grown from seeds. There are about 1800 seeds in a kg. Seed are sown 3-5 cm deep with a spacing of 60-80 cm between plants. If plants are going to be allowed to trail over the ground a spacing of about 3 m is necessary. Seed can be sown in nurseries and transplanted when 15-20 cm tall. They are usually planted in mounds and allowed to grow over a strong trellis. They can be allowed to stay on the ground. Decayed manure or compost is used where available. Plants are responsive to sulphate of ammonia. Flowering normally starts 60-80 days after planting. Flowers are open in the early morning. Hand pollination may assist fruit development. This becomes more important in colder areas. Thinning of fruit gives larger fruit. The growing tips of plants can be pruned out to encourage branching or to restrict growth.

Production: Fruit are ready 3-5 months after planting. The fruit keeps well when fully mature. They can be stored for 6 months at 13-15°C in a dry atmosphere. The pulp of wax gourds can be shredded and dried for later use.

Use: The white flesh is added to stir fried dishes.
The seeds are fried and eaten.
Young leaves and flower buds can be eaten.
The young fruit are used as a vegetable. The mature fruit are peeled, cut in pieces and candied.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	96.6	54	0.4		0.4	0	10.5	0.6
Seeds								
Flowers								
Leaves								

Insects: **Pests**:
Diseases:

Leaf spot	Fungus	*Cercospora citrullina* Cooke

Importance: These gourds are grown in most places where Chinese have moved and where the climate is warm enough. They are mainly grown near coastal towns in Papua New Guinea for sale to Chinese. They sell for a high price.

Names

English: Bitter cucumber
Tok pisin:
Tok ples:

Scientific name: *Momordica charantia* L.
Synonyms: *Momordica chinensis* Spreng.
Plant family: Cucurbitaceae



Description: A slender annual climber with flowers of both sexes on the one plant. It has simple tendrils and vines can be 4 m long. It has bright green lobed leaves. The leaves are 5 to 12 cm long on thin leaf stalks 3-10 cm long. The flowers have 5 petals, are small, yellow and with a sweet smell. Fruit are green when young and orange when ripe. The fruit have a lumpy appearance, with ridges along its length and when fully ripe burst open. It has bright red covering on the seeds inside. The seeds are 10-16 mm long and 7 to 10 mm wide and pale brown. Considerable variation in the fruit occurs between varieties.

Distribution: A tropical plant. It grows from sea level up to about 500 m and will probably grow to 1000 m altitude in tropical regions. They require a well drained soil preferably rich in organic matter. Seeds do not germinate below 15°C. Plants grow best with temperatures between 18°C and 35°C. In Nepal it grows to about 2100 m altitude. A soil pH of 6.5 is best. It suits hardiness zones 9-12.

Cultivation: For large scale plantings, 6-7 kg of seed are required for planting one hectare. Seeds are planted at 50 cm spacing in the place where the plants are to grow and need a stick to climb up. The seeds are put at 2 cm depth. Often plants are grown on raised beds 2 m apart with 0.5 m between plants. The seed has a hard seed coat and germinates slowly. Soaking seeds for 24 hours before sowing gives a quicker more even germination. Regular watering is required.

Production: Fruit are ready to harvest 45-55 days after planting. Fruit should be harvested when young and tender. Once fruit have begun to change colour to yellow they are past maturity for eating. Early removal of young fruit also ensures continuous fruit setting. This can allow 6-8 successive pickings of fruit. Fruit on the plant are sometimes wrapped in paper to prevent fruit fly damage. Seed well stored can remain viable for 4-5 years. The young bitter fruit are cooked and eaten. The fruit is blanched or soaked in salt water to reduce the bitter taste.

Use: The young bitter fruit are cooked and eaten.
The seed mass of the ripe fruit is used as a food flavouring.
The leaves are also cooked and eaten as a flavouring.
The tender shoots and leaves are sometimes eaten.
Caution: The leaves are considered to cause diarrhoea and vomiting.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	94.0	79	0.8		0.4	11	33	0.8
Leaves	88.7	146	3.6		1.0	173	57	0.3

Insects:

Leptoglossus australis (Fabricius)	Coreidae (HEM)	Black leaf-footed bug

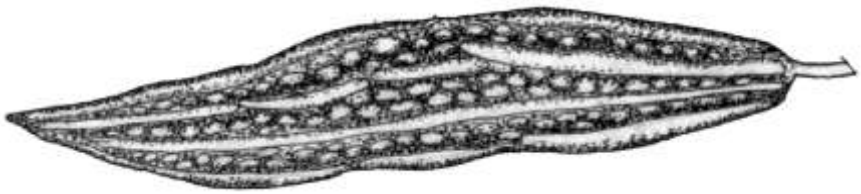
Megymenum sp.	Dinidoridae (HEM)	
Tiracola plagiata (Walker)	Noctuidae (LEP)	Cacao armyworm

Diseases:

Leaf spot	Fungus	*Cercospora citrullina* Cooke
Downy mildew	Fungus	*Pseudoperonospora cubensis* (Berk. & Curt.) Rostow
Powdery mildew	Fungus	*Oidium sp.*

Pests:

Importance: In Papua New Guinea only of minor importance and used by Asians.



Names

English: Spiny bitter cucumber **Scientific name:** *Momordica cochinchinensis* (Lour.) Spreng.
Tok pisin: **Synonyms:**
Tok ples: **Plant family:** Cucurbitaceae

Description: A coarse vine up to 15 m long. It keeps growing from year to year. It climbs by means of tendrils. It is slightly hairy. The leaves are 8 to 18 cm long, and 8-20 cm across and deeply 3 lobed and the base is heart shaped. Leaves are bright green. The leaf stalks are 2-10 cm long. Male and female flowers are separate on the same plant. Male flowers are 3.5 cm across on stalks 5-30 cm long. The petals are pale yellow. The female flowers are smaller. The fruit are egg shaped, yellow and roughened with small bumps scattered over it. They are edible.

Distribution: It suits tropical places. It occurs in the Philippines and other areas of SE Asia.

Cultivation: Plants can be grown from seed or cuttings of firm young growth.

Production:

Use: The young leafy shoots and fruit are eaten cooked.
The fruit are cooked and eaten as a vegetable.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Fruit								

Insects:

Diseases:

Pests:

Importance: Fruit are sold in markets in Asian countries. It is probably rarely used in Papua New Guinea.

Names

English: Cabbage
Tok pisin:
Tok ples:

Scientific name: *Brassica oleracea* var. *capitata* L.
Synonyms: *Brassica capitata* (L.) H. Léveillé
Plant family: Brassicaceae

Description: A herb. It is a short leafy plant with a thick stalk. In cold areas it forms a thick tightly packed ball of leaves called a "head". If the plant is left growing in the ground it will later produce a flower stalk. The flowers are yellow.



Distribution: It does best at higher altitudes in the tropics where there is a greater difference between day and night temperatures. It is mostly above 1000 m. They are frost resistant. It suits hardiness zones 8-11.

Cultivation: Plants are normally first grown from seeds. But in many places in Papua New Guinea they are re-grown from cuttings or sprouts that develop on the cut stalk.

Production: Cabbages take 5-7 months to be ready for harvest.

Use: The leaves can be eaten raw or cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	93.6	92	1.0		0.2	132 IU	20	0.1

Insects:

Agrotis ipsilon (Hufn.)	Noctuidae (LEP)	Black cutworm
Chrysodeixis eriosoma Doubleday	Noctuidae (LEP)	Vegetable looper
Colgar tricolor Dist.	Flatidae (HOM)	
Crocidolomia binotalis Zell.	Pyralidae (LEP)	Cabbage cluster caterpillar
Euricania discigutta (Walk.)	Ricaniidae (HEM)	Plant hopper
Papuana spp.	Scarabaeidae (COL)	Taro beetles
Phaneroptera brevis Serv.	Tettigoniidae (ORTH)	
Plutella xylostella (L.)	Plutellidae (LEP)	Diamond backed moth
Spodoptera litura (F.)	Noctuidae (LEP)	Cluster caterpillar
Valanga sp.	Acrididae (ORTH)	

Diseases:

Black leaf spot	Fungus	*Alternaria brassicicola*
Leaf spot	Fungus	*Colletotrichum sp.*
Ring spot	Fungus	*Mycosphaerella brassicicola*
Downy mildew	Fungus	*Peronospora parasitica*
Black rot	Bacteria	*Xanthomonas campestris* (Pamm)Dowson
Soft rot	Bacteria	*Erwinia carotovora* subsp. *carotovora*
Collar rot	Fungus	*Thanatephorus cucumeris*
Damping off	Fungus	*Pythium sp.*
	And	*Rhizoctonia sp.*

Pests:

Importance: Cabbages are very common and popular in high altitudes areas of Papua New Guinea.

Names

English: Bok-choy Celery cabbage

Tok pisin:

Tok ples: Taatsai

Scientific name: *Brassica rapa* var. *chinensis* (L.) Kitamura

Synonyms: *Brassica chinensis* Linnaeus

Plant family: Brassicaceae



Description: A leafy cabbage grown as an annual. It grows 40-60 cm high. The taproot is not fleshy. The stem is short. The leaves are arranged in spirals. They are simple and broadly oval. They can be 30 cm long by 10 cm wide. The leaves form a rosette. They do not form a head. The leaf stalk is thickened. It forms a half cylinder in cross section and does not have wings. The leaf blade is entire and can have a wavy edge. Flowers are small and yellow with 4 petals. The fruit is a pod 3.5 cm long. The seeds are black and 2 mm long. Several different kinds occur.

Distribution: More common in lowland areas but will grow in the highlands. It suits cool seasons but will not tolerate frost.

Cultivation: Plants are grown from seed and often transplanted. A spacing of 40 cm x 40 cm is suitable. Seeds are sown direct. They are sown 1 cm deep. They germinate in about 7 days with soil temperature of 21°C. Plants are thinned to about 20 cm between plants.

Production: The whole plant is harvested after 2-3 months.

Use: The leaves are cooked and eaten.
The stems are cooked and served with oyster sauce.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Stems								

Insects:

Diseases:

Pests:

Importance: They are common and popular in lowland areas of Papua New Guinea.

Names

English: Brussels sprouts

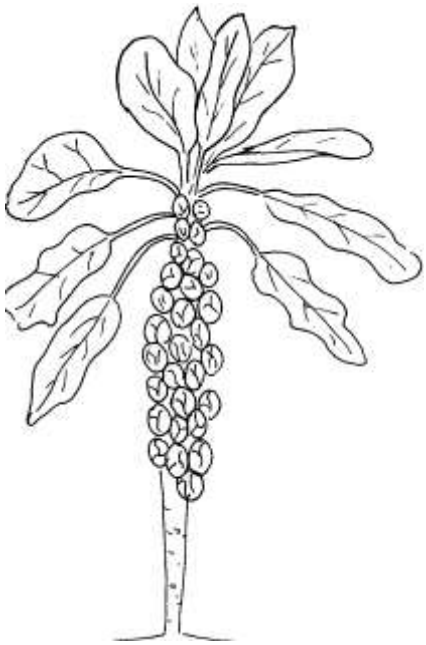
Scientific name: *Brassica oleracea* var. *gemmifera* L.; Zenker

Tok pisin:

Synonyms:

Tok ples:

Plant family: Brassicaceae



Description: A cabbage family plant with small sprouts of compact leaves up the stem. It grows up to about 1 m high. The leaves are stalked and the edges are wavy. They are slightly lobed. The flowers are yellowish.

Distribution: It suits the highlands in the tropics. Normally it needs to be above 800 m and in places with cool nights. It grows in the highlands up to 2600 m. It is frost tolerant. It suits hardiness zones 8-11.

Cultivation: It is normally grown from imported seed. Seedlings are transplanted after 5 or 6 weeks. The spacing needs to be about 60 cm x 60 cm.

Production: The sprouts can be harvested about 4 months after transplanting.

Use: The sprouts are cooked and eaten.
The leafy tops can also be eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Sprouts	91.5	175	2.8		1.2	72	40	0.4
Leaves								

Insects:

Acleris sp.	Tortricidae (LEP)	
Atractomorpha crenaticeps Blanch	Acrididae (ORTH)	
Crocidolomia binotalis Zeller	Pyralidae (LEP)	Cabbage cluster caterpillar
Oribius inimicus Mshl.	Curculionidae (COL)	Shot hole weevil
Phaneroptera brevis Serv.	Tettigoniidae (ORTH)	Long horned grasshopper
Phytometra orichalcaea (F.)	Noctuidae (LEP)	Semi looper
Plutella xylostella L.	Plutellidae (LEP)	Diamond backed moth

Diseases:

Black leaf spot	Fungus	*Alternaria brassicicola* (Schw.) Wilt.
Black rot	Bacteria	*Xanthomonas campestris* (Pamm.) Dows.

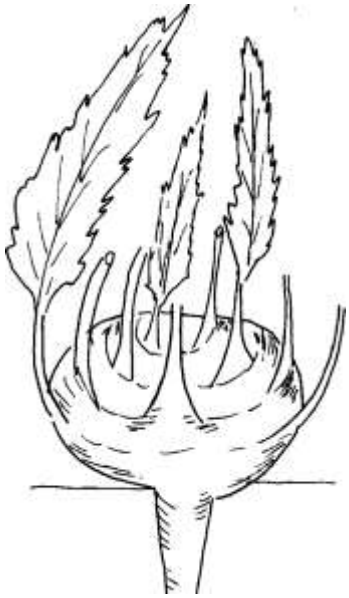
Pests:

Importance: In Papua New Guinea, mainly only grown by a few people for sale to Europeans.

Names

English: Kohl rabi
Tok pisin:
Tok ples:

Scientific name: *Brassica oleracea* var. *gongylodes* L.
Synonyms:
Plant family: Brassicaceae



Description: A cabbage family plant with a swollen bulb above the ground. This can be green or purple. It is round with a tapering root. Leaves come off around the side of this bulb. They have stalks. The edges of the leaves are wavy. The flowers are yellow.

Distribution: It does best in the highlands in the tropics but is reasonably tolerant of heat and drought. It can be grown from sea level to 2600 m altitude. It is frost tolerant. It suits hardiness zones 8-11.

Cultivation: They are grown from imported seed. The seed can be sown direct or in a nursery and transplanted.

Production:

Use: The bulb is mostly cooked and eaten. It can be added to soups. It can be lightly simmered in coconut milk with spices.
It can be eaten raw.
The leaves are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Bulb	91.6	99	1.9		0.9	4	63	0.3
Leaves	90.0	113	1.7		0.4	2000	62	

Insects:

Chrysodeixus eriosoma Doubleday	Noctuidae (LEP)	Green looper
Crocidolomia binotalis Zeller	Pyralidae (LEP)	Cabbage cluster caterpillar
Spodoptera exempta (Walker)	Noctuidae (LEP)	African armyworm

Diseases:

Pests:

Importance: In Papua New Guinea it is not commonly grown and is mainly by or for sale to Europeans.

Names

English: Cauliflower
Tok pisin:
Tok ples:

Scientific name: *Brassica oleracea* var. *botrytis* L.
Synonyms:
Plant family: Brassicaceae



Description: A herb. It is a cabbage family plant which develops a thick white edible flower in the centre. It has broad leaves around a thick stalk. The leaves clasp the stem. The leaves are oval and fleshy. The flowers are yellow.

Distribution: It mostly grows in the highlands in the tropics but has been grown from sea level to 2600 m altitude. It is frost resistant. In Nepal it grows up to 1800 m altitude. It suits hardiness zones 8-11.

Cultivation: They are normally grown from seeds and transplanted. Because plants cross pollinate and seed production requires low temperatures seed collecting is neither easy nor very successful.

Production:

Use: The thick white flower is cooked and eaten.
The leaves are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Flower	90.7	96	3.0		0.3	2	44.3	0.2
Leaves								

Insects:

Plutella xylostella L.	Plutellidae (LEP)	Diamond back moth

and probably others similar to cabbage.

Diseases:

Black leaf spot	Fungus	*Alternaria brassicicola* (Schw.)Wilt.
Leaf spot	Fungus	*Mycosphaerella brassicicola*
Black rot	Bacteria	*Xanthomonas campestris* (Pamm.) Dows.

Pests:

Importance: In Papua New Guinea, mainly only grown by a few people for sale to Europeans.

Names

English: Broccoli
Tok pisin:
Tok ples:

Scientific name: *Brassica oleracea* var. *italica* Plenck.
Synonyms:
Plant family: Brassicaceae



Description: A cabbage family plant. It has a thickened green or blue flower at the centre. The flower is often in several small heads. They are surrounded by broad leaves attached to a thick stalk. Calabrese is a variety with tightly packed green or purple heads.

Distribution: It is mostly grown in the highlands in the tropics. It is frost resistant. It suits hardiness zones 8-11.

Cultivation: It is normally grown from imported seed. The seeds are planted in a nursery then transplanted. A spacing of 60 cm x 60 cm is suitable.

Production: Plants are ready for harvest about 3 months after transplanting.

Use: The central flower is cooked and eaten.
The leaves are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Flower	89.9	78	3.1		1.0	2500	34	0.4
Leaves	90.7	117	3.0		0.9	1600	93.2	0.4

Insects:

Crocidolomia binotalis Zeller	Pyralidae (LEP)	Cabbage cluster caterpillar
Plutella xylostella (L.)	Plutellidae (LEP)	Diamond back moth

Diseases:

Grey leaf spot	Fungus	*Alternaria brassicae*
		Botrytis sp.
Black rot	Bacteria	*Xanthomonas campestris*

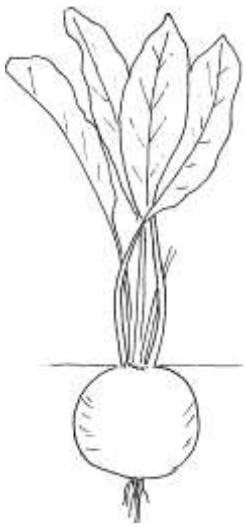
Pests:

Importance: In Papua New Guinea, only grown is a few highland areas mostly for sale to Europeans.

Names

English: Turnip
Tok pisin:
Tok ples:

Scientific name: *Brassica rapa* L.
Synonyms:
Plant family: Brassicaceae



Description: An erect annual herb. It has a round white fleshed taproot. It is often tinged purple. The leaves are divided and have hairs. Where the leaves join the root it is not raised into a "neck". The wild form is a thin plant with leaves that clasp the stem. The pods are 4-6.5 cm long and have seedless beaks 2-3.2 cm long.

Distribution: It will grow in both the lowlands and highlands in the tropics but does best in the highlands between 1700 and 2600 m altitude. It is frost resistant. It grows in Nepal to 2500 m altitude. It suits hardiness zones 9-11.

Cultivation: It is grown from imported seed. In the lowlands they are best grown in the shade.

Production: The roots are ready after 8-10 weeks.

Use: The swollen root is cooked and eaten.
The leaves can be eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Root	90.0	113	0.9		0.3	Tr	21	
Leaves	90.0	117	3.0		1.9	4560	139	

Insects:

Crocidolomia binotalis Zeller	Pyralidae (LEP)	Cabbage cluster caterpillar
Lyriomyza brassicae (Riley)	Agromyzidae (DIPT)	Cabbage leaf miner
Plutella xylostella L.	Plutellidae (LEP)	Diamond back moth
Plutella sera Meyr.	Plutellidae (LEP)	

Diseases:

Leaf spot	Fungus	*Alternaria brassicae* (Berk.)Sacc.
	and	*Alternaria brassicicola*
Back rot	Bacteria	*Xanthomonas campestris* (Pamm.) Dows.

Pests:

Importance: Not very common or widely used.

Names

English: Chinese kale
Tok pisin:
Tok ples:

Scientific name: *Brassica oleracea* var. *albiflora* Kuntze
Synonyms: *Brassica alboglabra* Bailey
Plant family: Brassicaceae

Description: A cabbage family plant which continues to grow from year to year. The stem base is long and cylindrical but not fleshy. It has leaves which are thick, oval and bluish-green. They can be dull or shiny. They are widely spaced and not grouped in a head. The leaf buds in the axils of leaves do not form a head. The flower stalk is lax and not fleshy. The flowers are white or rarely cream.

Distribution: It is cultivated in China.

Cultivation:

Production:

Use: The leaves are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English: Swede
Tok pisin:
Tok ples:
Scientific name: *Brassica napus* var. *napobrassica* (L.) Mill.
Synonyms:
Plant family: Brassicaceae

Description: A cabbage family plant. The plant has a round tap root which mostly have yellow flesh. The outside is often of various colours. It has a "neck" near the ground level and this helps distinguish it from a turnip. The leaves have a waxy appearance.



Distribution: They are not common in the tropics. They do best in the highlands and in the dry season. It suits hardiness zones 8-11.

Cultivation: They are grown from seed.

Production:

Use: The tubers are cooked and eaten.
The leaves can be eaten cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Tubers	91.6	76	0.9		0.3	Tr	17	0.1
Leaves								

Insects:

Diseases:

Pests:

Importance: Not a very popular vegetable in Papua New Guinea.

Names

English: Bai cai, Petsai
Tok pisin:
Tok ples:

Scientific name: *Brassica rapa* var. *glabra* Regel
Synonyms: *Brassica pekinensis* (Loureiro) Ruprecht
Plant family: Brassicaceae

Description: An annual or biennial plant. The taproot is not fleshy. The basal leaves are usually more than 20. They form a rosette and a head. This is normally oblong and compact. The leaf stalk is strongly flattened. It has incised or toothed edges. The leaf blade has teeth along the edge.

Distribution:

Cultivation:

Production:

Use: The leaves are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English: Leaf mustard
Tok pisin:
Tok ples:

Scientific name: *Brassica juncea* (L.) Czern & Cass
Synonyms: *Sinapis juncea* L.
Plant family: Brassicaceae



Description: It is an erect leafy annual cabbage plant. It grows to about 1 m high. The plant can vary a lot. The leaves are elliptical and deeply divided. They are dark green. The end segment of the leaves is oval. The leaves taper towards the stem and have a strong mustard flavour. The flowers are pale yellow. They have 4 petals. It produces a flower and seed pods at the top. The seed pod is long and narrow. It is 3-5 cm long. The seeds are reddish-brown.

Distribution: It is grown in some highland areas in the tropics. It is often grown as a cool season crop. Most varieties are not frost tolerant. It needs a fertile, well drained soil. A pH of 5.5-6.8 is suitable. It can tolerate poor soils. It suits hardiness zones 9-11.

Cultivation: The seed is broadcast. They can be put in a nursery and transplanted. A spacing of 25 cm x 25 cm is suitable.

Production: Leaves can be harvested one month after planting. Leaves can be harvested several times. Whole plants can be harvested in about 45 days from transplanting.

Use: The leaves are cooked and eaten. They have a bitter taste, so the cooking water needs changing.
They can be eaten crystallised in vinegar or salt.
They can be used in salads.
The seeds can be fried then used as a spice.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	92.0	108	2.4		2.7	1825	73	
Seeds								

Insects:

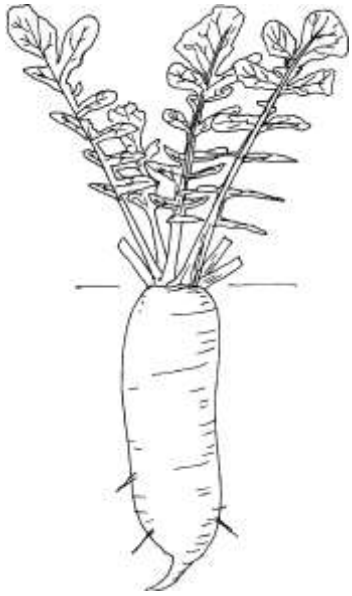
Diseases:

Pests:

Importance: Only grown occasionally in Papua New Guinea.

Names

English: Chinese radish
Tok pisin:
Tok ples:
Scientific name: *Raphanus sativus* var. *longipinnatus* Bailey
Synonyms:
Plant family: Brassicaceae



Description: A cabbage family plant like a large radish. It has a large fleshy root and deeply divided leaves. The taproot is long and white. It takes one or two years to complete its lifecycle. The stems can be 20-100 cm high. The leaves near the base are long. They are divided and have coarse teeth. The leaves up the stem are simple and narrow. The flowers develop at the top. They are usually white with purple veins. The fruit are pods about 3-8 cm long and 1.25 cm across. They have a long tapering beak. There are 6-12 round seeds. These can be yellow or brown.

Distribution: It is more common in lowland areas in the tropics. It needs a rich loose fertile soil. It suits hardiness zones 6-9.

Cultivation: Plants are grown from seeds. A spacing of 15 cm apart in rows is suitable. Often plants are sown more thickly and seedlings are thinned out and eaten. It is possible to save seed from plants.

Production: Plants are ready for harvesting about 50 days after planting.

Use: The roots are cooked and eaten.
The young leaves can be eaten cooked.
The roots can also be shredded and eaten raw in salads.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Roots								
Leaves								

Insects:

Diseases:

Leaf spot	Fungus	*Alternaria raphani* Groves & Skolko

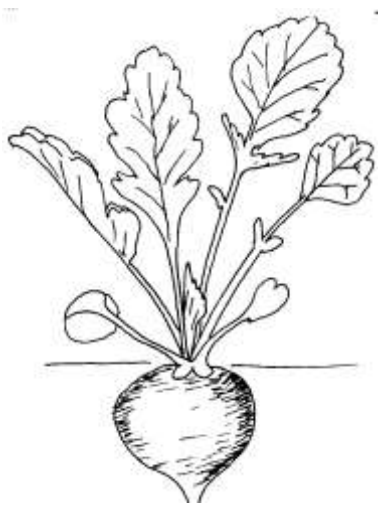
Pests:

Importance: Rarely grown or eaten by village people in Papua New Guinea. It is seen at schools and institutions and sometimes in coastal markets.

Names

English: Radish
Tok pisin:
Tok ples:

Scientific name: *Raphanus sativus* L.
Synonyms:
Plant family: Brassicaceae



Description: A small quick growing plant with a thickened edible root. The leaves are divided along the middle nerve and are hairy. The end lobe is largest. The flowers are white or lilac with purple veins. The fruit is a pod. It is round in cross section and does not open at maturity. It is constricted between the seeds. The fattened roots can be red, white, purple or black. They can be round, oblong or long and narrow.

Distribution: It grows from the coast up to at least 2400 m in the tropics. It is frost resistant. It suits hardiness zones 6-9.

Cultivation: Plants are grown from seed planted at 5 cm spacing. In highland areas seeds can be saved from plants to re-sow.

Production: Plants can be ready after 3 weeks.

Use: The young tender roots are mostly eaten raw.
The leaves are eaten cooked.
Roots and seeds are pickled.
The seeds can be sprouted and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Roots	93.3	62	1.0		1.9	Tr	25	0.1
Leaves								
Seeds	90.1	180	3.8		0.9	39	28.9	0.6

Insects:

Crocidolomia binotalis Zeller	Pyralidae (LEP)	Cabbage cluster caterpillar
Gonocephalum ochthebioides Ful.	Tenebrionidae (COL)	False wireworm
Onthophagus latenasutus Arrow	Copridae (COL)	A beetle

Diseases:

A leaf spot	Fungus	*Alternaria raphani* Groves & Skolko

Pests:

Importance: In Papua New Guinea tried out by many people and not liked.

Names

English: Bulb onion
Tok pisin:
Tok ples:

Scientific name: *Allium cepa* var. *cepa* L.
Synonyms:
Plant family: Alliaceae



Description: A herb with a two year life cycle. Normally it develops fattened bulbs at the base. It has a shallow fibrous root system. The actual stem in very short and condensed. Leaves are produced in an alternate fashion one after the other from the top of this stem. Successive leaves grow up inside, then burst through the leaf sheath of the previous leaf. Leaves are thin and long. They are slightly to markedly flattened on the upper surface. Long day lengths and warm temperatures help the leaf bases become swollen and store food reserves. Flowers are greenish white in colour. Flowers develop on a rounded head with stalks all coming from the centre. Flowers in the rounded head open irregularly. There are no bulbils on the flowerhead.

Distribution: It is more easy to get onions to grow and form bulbs in the highlands in the tropics but they can be grown from sea level to 2600 m altitude in Papua New Guinea. In Nepal they grow to 3000 m altitude. They do not suit the wet humid tropics. Because the day lengths are short near the equator, onions often do not produce a bulb. Some newer varieties will yield in the tropics. It suits hardiness zones 5-10.

Cultivation: They are grown from imported seed. For bulbs, a tropical cultivar is needed and bulbing is normally better at higher altitudes. Cultivars which form flowers early need to be avoided. Seedlings can be transplanted.

Production:

Use: The bulbs and leaves are used as flavouring raw or cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Bulb	92.8	99	0.9		0.3	0	10	0.1
Leaves	90.0		1.4		0.5			0.5

Insects:

Agrotis ipsilon (Hufn.)	Noctuidae (LEP)	Black cutworm
Neotoxoptera formosana Takahashi	Aphididae (HEM)	Onion aphid
Oribius inimicus Mshl.	Curculionidae (COL)	Shot hole weevil
Thrips tabaci Lind.	Thripidae (THYS)	Onion thrips

Diseases:

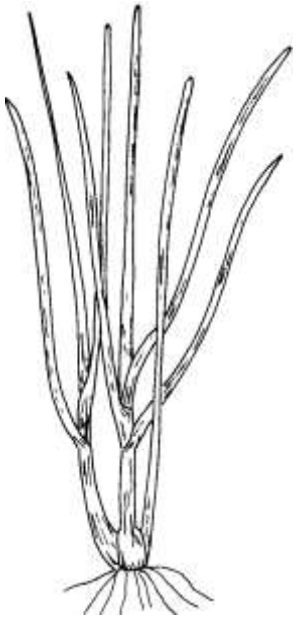
Leaf tip withering	Fungus	*Alternaria porri*
Smudge	Fungus	*Colletotrichum circinans* (Berk.)Voglino
Soft rot	Bacteria	*Erwinia carotovora*
	And	*Pseudomonas cepacia*

Pests:

Importance: In Papua New Guinea, it is not widely grown but is popular and imported for sale.

Names

English: Shallots
Tok pisin:
Tok ples:
Scientific name: *Allium cepa* var. *aggregatum* L., G.Don.
Synonyms: *Allium ascalonicum* L.
Plant family: Alliaceae



Description: These onion like plants produce a cluster of bulbs. They are narrowly oval. It grows to 1.2 m high. The leaves are round and hollow. This is a genuinely perennial form of Allium cepa, the bulb grows deeper in the soil and divides to produce a number of underground bulbs each year in much the same way as shallots. Large bulbs divide to form 5-15 bulbs whilst smaller bulbs grow into one large bulb. They do not produce bulbils in the flowerhead.

Distribution: They can be grown throughout the country but do best in the cooler higher places. They need a fertile well drained soil. They are frost resistant. They tolerate a pH in the range 4.5 to 8.3. It suits hardiness zones 5-10.

Cultivation: Normally plants are grown by planting one bulb. It is best to plant them on slightly raised beds. Plants should be about 20 cm apart.

Production:

Use: The bulbs are eaten raw or cooked.
The leaves are eaten raw or cooked.
The flowers are used raw or to flavour salads.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Bulbs	81	281	1.9		0.8	Tr	2	
Leaves	91	126	1.8		3.7	945	19	

Insects:

Thrips tabaci Lnd.	Thripidae (THYS)	Onion thrips
		Aphids

Diseases:

Leaf tip burn	Fungus	*Alternaria porri*
Leaf tip wither	Fungus	*Botryotinia fuckeliana* (de Bary)Fuckel
Smudge	Fungus	*Colletotrichum circinans*

Pests:

Importance: This is becoming a well accepted and popular vegetable for flavouring foods in most parts of Papua New Guinea.

Names

English: Chives
Tok pisin:
Tok ples:

Scientific name: *Allium schoenoprasum* L.
Synonyms:
Plant family: Alliaceae



Description: A herb which grows one year, then flowers the next. It is up to 30 cm tall. A narrow leafed onion which forms dense clumps. The leaves are hollow and narrow. They are 10-25 cm long by 0.1 cm in cross section. They are angular in cross section. Bulbs are not well developed. They can be 1-3 cm long by 0.5-1.5 cm across. The flowers are pink or purple. They are produced in a head where small flowers are on equal length stalks forming a rounded head.

Distribution: A temperate plant. It is tolerant of cold and suits the highlands in the tropics. It needs a well drained soil. They can tolerate drought and grow on a wide range of soils. Fertile loam soils are best. In China it grows in meadows and damp valleys along streams between 2000-3000 m altitude. It suits hardiness zones 5-10.

Cultivation: Plants are grown by division of the clump, or by seeds. Seeds are normally put in a nursery then transplanted. A spacing of 15-20 cm between plants is suitable. The leaves can be cut off several times.

Production: Shoots can be harvested 70-100 days from planting. The outer leaves are cut 2 cm from the base leaving the central clump intact. Clumps should be replanted every 2-3 years.

Use: The mild flavoured leaves are eaten raw or used to flavour food.
They are used to flavour salads and meat.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	92.0	113	2.7		0.8	435	32	0.6

Insects:

Diseases:

Pests:

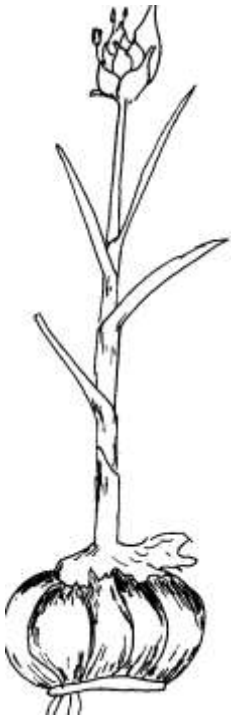
Importance: It is becoming more common in the highlands of Papua New Guinea.

Names

English: Garlic
Tok pisin:
Tok ples:

Scientific name: *Allium sativum* L.
Synonyms:
Plant family: Alliaceae

Description: It is an erect herb. It grows one year, then flowers the next. It grows about 40 cm high. This onion family plant has a number of tightly packed bulbs (cloves) wrapped in papery scale leaves. The true leaves of the plant are long, flat and solid. Leaves are 2.5 cm wide. The roots are side roots. The number of cloves per bulb varies from 16-50 depending on variety. Flowers are borne on a long stalk in a head where the flowers are on equal length stalks from one point forming a rounded head.



Distribution: It grows in the tropical highlands mostly between 1600 and 2200 m but will grow satisfactorily down to 500 m. In Nepal it grows to 3000 m altitude. There are kinds that will grow in hot coastal tropical places. Best bulb development occurs with temperatures up to 30°C. It is frost resistant. High humidity or high rainfall is not suitable. It is best grown in low rainfall areas with irrigation. Bulb development is favoured with long day lengths. It suits hardiness zones 8-10.

Cultivation: Plants are grown by planting individual cloves. The individual segments of the clove are separated out then planted. A spacing of 20 cm is suitable. They should be planted into a deeply dug but firm seedbed. They are planted almost covered with fine soil. Cloves or "rounds" are best planted at the end of the wet season. Plants rarely produce fertile flowers or seed. They can be grown from seed.

Production: Bulbs should be ready about 90-120 days from planting. Bulbs can be stored at 25-30°C for 90 days with low humidity and good air circulation.

Use: The cloves are used in small amounts to flavour food.
The leaves can also be used. Leaves should be cut before they are mature.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Bulb	66.0	512	5.0		1.2	Tr	7	
Leaves	87.0	50	2.1		0.4	684	38	1.0

Insects:
Probably thrips

Diseases:

Pests:

Importance: At present not widely grown or used in Papua New Guinea.

Names

English: Leek

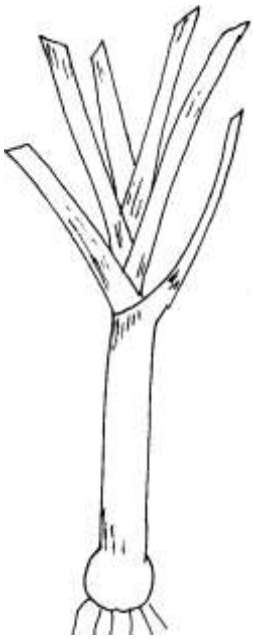
Scientific name: *Allium ampeloprasum* var. *porrum* L.; (L.) Gay

Tok pisin:

Synonyms: *Allium porrum* L.

Tok ples:

Plant family: Alliaceae



Description: An onion like plant without a bulb and with flat leaves. It grows one year, then flowers the next. There is one bulb. There can be bulblets. The covering is white. The leaves are flattened and vary from 40-100 cm long by 1.2-2.5 cm wide. Many flowers are produced in a large flower head where small flowers are on equal length stalks forming a ball.

Distribution: It does best with a day temperature below 24°C. So it is mostly over 800 m altitude in the tropics and grows up to 2600 m. It needs a fertile soil. It is very frost resistant. The soil needs to be well drained but retain moisture.

Cultivation: They can be grown from seed. Seedlings can be transplanted. They are transplanted when 15-20 cm high. The base of plants or suckers are more commonly used for planting. It is difficult to save seed in the wet tropics. If plants are planted in a hole 10-15 cm deep they develop long white edible stalks. The soil should be mounded up around the base of the plant. A spacing of 15-20 cm between plants and in rows 30-36 cm apart is suitable.

Production: Plants are ready for harvest after 16-20 weeks. A yield of 20 kg per 10 metres square is average.

Use: The whole plant is boiled except for the tops of the leaves. They can also be eaten raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Bulb	90.8	104	1.8		2.0	40	18	0.1
Leaves	89.4	147	2.3		2.7	1827	30	

Insects:

Spodoptera litura Fab.	Noctuidae (LEP)	Cluster caterpillar

Diseases:

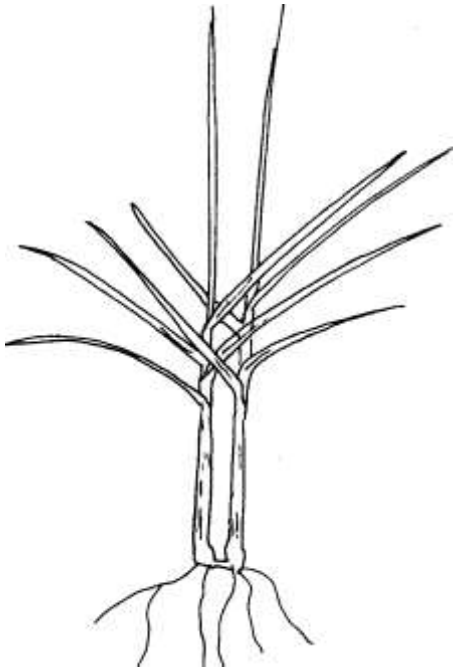
Leaf spot	Fungus	*Alternaria porri* (Ell) Cif

Pests:

Importance: Moderately common in the highlands of Papua New Guinea.

Names

English: Garlic chives, Chinese chives
Scientific name: *Allium tuberosum* Rottb. ex Spreng
Tok pisin:
Synonyms:
Tok ples:
Plant family: Alliaceae



Description: It is a herb which keeps growing year after year. It can be 40 cm high. It grows in clumps. These onions have rhizomes but no real bulbs. The leaves are long and grass like, and flat and solid. They are 15-30 cm long and about 5 mm wide. The young leaves are erect but the mature leaves bend gracefully down. The blades of the leaves are not folded lengthwise, as are those of garlic and leek. Flowers are white. The flowers are produced at the top of a flower stalk which grows from the underground stem. The flower head is round due to the small flowers being on the same length stalks and arising from the same point. The flower stalk can be 45 cm long. A dense clump of plants is produced.

Distribution: They are native to eastern Asia. Seeds are rarely formed in the lowland tropics. It is naturalised in S China. It suits hardiness zones 7-10.

Cultivation: Plants can be grown by dividing the clump of plants or by seed. Seed production is not easy. Plants are sown in rows 30 cm apart.

Production: Chives may be cultivated for its flowers which are plucked together with the stalks before the buds emerging from the sheath. They can also be grown for its edible leaves which have a special flavour considered fragrant by some people.

Use: The leaves and young flowers are used to flavour foods.
The bulbs are used like garlic.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Flowers								
Bulbs								

Insects:

Diseases:

Pests:

Importance: It is cultivated as a vegetable.

Names

English: Celery
Tok pisin:
Tok ples:

Scientific name: *Apium graveolens* var *dulce* L., (Mill.)D.C.
Synonyms: *Apium dulce* Mill.
Plant family: Apiaceae



Description: A herb up to 1 m high. It has leaf stalks with ridges and they are like a half circle when cut across. The plant is strong smelling. The plant is smooth and hairless. The leaves are divided into a compound leaf. The wild plant has leaves in tufts from the base or spread along creeping stems. The flowers are white and in small compound arrangements where each flower is on a stalk from the same point.

Distribution: It is a warm temperate plant. It is mainly grown in the highlands in the tropics. It grows up to about 2100 m altitude. It is damaged by frost. It often grows naturally in swampy conditions. In the tropical lowlands it grows as a small leafy plant but can be used for flavouring. It requires a rich sandy loam soil. Because celery has shallow roots it needs plenty of moisture and does best in humus rich soils.

Cultivation: Plants are mostly grown from seed and transplanted. To produce white stalks, the plant is wrapped up or soil is mounded up around the plant. Newer varieties will naturally form whiter stalks. Plants should be grown close together to keep sunlight off the stalks. This applies especially for the naturally whitening (blanching) varieties. The stalks are cut before the plant flowers.

Production: Leaf stalks take about 9 months from seed until harvest.

Use: The leaf stalks are eaten raw or used to flavour foods.
The leaves can also be used for flavouring.
The dry ripe fruit can be used for flavouring. e.g. in salt.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaf stalks	94.6	67	0.8		0.4	13	7	0.1
Leaves	95.7	88.2	0.6		0.4	13	5	0.1

Insects:

Oribius destructor Mshl.	Curculionidae (COL)	Shot hole weevil
Oribius inimicus Mshl.	Curculionidae (COL)	Shot hole weevil
Thysanoplusia orichalcea Fabricius	Noctuidae (LEP)	

Diseases:

Septoria leaf spot	Fungus	*Septoria apiicola*

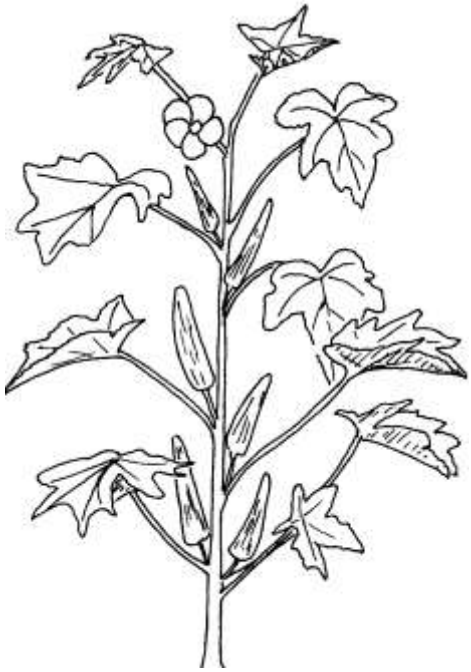
Pests:

Importance: Plants are fairly commonly seen in highland markets in Papua New Guinea.

Names

English: Okra
Tok pisin:
Tok ples:
Scientific name: *Abelmoschus esculentus* (L.) Moench.
Synonyms: *Hibiscus esculentus* L.
Plant family: Malvaceae

Description: A tropical annual plant. It grows erect, often with hairy stems. It mostly grows about 1 m tall but can be 3.5 m tall. It becomes woody at the base. The leaves have long stalks up to 30 cm long. Leaves vary in shape but are roughly heart shaped with lobes and teeth along the edge. Upper leaves are more deeply divided than lower ones. The flowers are yellow with red hearts. The fruits are green, long and ribbed. They have 5-7 ribs. They are 7.5-15 cm long. The seeds are 4-5 mm across. They are round and dark green. Many varieties exist.



Distribution: It suits the hot humid tropical lowlands but is unsuited to the highlands. It cannot tolerate drought. It is very sensitive to frost. They grow best where temperatures are between 20-36°C. It can grow well in dry climates with irrigation. It suits hot humid environments. It does best on well drained well manured soils but will grow on many soils. A pH or 5.5-7 is best. It suits plant hardiness zones 8-12.

Cultivation: They are grown from seeds. Seeds are easy to collect. They need high temperatures for germination (over 20°C) and a sunny position. Often seeds are soaked for 24 hours before sowing to give quick germination. Seeds are sown 1.5-2.5 cm deep with 2-3 seeds per hole. Later these are thinned out to one plant. Seeds can be sown in nurseries and plants transplanted. Pinching out the tops of plants when 30 cm high encourages branching. To select seed of a particular variety seed plants must be separated 400 m from other varieties. A spacing of about 90 x 45 cm is suitable. About 8-10 kg of seed are required for one hectare. Most kinds respond to fertiliser.

Production: Plants maintain production if the fruits are harvested regularly. Plants are ready to harvest 8-10 weeks after sowing. Seed yields of 500-800 kg per hectare are recorded. Pod yields of 4-6 tons per hectare occur. For young pods it takes 2-4 months from sowing. Pods develop 5-10 days after flowering. Pod harvests can continue for 1-2 months. Leaving pods on the plants stops new pods developing.

Use: Pods are eaten cooked. They are slimy, but less so if fried. Okra is frozen and canned.
Dried powdered seeds can be used in soups. It thickens the soup.
Young leaves can be eaten cooked. Flowers can also be eaten. They are slimy unless fried.
The seeds are roasted and used as a coffee substitute.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Pods	90.0	134	1.9		0.5	58	16.3	0.6
Seeds								
Leaves	81.0	235	4.4		0.7	385	59	
Flowers								

Insects: **Diseases**: **Pests**:

Importance: An introduced vegetable grown in a few lowland areas of Papua New Guinea but not yet common. It is an important vegetable in Asia.

Names

English: Asparagus
Tok pisin:
Tok ples:

Scientific name: *Asparagus officinalis* L.
Synonyms:
Plant family: Liliaceae/Asparagaceae

Description: A herb. A perennial plant with fern like leaves and underground root stock. It grows to 1.5 m high and spreads to 1 m across. The stems are erect but often hang over at the tips. The branches are soft. The leaves are feathery and a rich green colour. The flowers are small and greenish. They are of both sexes and occur either singly or in clusters of 2-4. The fruit are red berries. They are produced on female plants. They are 7-8 mm across. There are 2 or 3 seeds.



Distribution: It is a temperate plant. In Papua New Guinea it is grown mainly in the highlands at over 1000 m altitude in the tropics. It grows up to 2600 m. It can be grown on the tropical coast with special management. It prefers humus rich, moist, well drained soils. It does best in an open sunny position. It is frost resistant but drought tender. In China it grows naturally on the steppes in NW Xinjiang. It suits hardiness zones 4-8.

Cultivation: Plants can be grown from seed. It is best to soak the seeds for 24 hours then sow them in a nursery. They are transplanted after 8-12 months. A spacing or 1 m x 1 m is suitable. If white shoots are required, the shoots need to be kept covered with soil. Shoots turn green in sunlight. Plants can also be grown by division of the clump.

Production: The first harvest is 18-24 months after planting. The shoots are cut before they open out into the ferny erect stems. They are cut below ground level when about 15-20 cm high.

Use: The young shoots are eaten cooked. They should only be washed just before cooking.
The tuberous roots of some wild asparagus plants are eaten in China. Young roots should be used.
The seeds have been used as a substitute for coffee.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Shoots	95.4	52	1.7		0.6	50	16	0.3
Roots								

Insects:

Oribius destructor Mshl.	Curculionidae (COL)	Shot hole weevils

Diseases:

Pests:

Importance: Not widely grown in Papua New Guinea and then mostly near the houses of Europeans.

Names

English: Capsicum, Bell peppers
Tok pisin:
Tok ples:

Scientific name: *Capsicum annuum* var. *annuum* L.
Synonyms:
Plant family: Solanaceae



Description: An annual plant up to 1.5 m high. The leaves can be long and sword shaped or oval to rounded. The leaves can be 12 cm long. The flowers are produced singly, and are yellow or white. They are bell shaped. The flowers are 1.5 cm across and in the axils of leaves. Fruit are about 10 cm long and 6 cm wide and red when fully ripe. Kinds with different shaped fruit also occur.

Distribution: Plants grow from sea level up to about 2400 m altitude. They are killed by frost. Soils need to be well drained and fertile. The fruit and plants can rot in the middle of the wettest seasons. They need a temperature above 4°C.

Cultivation: Plants are grown from seed. Both self and cross pollination occur. It is possible to save your own seed. Seed will keep for 2 to 3 years. Seeds germinate in 6 - 10 days. Plants can be transplanted. Plants need to be about 50 cm apart. About 50% of flowers set fruit.

Production: The first fruit can be harvested after 3-4 months.

Use: The fruit are edible raw or cooked.
The leaves are edible cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	93.5	65	0.9		0.4	59	100	0.2
Leaves								

Insects:

Atherigona orientalis Schiner	Muscidae (DIPT)	Shootfly
Carpophilus maculatus Murray	Nitidulidae (COL)	Damaging fruit.
Dacus bryoniae (Tryon.)	Tephritidae (DIPT)	Fruit fly
Dacus musae (Try.)	Tephritidae (DIPT)	Banana fruit fly
Dacus trivialis Drew	Tephritidae (DIPT)	Fruit fly larvae destroying fruit
Euproctis sp.	Lymantriidae (LEP)	Reported eating leaves
Heliothis armigera (Huebner)	Noctuidae (LEP)	Corn earworm
Homeoxipha fuscipennis	Gryllidae (ORTH)	Reported chewing leaves
Macrosiphum euphorbiae (Thomas)	Aphididae (HEM)	Potato aphid
Oribius inimicus Mshl	Curculionidae (COL)	Shothole weevil
Pinnaspis strachani (Cooley)	Diaspididae (HEM)	Armoured scale
Planococcus pacificus Cox	Pseudococcidae (HEM)	Mealybug
Plautia brunneipennis	Pentatomidae (HEM)	Stink bugs
Pseudaulacaspis pentagona (Targioni)	Diaspididae (HEM)	White scale
Pulvinaria ubicola (Cockerell)	Coccidae (HEM)	Soft scale
Thrips tabaci Lind.	Thripidae (THYS)	Onion thrips
Silba sp.	Lonchaeidae (DIPT)	Larvae boring into fruit

Diseases:

Leaf spot	Fungus	*Alternaria sp.*
Collar rot	Fungus	*Athelia rolfsii*
Fruit rot (Anthracnose)	Fungus	*Glomerella cingulata* (Stonem) Spauld & Schrenck
Fruit rot	Fungus	*Curvularia sp.*
Leaf blotch	Fungus	*Thanatephorus cucumeris*
Wilt	Fungus	*Fusarium solani*
Root rot	Fungus	*Pythium sp.*
	And	*Fusarium sp.*
Bacterial wilt	Bacteria	*Pseudomonas solanacearum*
Storage rot	Bacteria	*Erwinia carotovora*
Bacterial leaf spot	Bacteria	*Xanthomonas campestris* pv. *vesicatoria*
Leaf distortion	Virus	Possibly potato virus y

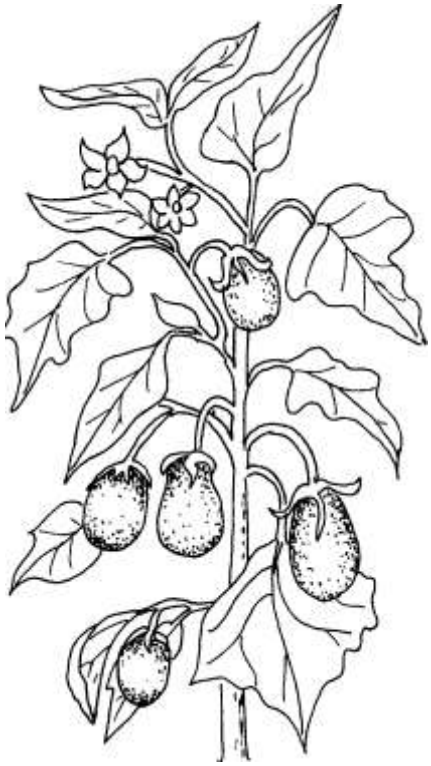
Pests:

Importance: In Papua New Guinea it is becoming a popular vegetable to eat raw.

Names

English: Eggplant
Tok pisin:
Tok ples:

Scientific name: *Solanum melongena* L.
Synonyms:
Plant family: Solanaceae



Description: A perennial shrubby herb up to 1 m tall. It is often grown as an annual. It has a deep taproot and branched side roots. The stem is thick and covered with many woolly hairs. The plant has many branches. Often the plant is spiny. The leaves are large, alternate and simple. They are angular and unequal near the stalk. Leaves can be 20 cm long and wavy along the edge. Leaves are covered with hairs. Flowers are bluish red and 5 cm across. They are either solitary or in small groups opposite the leaves. They have 5 large woolly lobes which continue to surround the base of the fruit. Fruit are white, blue, green or purple. The fruit colour and shape vary. Sometimes the fruit is spiny. Often the fruit are 10 to 20 cm long and 5-8 cm wide. Numerous kidney shaped seeds are in the flesh of the berry.

Distribution: A plant of the warm tropics. Plants grow from sea level up to 2200 m altitude in the tropics. It suits wet climates but does well in dry climates with irrigation. They are frost tender. They need a rich, friable, well tilled soil. In the subtropics they can be grown as a summer crop. In Nepal plants grow to 1500 m altitude. It suits hardiness zones 9-12.

Cultivation: Plants are grown from seeds. Seeds germinate slowly. Seedlings can be transplanted when about 8 cm tall. Plants need to be about 1 m apart.

Production: Fruit are ready for harvest after 3 months. They continue to yield for 3-4 months.

Use: Fruit are mostly fried then eaten. They can also be grilled, baked, stuffed and stewed. They are used in curries. The fruit are also dried and stored.
The leaves although edible are hairy and not good flavour.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	91.8	117	0.83		0.4	6	1.3	0.2
Leaves								

Insects:

Licyllus albicollis F.	Chrysomelidae (COL)	
Psylliodes loriae Jacoby	Chrysomelidae (COL)	

Diseases:

Leaf spot	Fungus	*Colletotrichum sp.*
Collar & stem rot	Fungus	*Pythium butleri*
Bacterial wilt	Bacteria	*Pseudomonas solanacearum*
Root rot	Fungus	*Fusarium oxysporum*
Storage rot	Fungus	*Alternaria sp.*
	And	*Botrydiplodia theobromae*
	And	*Curvularia lunata*

Importance: Occasionally seen in most areas of Papua New Guinea.

Names

English: Pea eggplant
Tok pisin:
Tok ples:

Scientific name: *Solanum torvum* Sw.
Synonyms:
Plant family: Solanaceae

Description: A shrub 1.5-3 m high. The leaves are oblong and 10-25 cm long. They can be entire or lobed. They often have prickles beneath the midrib. The young stem and undeside of leaves are hairy. The flower is white and 2 cm across. The fruit are round berries, yellow when ripe. They are about 1 cm across. They grow in clusters. The seed are roughly circular and 2-3 mm across.

Distribution: In Papua New Guinea it grows from sea level to 2000 m altitude. In Cambodia it grows between 0 and 1200 m. In Nepal it grows to 1000 m altitude. It grows in open, moist places. in Yunnan in China it grows between 200-1650 m altitude.

Cultivation: Plants are grown from seed.

Production:

Use: The green unripe fruit are added to curries in Malaysia.
They are eaten in soup in Cambodia and China.
They are pickled in Nepal.
They are used in soup in China. They are also dried and preserved.
Caution: This plant has been shown to contain poisonous compounds.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: Tomato
Tok pisin:
Tok ples:

Scientific name: *Lycopersicon esculentum* Miller
Synonyms: *Solanum lycopersicum* L.
Plant family: Solanaceae



Description: A short lived perennial plant. It is upright but with weak stems. It can grow to 2 m tall with support for the stems. The stems have long hairs. It is bad smelling. The leaves are deeply lobed with an odd number of leaflets. They have irregular teeth around the edge. There are up to 12 star shaped flowers on each raceme. Flowers are yellow. The fruit are round and red when ripe. Yellow coloured fruit also occur. There are many varieties.

Distribution: It grows from sea level to 2400 m altitude in the tropics. It needs to be grown in fertile soil. For best production it requires much water, plenty of sunshine and low night temperatures. It is frost susceptible. In Nepal it grows to 1400 m altitude. It suits hardiness zones 9-12.

Cultivation: Plants are sown from seeds. These are normally sown in a nursery and transplanted. They can also be grown from cuttings. To give fewer and larger fruit the side branches of upright types are removed. Upright plant types need to be tied to stakes. Plants are often grafted into stronger rootstocks.

Production: Harvesting commences after about 14 weeks. Yields can be 3-4 kg of fruit per plant.

Use: The fruit are eaten raw or cooked.
Caution: Although in a lot of places in Papua New Guinea the leaves are eaten this is probably not a good idea. Leaves and green fruit are poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	93.0	88	1.0		0.6	45	26	0.1

Insects:

Agrotis ipsilon (Hufn.)	Noctuidae (LEP)	Black cutworm
Chrysodeixis eriosoma Doubleday	Noctuidae (LEP)	Green looper
Helicoverpa armigera (Hubner)	Noctuidae (LEP)	Tomato grub
Leptoglossus australis (Fabricius)	Coreidae (HEM)	Black leaf-footed bug
Nezara viridula (Linnaeus)	Pentatomidae (HEM)	Green vegetable bug
Psylliodes sp.	Chrysomelidae (COL)	
Spodoptera litura (Fabricius)	Noctuidae (LEP)	Cluster caterpillar

Diseases:

Target spot/ early blight	Fungus	*Alternaria solani* Sorauer
Fruit rot	Fungus	*Athelia rolfsii*
	And	*Phytophthora nicotianae*
Collar rot	Fungus	*Athelia rolfsii*
	And	*Pythium butleri*
	And	*Thanatephorus cucumeris*

Brown mould	Fungus	*Cladosporium fulvum* Cooke
Anthracnose	Fungus	*Colletotrichum sp.*
Leaf spot	Fungus	*Curvularia sp.*
Fruit spot	Fungus	*Didymella lycopersici*
Soft rot fruit	Bacteria	*Erwinia carotovora*
Brown mould	Fungus	*Fulvia fulvum*
Fusarium wilt	Fungus	*Fusarium oxysporium* f. *lycospersici* (Sacc.) Sny. & Hans.
Wilt and collar rot	Fungus	*Fusarium equiseti*
	And	*Fusarium oxysporum*
Leaf spots	Fungal	*Cercospora spp.*
	And	*Corynespora cassiicola*
	And	*Phoma destructive*
	And	*Septoria lycopersici* Speg.
Leaf spot	Fungus	*Helminthosporium sp.*
Bacterial wilt	Bacteria	*Pseudomonas solanacearum* E F Smith
Brown leaf mould	Fungus	*Pseudocercospora fuligena*
Small leaf spot	Fungus	*Stemphylium lycopersici*
Bacterial leaf spot	Bacteria	*Xanthomonas campestris* pv. *vesicatoria*
Mosaic	Virus	Tobacco mosaic virus
Spotted wilt	Virus	

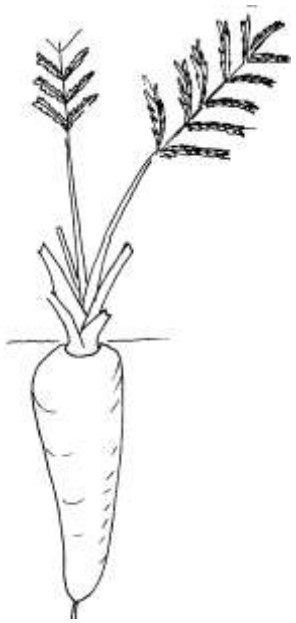
Pests:

Importance: Common in small amounts in most areas of Papua New Guinea but often for sale as it is not a popular food.

Names

English: Carrot
Tok pisin:
Tok ples:

Scientific name: *Daucus carota* L.
Synonyms:
Plant family: Apiaceae



Description: A root crop grown from seed. It can be 60 cm high and spread to 50 cm wide. The root is long in shape and orange in colour. The stem is erect, tough and furrowed. The leaves are feathery and divided 3 times. The leaves have a sheath clasping the stalk at the base. The flowers are white and lacy. They form a dense compound cluster at the top of the plant. Sometimes flowers are only produced into the second year of growth, depending on temperature.

Distribution: In the tropics it is mostly grown in the highlands, but will grow from sea level to 2600 m altitude. Sometimes on the coast only leaves are produced. Carrots are frost resistant. In Nepal carrots are grown up to 1700 m altitude. It suits hardiness zones 3-9.

Cultivation: They are grown from seeds sown directly. A spacing 5 cm apart in rows 15-20 cm apart is suitable.

Production:

Use: Both the roots and the leaves are edible. The young leaves are used in soups.
The roots can be eaten raw or cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Roots	91.5	79	0.6		0.4	2455	4	0.3
Leaves								

Insects:

Agrotis ipsilon (Hufn.)	Noctuidae (LEP)	Black cutworm
Apirocalus cornutus Pasc.	Curculionidae (COL)	Horned weevil
Oribius inimicus Mshl.	Curculionidae (COL)	Shot hole weevils

Diseases:

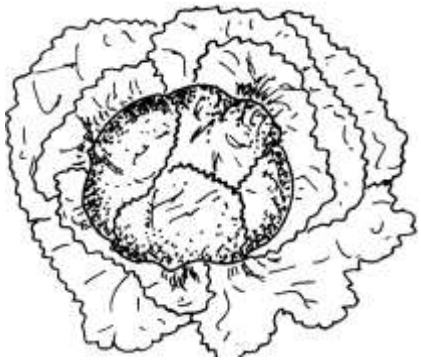
Leaf spot	Fungus	*Alternaria dauci* (Kuhn) Groves & Skolko
Leaf blight	Fungus	*Thanatephorus cucumeris*

Pests:

Importance: Within Papua New Guinea carrots are not common but are occasionally seen in gardens in many areas of the country. Often it is grown for sale.

Names

English: Lettuce
Tok pisin:
Tok ples:
Scientific name: *Lactuca sativa* L.
Synonyms:
Plant family: Asteraceae



Description: A leafy vegetable which forms a heart or clump of tightly wrapped leaves under cool temperature conditions. The leaves are often pale green. Plants are about 20 cm high. In the tropics a leafy annual grown for its succulent crisp radical leaves. The lowland species has loose leaves, crumpled with frilly margins while the leaves of the highland variety fold over the growing point to form a head; with light green almost white leaves of a greasy texture and coarse veins and prominent midrib. There are many lettuce varieties

Distribution: Plants are grown throughout the country of Papua New Guinea but particularly in the highlands and mainly for sale. Leafy forms are used in cooking in many parts of Asia. It suits hardiness zones 6-11.

Cultivation: Plants are grown from seeds and often transplanted. Seeds need to be sown very shallowly. In hot places lettuce develops a bitter taste if transplanted or checked in their growth. Cutting the tap root can stop plants seeding quickly.

Production:

Use: Eaten raw or in soups.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	94.0	84	1.2		0.7	180	15	0.2

Insects:

Agrotis interjectionis Guenee	Noctuidae (LEP)	
Ananipa sp.	Gryllidae (ORTH)	
Aphis gossypii Glover	Aphididae (HEM)	Cotton aphid
Apirocalus terrestris Thompson	Curculionidae (COL)	Horned weevil
Cassida sp.	Chrysomelidae (COL)	
Cicadella sp.	Cicadellidae (HEM)	
Coelophora inaequalis Fab.	Coccinellidae (HEM)	
Euscyrtus hemelytrus (de Haan)	Gryllidae (ORTH)	
Helicoverpa armigera Hubner	Noctuidae (LEP)	Corn earworm
Kolla sp.	Cicadellidae (HEM)	
Spodoptera litura (Fab.)	Noctuidae (LEP)	Cluster caterpillar

Diseases:

Mosaic	possibly Virus	
Collar rot	Fungus	*Athelia rolfsii*
Leaf spot	Fungus	*Septoria lactucae* Pass.
Leaf spot	Fungus	*Alternaria sp.*
Leaf spot	Fungus	*Cercospora brassicicola & Cercospora longissima*
Leaf spot	Fungus	*Phyllosticta sp.*
Soft rot	Bacteria	*Erwinia carotovora*
Mosaic	Possibly virus	

Importance: It has social significance to affluent people. It is mostly grown for sale in highland areas of Papua New Guinea.

Minor vegetables

Minor and less common vegetables

English name	Tok Pisin	Scientific name	Page
Globe artichoke		*Cynara scolymus*	**259**
Parsley		*Petroselinum crispum*	**260**
Parsnip		*Pastinaca sativa*	**261**
New Guinea edible bamboo	Mambu	*Nastus elatus*	**262**
Giant bamboo		*Dendrocalamus asper*	**263**
Giant bamboo		*Dendrocalamus giganteus*	**264**
Alfalfa, Lucerne		*Medicago sativa*	**265**
Endive		*Cichorium endivia* subsp. *endivia*	**266**
Chicory, Witloof		*Cichorium intybus*	**267**
Common bamboo	Mambu	*Bambusa vulgaris*	**268**
Native bamboo		*Bambusa forbesii*	**269**
Buckwheat		*Fagopyrum esculentum*	**270**
Beetroot		*Beta vulgaris*	**271**
Sunflower		*Helianthus annuus*	**272**

Names

English: Globe artichoke
Tok pisin:
Tok ples:

Scientific name: *Cynara scolymus* L.
Synonyms:
Plant family: Asteraceae



Description: A thistle like perennial plant. It grows 1-2 m high and spreads to 1 m across. It forms a clump. It has deeply lobed leaves. The leaves are 80 cm long. They are greyish green above. They have a woolly, white surface underneath. The flower is purple and surrounded by green bracts. It forms a large head. The flower head is about 8-15 cm across.

Distribution: A Mediterranean plant. It can be grown in the highlands in the tropics. It suits drier areas. It prefers deep, rich, alkaline soils in an open sunny position. It is frost resistant but drought tender.

Cultivation: Plants can be grown by seed or suckers. It is best to grow the seeds in a nursery and then transplant them. It can also be grown by dividing up a mature clump.

Production: The flower buds can be produced over a 2 or 3 year period.

Use: The fleshy bracts of the flower and the base of the flower head are boiled and eaten. They can be used in soups. (To stop the cut artichoke turning brown in air, they can be dipped in lemon juice.)

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Flower	84.0	209	3.5		1.3	177	10	0.5

Insects:

Diseases:

Pests:

Importance: Not commonly seen in Papua New Guinea although apparently gaining some acceptance in some areas.

Names

English: Parsley
Tok pisin:
Tok ples:
Scientific name: *Petroselinum crispum* (Miller)Nym
Synonyms:
Plant family: Apiaceae

Description: A short lived perennial plant. Often it grows and flowers over two years. It forms clumps and is a hairless plant. It has stems up to 50 cm long which are upright and with grooves. They branch. Several stems come from the top of the fattened taproot. It spreads to 50 cm across. The leaflets are finely divided. They are fern like and dark green. They are triangular and divided 3 times. They are divided into toothed segments about 3 cm long. They have a stong smell. The flowers are greenish white and star shaped. They occur at the ends of branches. The flowers are flat topped and up to 4 cm across. There are about 30 variations of curled parsley. Some are more tightly curled than others.



Distribution: It can be grown from sea level up to 2400 m altitude in the tropics. It grows best in moderately cool, shady and humid conditions. It can grow well in full sunlight but also in slight shade. Young plants can be damaged by frost. It suits hardiness zones 7-9.

Cultivation: It is grown from seed and transplanted. Seeds are slow to germinate. They can be sown directly where they are to grow. Seed are collected by cutting flowers before they ripen then shaking the seeds out onto a cloth.

Production:

Use: The plant becomes bitter after flowering.
The leaves are used for flavouring.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	78.7	88	5.2		8.0	7000	150	0.9

Insects:

Phytometra orichalcaea (F.)	Noctuidae (LEP)	Larvae of a moth

Diseases:

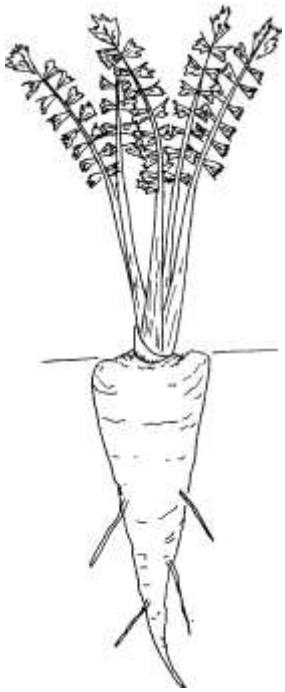
Pests:

Importance:

Names

English: Parsnip
Tok pisin:
Tok ples:

Scientific name: *Pastinaca sativa* L.
Synonyms:
Plant family: Apiaceae



Description: A plant with long thickened tap root. The stems are angular and have grooves along them. The leaves are divided. The ones near the base have 5-11 lobes. These are oval and have teeth along the edge. The thickened root is yellowish white.
Wild parsnip grows in some temperate places. It has a very strong parsnip smell. It can be used as food.

Distribution: It grows in the highlands in the tropics from 1700-2600 m altitude. It is frost resistant. It suits hardiness zones 4-8.

Cultivation: Plants are grown from seeds.

Production: Plants are slow growing. The taste is best after the first frosts.

Use: The root is cooked and eaten. It can be boiled, baked, fried or used in stews.
The root of wild parsnip is normally washed, peeled, cooked in salt water then strained and added to soups.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Root	83.2	238	1.3		0.5	0	10	0.1

Insects:

Halticus tibialis Reuter	Miridae (HEM)	Grass bug

Diseases:

Pests:

Importance: In Papua New Guinea, it is not widely grown and not liked by many people.

Names

English: New Guinea Edible Bamboo
Tok pisin: Mambu
Tok ples:
Scientific name: *Nastus elatus* Holtumm
Synonyms:
Plant family: Poaceae



Description: A large bamboo with stalks 20 m long and 5 -6 cm across. The leaves are fine and narrow. It produces large clumps.

Distribution: It grows in the highlands between about 1200 m and 1900 m altitude. It only occurs in PNG. Clumps are planted near highland houses.

Cultivation: It is planted by dividing an old clump and planting the shoots. It can also be grown from cuttings.

Production: New shoots are produced throughout the year.

Use: The pith in the centre of young shoots is eaten after cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Shoots								

Insects:

Apirocalus cornutus Pasc.	Curculionidae (COL)	Horned weevil
Locusta migratoria (L.)	Acrididae (ORTH)	Migratory locust

Diseases:

Leaf blotch	Fungus	*Trematosphaerella bambusae* (Miyake & Hara) Hino & Katumoto

Pests:

Importance: In Papua New Guinea, most highland families maintain at least one clump to use as containers and they eat surplus shoots.

Names

English: Giant bamboo

Tok pisin:

Tok ples:

Scientific name: *Dendrocalamus asper* (Roemer & Schultes) Backer ex K. Heyne
Synonyms: *Bambusa aspera* Schult. & Schult. f.
Plant family: Poaceae

Description: A very large densely tufted bamboo. It forms large groves. The culms or stems can be 20-30 m high. The clumps can spread 12-24 m wide. The stalks are 15-20 cm across. They are covered with fine velvety brown hairs when young. The internodes can be 10-20 cm long lower down and 30-50 cm long higher up. The nodes are swollen. The lowest nodes have many aerial roots. The nodes in the middle and higher have branches. The culm sheath is 20-40 cm long by 20-25 cm wide. The leaf blade is 30 cm long by 2.5 cm wide.



Distribution: A tropical bamboo. In tropical Asia it grows from sea level to 1500 m altitude. It does best between 400-500 m altitude. It grows best on heavy soils with good drainage. It suits hardiness zones 9-12.

Cultivation: It can be grown from rhizomes, culm or branch cuttings. The spacing is 5-10 m apart. Mulching is essential to produce young shoots.

Production: The shoots emerge in the rainy season. They develop to their full height in one year. A good healthy clump can produce several shoots each year. A good clump with 10 culms can produce 60 shoots in one year. The edible portion of young shoots is 5.4 kg before peeling and 1.8 kg after peeling. A well established plantation can produce 10 tonnes/ha/yr of edible shoots.

Use: The tender shoots are eaten as a vegetable or pickled in vinegar or salted.
The shoots have good canning quality.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Shoots								

Insects:

Diseases:

Pests:

Importance: It is not known if this bamboo is used for food in Papua New Guinea.

Names

English: Giant bamboo
Tok pisin:
Tok ples:

Scientific name: *Dendrocalamus giganteus* Munro
Synonyms: *Bambusa gigantea* Wallich ex Munro
Plant family: Poaceae

Description: A clump forming bamboo. It can be 25-30-50 m tall. It has rhizomes which spread. The clumps can be 10-15 m wide. The canes can be 35 cm across. They are erect and jointed. The nodes are hairy. The leaf blades are sword shaped and smooth with fine teeth along the edge. The leaves can be 55 cm long. These clasp the canes at their base. The flower is a long panicle which droops.

Distribution: It is a tropical plant. It often grows in high mountains. It must have temperatures above 5°C. They are frost tender. It cannot tolerate drought. It prefers rich moist soil. In Nepal it grows between 200-1300 m altitude.

Cultivation: The plants can be grown from seed. They can also be grown by dividing established clumps. Sections of the young stalk will shoot if cut and placed horizontally in a growing medium in a warm place. The cuttings should be 50 cm long and planted 20 cm deep.

Production: Young shoots can grow at the rate of 30 cm a day.

Use: Young shoots are eaten as a vegetable.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Shoots								

Insects:

Diseases:

Pests:

Importance: It is widely used for building, water pipes and other uses. It is not known if it is used for food in Papua New Guinea.

Names

English: Alfalfa, Lucerne
Tok pisin:
Tok ples:

Scientific name: *Medicago sativa* L.
Synonyms:
Plant family: Fabaceae

Description: An erect or spreading legume. It grows to 80 cm high and spreads to 30-80 cm wide. It forms deep roots. It keeps growing from year to year. The stems are slender and hairy. The leaves are bluish green. The leaves have 3 leaflets like clover. The leaflets are oval or narrow. They are 3 cm long. The flowers are mauve. They appear in long stalked bunches. The fruit are small sickle shaped pods. The pods are deep brown.

Distribution: It will grow in warm and temperate climates. It suits hardiness zones 4-8.

Cultivation: Plants are grown from seed sown where they are to grow. Plants can be 10 cm apart. Plants can be cut back to encourage new growth for the young leaves.

Production: The first picking of young leaves can be made 3-4 weeks after sowing.

Use: Seeds are often sprouted and the young sprouts eaten raw.
Young leaves are eaten cooked.
The dried and powdered leaves and flowers can be used as tea.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Sprouts	91.2	122	4.0		1.0	155	8.2	0.9
Leaves								

Insects:

Diseases:

Pests:

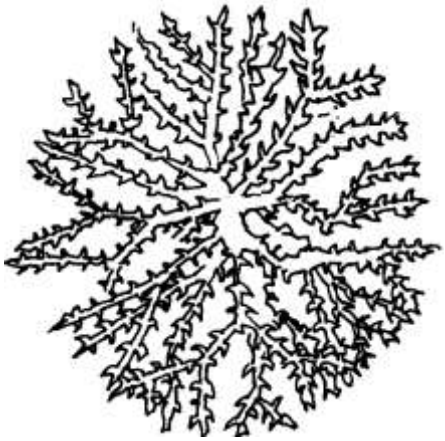
Importance: The sprouts are probably only used by expatriates and educated indigenes.

Names

English: Endive
Tok pisin:
Tok ples:

Scientific name: *Cichorium endivia* subsp. *endivia* L.
Synonyms: *Cichorium endivia* var. *crispum* Lam.
Plant family: Asteraceae

Description: An annual plant, or one which grows one year, then flowers the next. It grows 20-50 cm high and spreads 20-50 cm wide. The plant looks a lot like lettuce but the leaves are wrinkled near the edge.



Distribution: Plants grow from sea level up to 2600 m altitude in the tropics. It needs a fertile soil and the soil needs to be well drained. It is more tolerant to heat, than lettuce. It suits hardiness zones 9-11.

Cultivation: Plants are grown from seed. They are often transplanted. A spacing of 30 cm x 30 cm is suitable. Covering the plants for 2-3 weeks before harvesting, makes the leaves whiter, more tender and less bitter. It is possible to save seed. Plants which form a heart are covered with a cloth or pot to blanch them and reduce the bitterness.

Production: Plants are ready about three months after transplanting.

Use: The leaves are eaten raw or cooked. They have a slightly bitter taste.
The broadleafed kinds are used in stews and the curled-leaf kinds are used in salads.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	93.7	47	1.8		2.8	2000	12	0.3

Insects:

Diseases:

Leaf spot	Fungus	*Alternaria cichorii* Nattrass.

Pests:

Importance: Not widely grown in Papua New Guinea.

Names

English: Chicory, Witloof
Tok pisin:
Tok ples:

Scientific name: *Cichorium intybus* L.
Synonyms:
Plant family: Asteraceae

Description: A perennial herb up to 1 m high. It forms clumps. It has white, milky sap when parts are broken off. Kinds have been selected either for their fattened edible roots or for their edible leaves. The plant has a large taproot. The leaves are sword shaped and have teeth along the edge. The leaves form a cluster around the base of the plant. They can be 12 cm long. The leaves up the stem clasp the stem. The highest leaves are reduced to bracts. It has a bright blue, pink or white flowers on a branched stem. The flowers are dandelion-like. The flower heads can be 3.5 cm across. Several cultivated varieties have been produced.



Distribution: A Mediterranean plant. It grows in the highlands in the tropics. It suits hardiness zones 9-11.

Cultivation: Plants are grown from seed. Seed are sown 15 mm apart, in rows 20 cm apart. Seedlings do not transplant easily. Young tender shoots are formed by stripping roots of their leaves then covering with soil. Roots the size of a parsnip are harvested. These are then planted upside down in trenches in sand and after a few weeks more soil is added to exclude all light. The chicons are ready to use in 9-12 weeks.

Production: Roasted chicory is made by digging up the taproot washing them cutting and drying the root then roasting.

Use: The leaves and plant are eaten raw or cooked. They are bitter. Young leaves are less bitter. They are used in soups.
The roots of some kinds are dried, roasted and powdered then added to coffee.
The flowers can be used in salads.
The large blanched heads are steamed or served raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Stem	96.2	71	0.8		0.3	3	4	0.2
Leaves	92.0	96	1.7		0.9	4	24	0.4
Roots	80.0	305	1.4		0.8	1	5	0.3

Insects:

Diseases:

Leaf spot	Fungus	*Alternaria cichorii* Natrass

Pests:

Importance: Mainly in the gardens of expatriates within Papua New Guinea.

Names

English: Common bamboo
Tok pisin: Mambu
Tok ples:

Scientific name: *Bambusa vulgaris* Schrad. ex Wendl.
Synonyms:
Plant family: Poaceae

Description: An erect clump forming spineless bamboo. It is a large bamboo with strong stalks used for buildings. The stalks can be 20 m tall and 5-10 cm across at the base. They are often not straight. The stalks can be green and glossy or yellow or yellow with green stripes. It very rarely flowers. The distinctive culm sheath (top of the leaf that is wrapped around the stalk) helps identify the plant. The culm sheath is triangular and 15-45 cm long by 20 cm wide. The edges are hairy. The leaf blade is 6-30 cm long by 1-4 cm wide.

Distribution: It grows throughout the tropics and subtropics. It grows up to 1,200 m altitude. It does best at low altitudes. It can stand frost down to -3°C. It has been introduced to PNG and is common in the lowlands. (A different large bamboo is grown and eaten in the highlands of Papua New Guinea.) It suits hardiness zones 9-12.

Cultivation: It is easily grown by planting cut portions of the green stalks. It can also be grown from shoots off the rhizome or underground stem and from branches.

Production: Offsets can produce mature clumps in 7 years. They grow very quickly. Haulms can grow 4 m high in 2 weeks.

Use: The very young shoots are cooked and eaten.
They are cooked and pickled.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Shoots								

Insects:

Diseases:

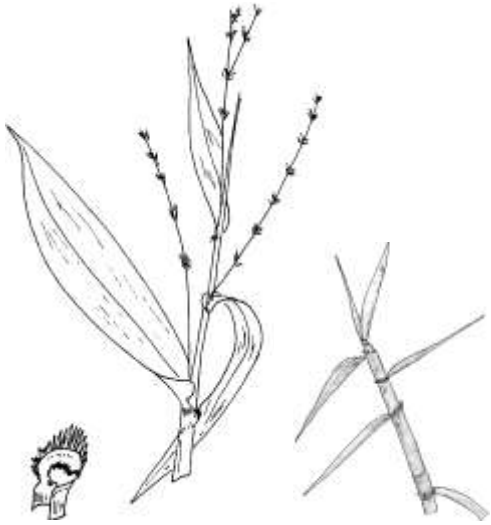
Leaf spot	Fungus	*Phaeoisariopsis bambusae*
Leaf spot	Fungus	*Plectronidium minor*

Pests:

Importance: The plant is widespread in Papua New Guinea and is important for building. As a food plant it is only of minor importance.

Names

English: Native Bamboo
Tok pisin:
Tok ples:
Scientific name: *Bambusa forbesii* (Ride)Holttum
Synonyms:
Plant family: Poaceae



Description: A scrambling bamboo which grows up to about 5 m tall and has canes about 3 cm across. There are several woody light coloured stems. It forms thick clumps which are hard to penetrate. The leaves are 20-50 cm long by 6-10 cm wide and rounded at the base. The leaves are light green. There are distinct hairs on the leaf sheath where the blade joins the stalk. The leaf sheath completely surrounds the stem. It flowers almost continually and doesn't die after flowering.

Distribution: A tropical plant. It grows from sea level up to about 1250 m altitude in Papua New Guinea. Often the plant grows near watercourses that are flooded in wet seasons. It is very sensitive to cold.

Cultivation: It is planted from cuttings of the cane. They take a little over a year to become established and produce edible shoots. They also grow wild. To stop clumps spreading the rhizome below the ground level needs to be chopped through. Young plants are not easily transplanted. Rooted shoots near the base can be separated off and replanted.

Production:

Use: The young shoots are harvested and cooked and treated like a pitpit.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Shoots								

Insects:

Diseases:

Pests:

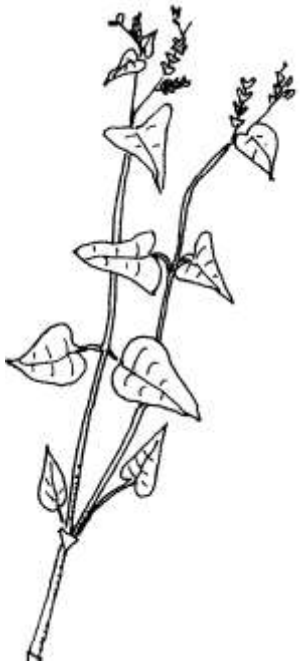
Importance: It occurs fairly widely as a self sown plant and is a minor food in several areas. It is cultivated in gardens at Kutubu in Papua New Guinea.

Names

English: Buckwheat
Tok pisin:
Tok ples:

Scientific name: *Fagopyrum esculentum* Moench
Synonyms:
Plant family: Polygonaceae

Description: An upright annual plant up to 1 m high. It spreads to 1 m across. It has angular hollow stems. These are erect and branching. Leaves are heart shaped or triangular and small. It has groups of white or pink flowers. These have a smell. They occur in clusters at the ends of branches. Fruit are small and 3 angled. The plants are not grasses but the seeds are normally grouped with other grain crops.



Distribution: It can be grown at high altitudes in the tropics. It will grow on poor soils. It prefers rich soils and a protected sunny position. It is resistant to frost but damaged by drought. In Nepal it grows between 1000-2500 m altitude. In Uttar Pradesh it grows up to 3000 m altitude.

Cultivation: Plants are grown from seed.

Production: Seeds usually germinate in 5 days. It has a very short growing period from sowing to maturity. It can produce a crop of leaves in 8 weeks and seeds in 12 weeks. Seed ripen irregularly over several weeks making harvesting difficult. Under cool conditions plants flower in 7-9 months. Commercial grain yields in Australia have been up to 2.5 tonnes/ha. In India yields of 600-800 kg/ha are achieved.

Use: The seeds are eaten in porridge and biscuits etc.
Seeds can be soaked overnight then sprouted and eaten.
The tender leaves and shoots are cooked and eaten.
Caution: The seeds are used mainly for flour and stock feed. Seeds are bitter. If they are eaten in large amounts they can produce an unpleasant skin disorder.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds								
Sprouts								
Leaves								

Insects:

Diseases:

Pests:

Importance:

Names

English: Beetroot
Tok pisin:
Tok ples:

Scientific name: *Beta vulgaris* L.
Synonyms:
Plant family: Chenopodiaceae

Description: A dark green leafed plant. The plant is upright and about 20 cm tall. It can be grown as an annual plant. The leaves vary in shape and colour. They can be oval with an irregular wavy edge. They can be dark green or reddish. It has a round or elongated fattened root. The root is red in colour. (White varieties also occur). The flowers are small and green and have both sexes. They occur in flower arrangements with the end bud a flower bud. This forms a tall, branching, spike-like arrangement. The fruit are one seed. Often 2 or more seeds are joined together in a "seedball".



Distribution: It is a temperate climate plant. It is mainly in the highlands between 1150 and 2600 m altitude in the tropics. Plants are frost resistant.

Cultivation: Plants are grown from seed. Normally the plants are planted in the final site because transplanting is difficult. When the small clump of seeds or seed ball are planted more than one seedling will result.

Production:

Use: The red tubers are eaten after cooking. The root is also dried and powdered and the flour mixed with barley or wheat.
They are often boiled, sliced and served with vinegar.
Tops or leaves are edible. They are cooked in soups and stews.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Root	82.7	189	1.8		0.4	4	5	0.4
Leaves	89.0	113	2.6		1.9	510	25	0.5

Insects:

Alcidodes sp.	Curculionidae (COL)	Weevil
Apirocalus cornutus Pasc.	Curculionidae (COL)	Horned weevil
Henosepilachna signatipennis (Boisd.)	Coccinellidae (COL)	Leaf eating ladybird
Spoladea recurvalis Fabricius	Pyralidae (LEP)	Beet webworm

Diseases:

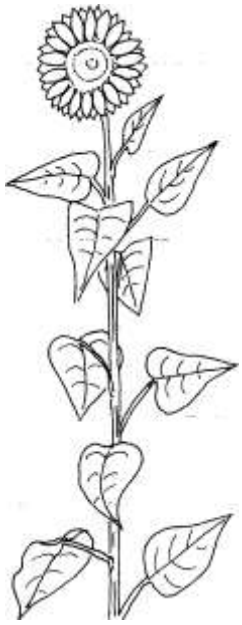
Leaf spot	Fungus	*Cercospora beticola* Sacc.
Blossom blight	Fungus	*Choanephora cucurbitarum* (Berk & Rav.)Thaxter

Pests:

Importance: Not often seen in Papua New Guinea.

Names

English: Sunflower
Tok pisin:
Tok ples:
Scientific name: *Helianthus annuus* L.
Synonyms:
Plant family: Asteraceae



Description: An upright annual plant. It varies in height from 1-4 m. It has a strong tap root. Plants are mostly unbranched but may have some branches. The stems are hairy. The leaves are large and oval to heart shaped. They have teeth around the edges. They are roughly hairy and mid to dark green. Leaves can be 10-40 cm long by 5-20 cm wide. The leaf stalk is long. The flowers are yellow and daisy like. Flowers are 9-20 cm across. Sometimes they are tinged red or purple.

Distribution: It suits the highlands of the tropics and can stand a light frost. It needs a well drained soil. It prefers a rich soil. It is drought and frost resistant. Sunflowers grow from the equator to 55°N latitude. They do not suit the wet tropics. They cannot tolerate very acid soils. In Nepal it grows up to 600 m altitude. It suits hardiness zones 4-11.

Cultivation: Plants are grown from seed. Only well filled seed should be planted. It is easy to save your own seed. Dry seed stores well. It will grow on most soils. A plant spacing of 1 m by 0.5 m is suitable. Seed are sown at a depth of 2-4 cm. At maturity heads are collected by hand and dried then threshed.

Production: Time to maturity is usually 4-5 months. Seeds are ready to eat when the flower starts to wither.

Use: An edible oil is extracted from the seeds and used for cooking.
Sometimes seeds are eaten raw or roasted.
The seeds can be ground into a meal for using in bread and cakes.
They are also dried, roasted and ground and used as a coffee substitute.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed	5.4	2385	22.8		6.8	5	1.4	5.1

Insects:

Colgar tricolor Dist.	Flatidae (HOM)	
Helicoverpa armigera Hubner	Noctuidae (LEP)	Corn earworm
Helicoverpa punctigera Wallengren	Noctuidae (LEP)	Corn earworm
Homona coffearia Nietn.	Tortricidae (LEP)	Coffee leaf roller
Oribius cinereus Mshl.	Curculionidae (COL)	Shot hole weevil
Oribius inimicus Mshl.	Curculionidae (COL)	Shot hole weevil
Phaneroptera brevis Serv.	Tettigoniidae (ORTH)	Longhorn grasshopper
Phytometra orichalcaea (F)	Noctuidae (LEP)	
Plautia brunneipennis	Pentatomidae (HEM)	Stink bug
Spodoptera exempta (Walker)	Noctuidae (LEP)	African armyworm

Diseases:
Pests:
Importance: A major crop for oil seed. The seeds contain 40% oil. It is only a minor food in Papua New Guinea.

Grains and cereals

Grains and cereals

English name	Tok Pisin	Scientific name	Page
Rice	Rais	*Oryza sativa*	**275**
Wild rice		*Oryza rufipogon*	**278**
Sorghum		*Sorghum bicolor*	**279**
Wheat		*Triticum aestivum*	**280**
Bermuda grass		*Eleusine indica*	**281**
Job's tears		*Coix lachryma-jobi*	**282**

Names

English: Rice
Tok pisin:
Tok ples:

Scientific name: *Oryza sativa* L.
Synonyms:
Plant family: Poaceae



Description: An annual grass with hollow stems. The stems can be 30 cm to 150 cm tall. (Floating varieties can be 5 m long.) The nodes are solid and swollen. The stem is protected by a skin layer which can often be high in silicon. A clump of shoots are produced as tillers from buds in the lower leaf axils. The leaves are narrow and hairy. They taper towards the tip. Each stem produces 10-20 leaves and the seeds hang from the flower stalk at the top.

Distribution: It grows in tropical and subtropical countries. Plants are grown in both flooded and dryland sites. It will grow over a range of conditions but is normally between sea level and 900 metres altitude in the tropics. Occasionally it is grown up to 1600 m. In Nepal it grows to about 2800 m altitude. It suits hardiness zones 9-12.

Cultivation: Plants are grown from seed. Seed can be sown direct or in a nursery and transplanted. For dryland crops - 5 to 10 seeds in holes 20 to 25 cm apart. For transplanting 2 or 3 plants as a 20 x 20 cm spacing is suitable. Weed control is a problem in the early stages. Flooding can be used for weed control.

Production: The glumes are removed to produce husked rice. Polishing removes the integument giving polished rice. Rice development takes 90 to 200 days depending on variety.

Use: The grains are boiled and eaten after the husks are removed by pounding and winnowing.
Rice noodles and rice flour can be produced.
Rice can be used to make alcoholic drinks.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed white	11.4		4.8		1.0		0	
Seed brown			8.0		2.5			

Insects:

Amorbus rhombeus Westw.	Pentatomidae (HEM)	
Arsipoda tenimberensis Jacoby	Chrysomelidae (COL)	Black flea beetle
Atherigona oryzae Malloch	Muscidae (DIPT)	Paddy stemfly
Blissus sp.	Lygaeidae (HEM)	
Borbo cinnara Wallace	Hesperiidae (LEP)	
Borbo impar tetragraphus Mab.	Hesperiidae (LEP)	Borbo butterfly
Bothrichara palliata Macleay	Cerambycidae (COL)	
Brevennia rehi (Lindinger)	Pseudococcidae (HEM)	Mealybug of rice
Caenoblissus pilosus (Barber)	Lugaeidae (HEM)	Chinch bugs
Chaetocnema basalis (Baly)	Chrysomelidae (COL)	
Chilo auricilius (Dudg.)	Pyralidae (LEP)	Gold-fringed rice borer
Chilo infuscatellus Snellin	Pyralidae (LEP)	
Chilo suppressalis (Walker)	Pyralidae (LEP)	Purple lined rice stem borer

Cicadella spectra (Dist.)	Cicadellidae (HEM)	White jassid
Cicindela decem-guttata urvillei Dejean	Cicindellidae (COL)	
Cnaphalocrocis medinalis (Gn.)	Pyralidae (LEP)	Rice leaf roller
Cnaphalocrocis poeyalis Boisduval	Pyralidae (LEP)	Rice leaf rollers
Coronacella kirkaldyi Muir	Delphacidae (HEM)	
Cyrtorhinus lividipennis Reuter	Miridae (HEM)	Predator of *Nilaparvata lugens*
Dimorphopterus cornutus Slater	Lygaeidae (HEM)	
Dimorphopterus sp.	Lygaeidae (HEM)	
Eysarcoris ventralis West.	Pentatomidae (HEM)	
Gonocephalum ochthebioides Ful.	Tenebrionidae (COL)	False wireworm
Gryllotalpa africana Pal.	Gryllotalpidae (ORTH)	Mole crickets
Helicoverpa armigera (Hubner)	Noctuidae (LEP)	Corn earworm
Leptocorisa acuta (Thunberg)	Alydidae (HEM)	Paddy bugs
Leptocorisa discoidalis	Alydidae (HEM)	Paddy bugs
Leptocorisa oratorius (Fab.)	Alydidae (HEM)	Paddy bugs
Leptocorisa palawanensis	Alydidae (HEM)	Paddy bugs
Leptocorisa solomonensis Ahmad	Alydidae (HEM)	Paddy bugs
Locusta migratoria (Linnaeus)	Acrididae (ORTH)	Migratory locust
Lophops sp.	Lophopidae (HEM)	
Maliarpha separatella Rag.	Pyralidae (LEP)	White stem borer
Marasmia spp.	Pyralidae (LEP)	Rice leaf rollers
Marasmia bilineatis	Pyralidae (LEP)	Rice leaf rollers
Marasmia hexagona	Pyralidae (LEP)	Rice leaf rollers
Meijerella inaequalis Becker	Chloropidae (DIPT)	
Melanitis ledabankia F.	Nymphalidae (LEP)	Evening brown butterfly
Meninda bisignata Walker	Pentatomidae (HEM)	
Mythimna loreyi (Dup.)	Noctuidae (COL)	Rice armyworms
Mythimna separata (Walk.)	Noctuidae (COL)	Rice armyworms
Nephotettix apicalis (Motsch.)	Jassidae (HEM)	Green rice leafhopper
Nezara viridula (Linnaeus)	Pentatomidae (HEM)	Green vegetable bug
Nilaparvata lugens Haseg	Delphacidae (HEM)	Brown backed rice planthopper
Ostrinia furnacalis (Guen.)	Pyralidae (LEP)	Maize stem borer
Oxya japonica (Thnb.)	Acrididae (ORTH)	
Oxya vittigera (Blanch)	Acrididae (ORTH)	
Pachybrachius nervosus Horv.	Lygaeidae (HEM)	
Pelopidas agna dingo Evans	Hesperiidae (LEP)	
Rhopalosiphum maidis (Fitch.)	Aphididae (HEM)	Corn leaf aphid
Saccharicoccus sacchari (Cockerell)	Pseudococcidae (HEM)	Sugarcane mealy bug
Scirpophaga innotata (Walker)	Pyralidae (LEP)	White rice borer
Sesamia inferens (Walker)	Noctuidae (LEP)	Violet rice stem borer
Sogatella furcifera Horvath	Delphacidae (HEM)	White backed rice planthopper
Spodoptera exempta (Walker)	Noctuidae (LEP)	African armyworm
Spodoptera litura (Fab)	Noctuidae (LEP)	Cluster caterpillar
Spodoptera mauritia (Boisduval)	Noctuidae (LEP)	Paddy armyworm
Stenocatantops augustifrons (Walker)	Acrididae (ORTH)	
Tetraneura nigriabdominalis (Sas.)	Aphididae (HEM)	Rice root aphid
Trypopsilopa chinensis Wiedimann	Ephydridae (DIPT)	
Valanga irregularis (Walker)	Acrididae (ORTH)	Giant grasshopper
Valanga nigricornis (Burm.)	Acrididae (ORTH)	Javanese grasshopper
Valanga sp.	Acrididae (ORTH)	

Diseases:

Rot at base of plant	Fungus	*Athelia rolfsii*
Narrow brown leaf spot	Fungus	*Cercospora oryzae*
Leaf spot & on grains	Fungi	*Cochliobolus cynodontis*
(As Brown spot) and	Fungus	*Cochliobolus geniculatus*
	and	*Cochliobolus hawaiiensis*

	and	*Cochliobolus miyabeanus*
Leaf smut	Fungus	*Entyloma oryzae*
Seedling blight	Fungus	*Fusarium lateritium*
Foot rot	Fungus	*Gibberella fujikuroi*
Brown sheath rot	Fungus	*Gaeumannomyces graminis*
Stem rot rice	Fungus	*Magnaporthe salvinii*
Leaf blotch	Fungus	*Metasphaeria oryzae-sativae*
White leaf streak	Fungus	*Mycovellosiella oryzae*
Glume blotch	Fungus	*Phaeoseptoria oryzae*
Sheath blight	Fungus	*Thanatephorus sasakii*
Leaf spot	Fungus	*Trichoconiella padwickii*
False smut	Fungus	*Ustilaginoidea virens*
Root knot	Nematode	*Meloidogyne sp.*

(Also several fungi isolated off stored grain.)

Pests:

Importance: Although rice is a very popular food, rice is only grown on a small scale in several coastal areas of Papua New Guinea.

Names

English: Wild rice
Tok pisin:
Tok ples:

Scientific name: *Oryza rufipogon* Griff.
Synonyms:
Plant family: Poaceae

Description: It is wild rice. It has swollen roots.

Distribution: It grows on the edges of ponds or floating on water.

Cultivation: In Rajasthan in India, seed are produced in September to November.

Production:

Use: The seeds are eaten like rice.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed								

Insects:

Diseases:

Pests:

Importance:

Names

English: Sorghum
Tok pisin:
Tok ples:

Scientific name: *Sorghum bicolor* (L.) Moench
Synonyms: *Sorghum vulgare* Pers., nom. illeg.
Plant family: Poaceae



Description: A millet grass. A mature sorghum plant resembles maize. Plants vary in height from 45 cm to 4 m. It is an annual grass with erect solid stems. The stems can be 3 cm across at the base. Under the ground there is a widely branching extensive root system. Prop roots occur near the base. There are a range of different types of sorghum. Some have one main stem while others have many tillers. There are more tillers when plants are widely spaced. The nodes on the stem are slightly thickened. The distance between nodes is shortest near the base of the plant. Short eagerly kinds have 7 leaves while tall late varieties may have 24 leaves. The leaf blade can be 30-135 cm long. Leaves are bluish green and waxy. They have a prominent midrib. The large flower panicle can be 20-40 cm long. The flower occurs at the top of the plant. It can stick upright or bend over. The flower can be open or compact. There are several different varieties.

Distribution: It suits the savannah zones in the tropics. It tolerates heat and drought. It can recover from drought even as a seedling. It can tolerate waterlogging. It can be grown on heavy or light soils. Sorghum needs short daylengths to flower. Many kinds are adapted to specific daylength and rainfall patterns. It suits hardiness zones 9-12.

Cultivation: Sorghum seeds will germinate soon after harvest. The seeds also store well if kept dry and protected from insects.

Production: Grain is ready for harvest 4-8 weeks after flowering.

Use: Flour is prepared then used for porridge or other dishes. It cannot be used for bread as it contains no gluten.
The stems of some kinds are sweet and are chewed.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed								
Stems								

Insects:

Diseases:

Pests:

Importance: One of the most important cereals of the semi-arid tropics. It is the most important native African cereal. It is grown on 50 million hectares in Africa. It is mainly only used for poultry and stock food in Papua New Guinea.

Names

English: Wheat
Tok pisin:
Tok ples:

Scientific name: *Triticum aestivum* L.
Synonyms: *Triticum vulage* Vill.
Plant family: Poaceae



Description: An annual grass. It easily forms tillers to produce a clump of shoots. Plants grow between 30 and 80 cm tall. The stems are erect and simple. They are usually without hairs. The stems have 5-7 nodes and are hollow between these. The leaf sheath is wrapped around the stem. It is entire at the lower section but split further up. The strap like part where the leaf blade forms is coourless and jagged. The blade is flat, narrow and pointed. It is about 20-37 cm long and 1.2 cm wide. The veins are parallel. The flower stalk or ear is at the end of the stem as a compound spike. It is 5-10 cm long. There are 2 rows of spikelets along each side. Usually 2 grains per spike develop and these are oval with a groove along the centre. There is a tuft of hairs at the end.

Distribution: A temperate plant. It is grown st higher altitudes in the subtropics and tropics. In East Africa most wheat is grown between 1,600 and 3,000 m altitude. The best temperature for germination is about 29°C and the minimum temperature about 4°C. Under good conditions seeds germinate in about 4-5 days. In Nepal it grows to about 3,000 m altitude. Wheat can be grown to 57°N in Britain. It suits hardiness zones 9-11.

Cultivation: Seed should be sown into a clean weed free seedbed. Seeds can be broadcast or drilled. Seed should be 2.5-5 cm deep and plants 20-25 cm apart.

Production: Spring wheat has a growing period of 100 days or more. The rainfall of most wheat areas is 750 mm per year or less. In the tropics maturity varies between 95 and 150 days. Yields of 1,420 kg per ha are world average.

Use: Wheat is mostly ground for flour. It is used for bread, chapaties and a range of doughs and cakes.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance: It has been tried in trials in the equatorial highlands but most wheat is imported. It is a major import into Papua New Guinea.

Names

English: Bermuda grass
Tok pisin:
Tok ples:

Scientific name: *Eleusine indica* (L.) Gaertn.
Synonyms:
Plant family: Poaceae

Description: A tufted annual grass. It grows up to 0.6 m tall. It has many branches from the base and tough wiry stems. The stems are slender and flattened. The leaves are 17 cm long and 3-8 mm wide. The leaves are covered with a bluish-green bloom. They are folded. The flower spikes are divided like fingers on a hand except for one which is single and below. The flowers do not have stalks and the flower spikes are 4-15 cm long. The seed heads shatter at maturity dropping their seed.

Distribution: It is mainly a tropical and subtropical plant. In the tropics it grows from sea level to 1800 m altitude. It tends to grow in places high in nitrogen. It grows on clayey soil.

Cultivation: It is mostly self sown from seed. Seed are spread in animal manure.

Production: It Australia plants flower and fruit in April.

Use: The seeds are used as food in times of food shortage.
The young shoots are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Shoots								
Seeds								

Insects:

Diseases:

Pests:

Importance:

Names

English: Job's tears
Tok pisin:
Tok ples:

Scientific name: *Coix lachryma-jobi* Linnaeus
Synonyms:
Plant family: Poaceae



Description: A millet grass. It is a loosely tufted, tall, annual grass. It grows up to 1-2 m high with long slender leaves. The stems have a soft, white, centre inside. The leaves can be 60 cm long and 3-5 cm wide. The sheath of the leaf around the stem, is short. The flower stalk is long and arching. Male and female flowers are in separate spikes on the flowering stalk. The female flowers have a hard covering which changes from green to black to white, as it ripens. Male flowers are small and on top. The seed is like a bead and used for necklaces. They are 1.5 cm long. The seeds are green when young, and turn to pearly grey or purple when mature.

Distribution: A tropical and subtropical plant. It grows wild and semi-cultivated in many areas of Papua New Guinea. It is well suited to grow in swampy places. It grows up to 2000 m altitude in the tropics. It suits hardiness zones 9-11.

Cultivation: Plants are grown by seed. It grows wild in many swampy places. Seed are sown 5 cm deep. Plants are spaced at 40-60 cm.

Production: Seeds are ready to harvest about 5 months after sowing. On poor soils in dry conditions, hollow fruits may be produced. The tough seed shell has to be broken.

Use: The seeds are eaten raw. They can be cooked like rice.
The seeds can be crushed to produce a cereal flour.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed	12.5	588	15.0			0	0	

Insects:

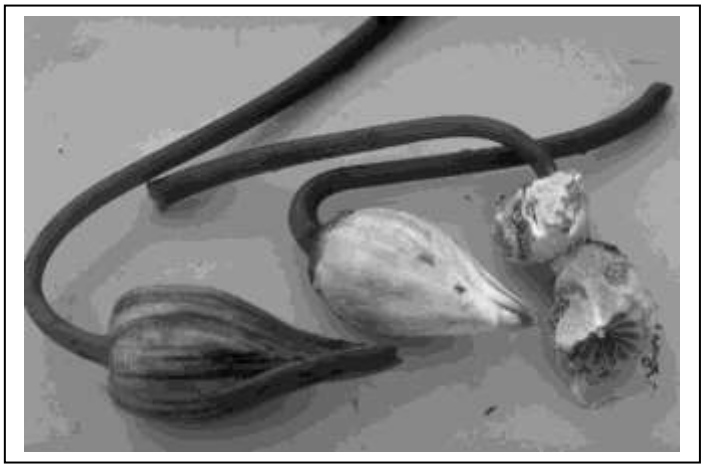
Diseases:

Leaf spot	Fungus	*Cercospora sp.*
Tar spot	Fungi	*Phyllachora coicis* P.Henn
	And	*Phyllachora graminis* Fuch.
Rust	Fungus	*Puccinia operta* Mundk. & Thirum.
Leaf galls and mosaic	Viruses	

Pests:

Importance: Common in most areas of Papua New Guinea but rarely eaten. It is eaten often in some places e.g. Mendi Valley. Similarly in many tropical countries, the thin shelled form is used as food.

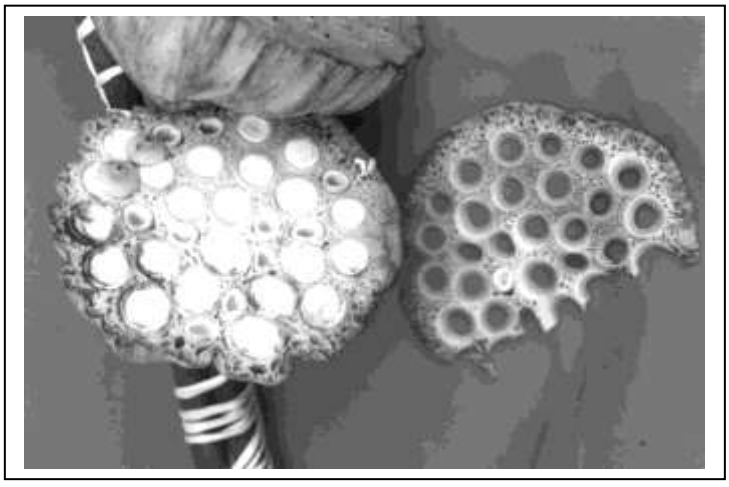
Waterlilies



Nymphaea pubescens

Nymphaea violacea





Nelumbo nucifera

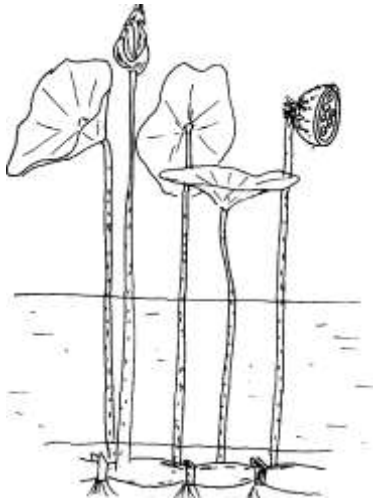
Waterlilies

English name	Tok Pisin	Scientific name	Page
Lotus root		*Nelumbo nucifera*	**285**
Giant waterlily		*Nymphaea gigantea*	**286**
		Nymphaea lotus var. *pubescens*	**287**
		Nymphaea macrosperma	**288**
Tiny waterlily		*Nymphaea nouchali*	**289**
Blue waterlily		*Nymphaea violacea*	**290**

Names

English: Lotus root
Tok pisin:
Tok ples:

Scientific name: *Nelumbo nucifera* Gaertner
Synonyms:
Plant family: Nelumbonaceae/Nymphaeaceae



Description: A herb which grows in water and continues growing for several years. The rootstock is under water and creeping. The leaf stalk grows 1-2 m high. The leaves can be 20-90 cm across. It has large round leaves which stand out of the water. The stalk joins to the centre of the leaf. It has large attractive pink, red or white flowers which stand out of the water on long stalks. Flowers are pink or white and 15 to 25 cm across. The flower stalk can be longer than the leaf stalk. The mature fruit is a spongy cone shaped structure with several seeds about 1 cm across under the holes in the top. These fruit can be 7-15 cm long. The edible rhizome is submerge in mud.

Distribution: It is a tropical plant but will grow in cooler places. It needs 20-30°C. It needs full sunshine. It can grow in deep water. It does best in fresh water. The pH can range from 5.6-7.5. It suits hardiness zones 9-12. It will probably grow up to about 1000 m altitude.
It occurs in the Fly and Sepik River areas in Papua New Guinea. It is cultivated in most of China except the very northern areas. It suits hardiness zones 9-12.

Cultivation: It can be grown from sections of the root or from seed. Seed germinate between 25-30°C. The hard seed coat needs to be cracked to enable seed to grow. Seed will remain viable for many years. Plants grown from seed vary as seed do not breed true. It needs to be in water at least 30-50 cm deep. Rhizomes with 2-3 segments are used. They are put in the mud at a 30° angle.

Production: Rhizomes are harvested all year round and contain an abundance of starch. Plants grown from seed take 2 years to produce. Plants grown from cuttings can produce the same year.

Use: The seeds are eaten raw or roasted. Ripe seeds are prepared by removing the seedcoat and the intensely bitter plumule and then boiled in syrup. Slightly unripe seeds are also eaten raw.
The white roots are eaten raw with meat.
The flower stalks are cooked as a vegetable. They are also eaten raw.
The young tender leaves are eaten with a savoury sauce.
The stamen are used for flavouring tea.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed	38.8	545	8.8		8.0	2	3	0.2
Root	81.4	276	1.6		0.9	0	27.4	0.3
Flower stalks								
Leaves								

Insects: **Diseases**: **Pests**:

Importance: The rhizomes are sold in markets. The stalks are sold in markets. The plant occurs in several coastal areas of Papua New Guinea and the seeds are the part most commonly used for food. It is a sacred plant to Hindus.

Names

English: Giant waterlily, Blue waterlily
Tok pisin:
Tok ples:
Scientific name: *Nymphaea gigantea* Hook.
Synonyms:
Plant family: Nymphaeaceae

Description: A plant which grows in water. It grows 8-40 cm high and spreads 0.9-3.5 m wide. It is a herb with a round rhizome or underground stem. The leaves are 80 cm across. They are round but with a slit towards the centre. They float on the water. They are green. The edges have uneven teeth about 0.5 cm long. The flowers are about 25 cm across. They grow on stems which reach 50 cm above the water. There are 4 sepals and 32 petals. The sepals are 11 cm long and green with purple stripes. The petals are white, pink or blue. The flowers open during the day and close at night. The fruit is a berry 5 cm across. It is round.

Distribution: It is a warm temperate or subtropical plant. It usually grows in pools or permanent water. It can grow in water 1-3 m deep. It grows in soft mud. It needs water above 27°C to bloom and grow. It suits hardiness zones 11-12.

Cultivation: Plants can be grown from seed or by division of the rhizome.

Production:

Use: The porous seed stalk is peeled and eaten raw or roasted.
The tubers are roasted and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed	57.4		3.4		1.8		9	0.2
Tubers	55.3	563	2.1		22.2		2	2.1

Insects:

Diseases:

Pests:

Importance:

Names

English: Waterlily

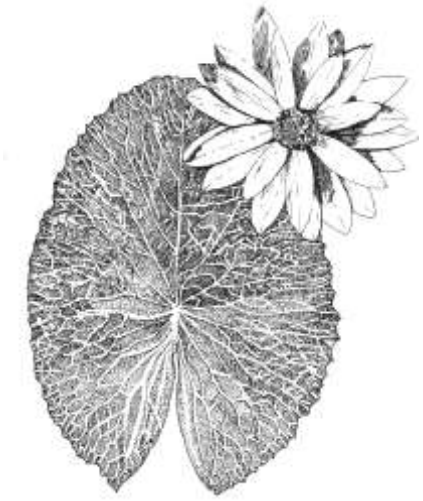
Scientific name: *Nymphaea lotus* var. *pubescens* L., (Willd.)Hook.f.& Th

Tok pisin:

Synonyms: *Nymphaea pubescens* Willd.

Tok ples:

Plant family: Nymphaeaceae



Description: A herb which grows in water. The rhizome creeps in the mud. They produce slender stolons or runners. The leaves are oval or round. They are deeply divided into a heart shape. They have coarse teeth. Leaves are 15-26 cm across. They float on the water. They are papery. They are hairy underneath. The leaf stalk is cylindrical. The flowers are above the water. The flowers occur singly. There are 4 outer green segments. There are 12-14 petals. Flowers are large (5-8 cm across) and white, pink or violet. The fruit is round and compressed. It is fleshy and ripens under the water. There are many seeds, which are round. The seeds are 1-2 mm across and have lines along them.

Distribution: It is cultivated in ditches and ponds. In China it grows in ponds in the hills.

Cultivation: The stalks of the flowers are edible. They are eaten raw or added to soup.

Production:

Use: The seeds can be eaten raw when the fruit are green.
The seeds from dry heads are removed and ground into flour and used for bread.
The root can be baked or boiled and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds								
Root								

Insects:

Diseases:

Pests:

Importance:

Names

English: Waterlily
Tok pisin:
Tok ples:
Scientific name: *Nymphaea macrosperma* Merr. & Perry
Synonyms: *Nymphaea dictophlebia* Merr. & Perry
Plant family: Nymphaeaceae

Description: A plant which grows in water in swamps. This herb keeps growing from year to year. The rhizome or underground stem is round. The leaves are 55 cm across. The leaves are almost round but with a split towards the centre. The edges of this overlap. The leaf lays near the water surface. There are evenly spaced teeth around the edge of the leaf. The flower is on a stalk above the water. The flower is 15 cm across and occurs singly. It is 30 cm above the water. The flowers have a sweet smell. The flowers open during the day and close at night. There are 4 sepals and 22 petals. The sepals are 6.5 cm long and green with purple stripes. The petals are white, blue or pink. The fruit is a berry 4 cm across. It is round.

Distribution: It grows in water up to 3 m deep. It grows in the tropics and subtropics.

Cultivation: Plants can be grown from seed or by dividing the rhizome.

Production:

Use: The seed are eaten after extracting from the fruit.
Some parts of the young flower buds are eaten raw.
The flower stem is eaten raw after peeling off the skin.
The tuber is roasted then peeled and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	54.2	479	2.9		2.5		4	0.5
Flower buds								
Stalks								
Tuber	33.6	575	9.6			3.4	4	0.8

Insects:

Diseases:

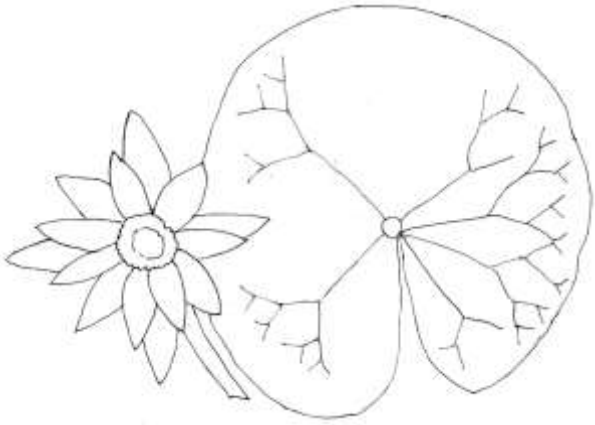
Pests:

Importance:

Names

English: Tiny waterlily, Blue lotus
Tok pisin:
Tok ples:

Scientific name: *Nymphaea nouchali* Burm.f.
Synonyms:
Plant family: Nymphaeaceae



Description: A herb which grows in water and keeps growing for several years. It is about 1.5 m high. The rhizomes or underground stems are erect and unbranched. The leaves arise from the base of the plant and are very large with few teeth around the edge. The leaves are shaped like an arrowhead. They are green on the upper surface and reddish on the lower surface. Leaves are 13 cm long and 7-10 cm wide. They can be 45 cm across. They are on long stalks. The flowers are slightly above the water. The flowers are very large with white petals tinged with pink or yellow. The flowers are 8-18 cm across. There are 10-30 petals. The fruit are fleshy. They are round and 1.5-4.5 cm across. There are many seeds inside. The seeds are oval or round and 0.5-1.3 mm across. They have rows of hairs along them.

Distribution: It is a tropical and subtropical plant. It grows in ditches and rice fields. They are widely distributed in the Philippines being very abundant in some lakes.

Cultivation:

Production: Tubers are normally available throughout the year.

Use: The seed are eaten raw.
The stalks and roots are cooked and eaten.
The stalks are also eaten raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed								
Stalks								

Insects:

Diseases:

Pests:

Importance: The stalks are sold in markets. In Papua New Guinea, the plant is more commonly used in very swampy lagoon areas such as Suki and Balimo in the Western Province. In India, stalks are sold in markets.

Names

English: Blue Water lily
Tok pisin:
Tok ples:

Scientific name: *Nymphaea violacea* Lehm.
Synonyms:
Plant family: Nymphaeaceae



Description: A herb which grows in water. It keeps growing from year to year. It floats on the water with the rhizome rooted in the mud. The leaves are large and smooth. The are round with a deep split or lobe at the base. The blade is 10-30 cm long by 10-25 cm wide. It floats on the water surface. The leaf is dark green and has easy to see veins underneath. The edges of the leaf are sometimes slightly wavy. There is a long thick fleshy stalk. The flowers are large and white or blue or pink. They are many yellow stamens in the centre.

The flowers are 5-15 cm across. They occur on long stalks either at water level or up to 15 cm above the water. The fruit are spongy berries. These have many seeds. They are green and about 2-3 cm across. They are carried under the water and break up when ripe.

Distribution: They grow naturally in fresh water swamps.

Cultivation: Plants can be grown from seed or by dividing the rhizome.

Production:

Use: The rootstock, stalk and seed head are eaten raw or cooked.
The seeds can also be made into flour.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds								
Root								
Stalk								
Seed head								

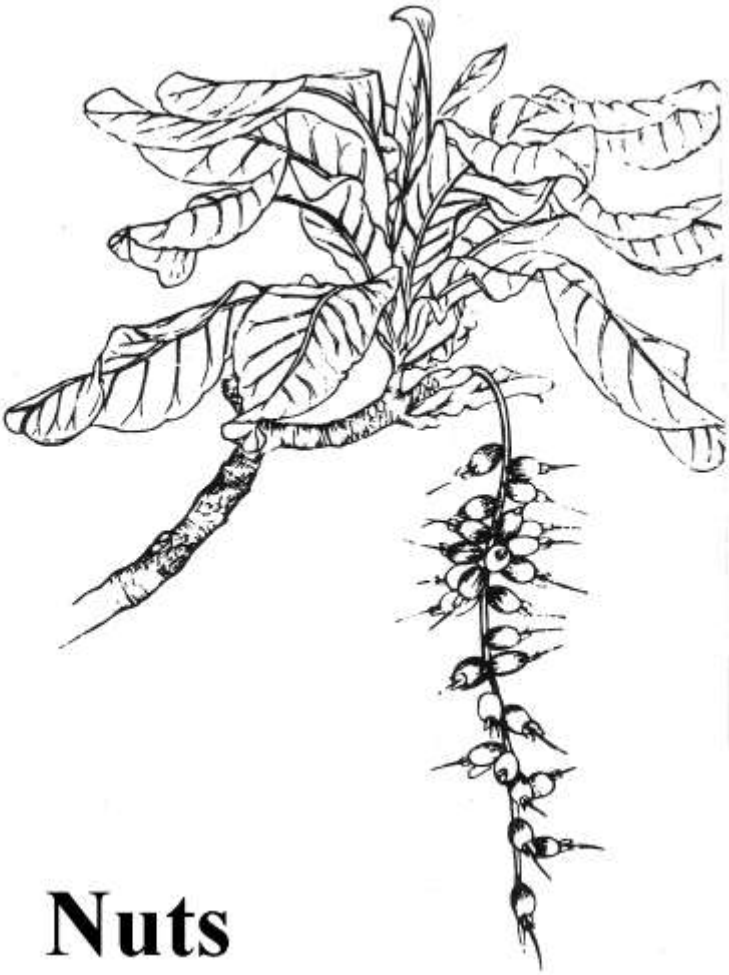
Insects:

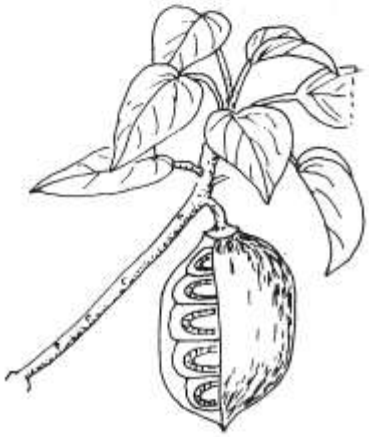
Diseases:

Pests:

Importance:







Nuts







Nuts

English name	Tok Pisin	Scientific name	Page
Java almond	Galip	*Canarium indicum*	**293**
		Canarium kaniense	**295**
		Canarium salomonense	**296**
		Canarium vitiense	**297**
		Canarium sp.	**298**
		Canarium schlechteri	**299**
		Canarium lamii	**300**
		Canarium decumanum	**301**
Melville Island white beech		*Canarium australianum* var.*glabrum*	**302**
		Canarium acutifolium	**303**
	Vutu kana	*Barringtonia edulis*	**304**
Pao nuts	Pao	*Barringtonia procera*	**305**
		Barringtonia niedenzuana	**306**
	Pao	*Barringtonia novae-hibernae*	**307**
Breadfruit	Kapiak	*Artocarpus altilis*	**308**
Jackfruit		*Artocarpus heterophyllus*	**311**
		Artocarpus vrieseanus	**313**
Karuka	Karuka	*Pandanus jiulianettii*	**315**
Wild karuka	Wail karuka	*Pandanus brosimos*	**317**
		Pandanus antaresensis	**318**
Coastal pandanus		*Pandanus tectorius*	**319**
		Pandanus dubius	**320**
	Okari	*Terminalia kaernbachii*	**321**
	Talis	*Terminalia impediens*	**322**
	Talis	*Terminalia copelandii*	**323**
Tropical almond		*Terminalia catappa*	**324**
		Terminalia calamansanai	**325**
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Finschia nuts		*Finschia chloroxantha*	**330**
		Finschia ferruginiflora	**331**
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Macadamia		*Macadamia ternifolia*	**332**
Rough shelled madacamia		*Macadamia tetraphylla*	**333**
Polynesian chestnut	Aila	*Inocarpus fagifer*	**334**
Nypa		*Nypa fruticans*	**336**
Tambour		*Omphalea queenslandiae*	**337**
Cape chestnut		*Horsfieldia australiana*	**338**
		Elaeocarpus polydactylus	**339**
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Queensland almond		*Elaeocarpus bancrofti*	**342**
Blue quandong		*Elaeocarpus angustifolius*	**343**
Arnhem land quandong		*Elaeocarpus arnhemicus*	**344**
Qandong		*Elaeocarpus culminicola*	**345**
Castanopsis chestnut		*Castanopsis acuminatissima*	**346**
Candle nut		*Aleurites moluccana*	**347**

Names

English: Galip nut, Java almond
Tok pisin:
Tok ples:

Scientific name: *Canarium indicum* L.
Synonyms: *Canarium commune* L.
Plant family: Burseraceae



Description: It is a large tree often up to 40m high. The stems are often twisted or rough and 1 m across the trunk and there are usually buttresses at the base of the tree. The buttresses are tall but thin. The small branches are more or less powdery. The vascular strands are unusual as can be seen in the pith or centre mass of cells, not spaced in a continuous circle as in many trees. The leaf of a galip tree is made up of 3 to 7 pairs of leaflets. The leaves do not have hairs on them. The leaflets are oblong and can be 7 to 28 cm long and 3 to 11 cm wide. In young trees the leaves are distinctly larger. The leaves are pointed at the tip and rounded at the base. The leaflets are stiff and glossy being dark green on top and light green underneath. At the base of a leaf where the stalk joins the branch there is a stipule and it is large and has saw like teeth around the edge. This is important for identifying species.
The flowers are mostly produced at the end of the branches. A group of flowers are produced on the one stalk. The flowers are separately male and female often on separate trees. The male flowers have 6 anthers or pollen containers in a ring. In the female flower these 6 stamens are improperly developed (staminodes) around a 3 celled ovary. The fruit is slightly triangular in cross section and black when mature. The galip fruit has 3 cells (sometimes 4) but mostly only one cell is fertile so that 2 of the cells are empty, and one has a kernel. The fruit has a thin layer of pulp and a very hard inner shell. The kernel is inside the shell. Fruit can be 6 cm x 3 cm. This kernel is oily and edible. Considerable varietal variation occurs.

Distribution: The galip (*Canarium indicum*) grows in coastal areas, and is most common in the islands such as North Solomons Province, New Britain and New Ireland. It also occurs naturally in the Solomon Islands, Vanuatu and Guam. It occurs on the New Guinea mainland and Irian Jaya as well as in Maluku in Indonesia. It has been taken to some other countries to grow. It is a tropical plant. Galip nuts are common in the lowland rainforest. They mostly grow from sea level up to about 450 m altitude in the equatorial tropics.

Cultivation: Trees are planted near houses. They are mostly grown from seed. Many of the galip nuts take several months for the seeds to start to grow. As well, the seeds normally should not be buried under the ground, but should be just near the surface of the ground. Care is needed to see that the seeds and seedlings do not dry out. As the seed grows or germinates, a well defined cap is split off the nut. Trees grow fairly quickly. They can be grown by budding or grafting.

Production: The main season is often April to May but trees can bear nuts 2 or 3 times a year. An average kernel weighs 3 g.. Climbing the large trees is difficult and dangerous, so often nuts are harvested after they fall. Nuts are often stored inside houses after the fleshy outer layer is removed but the hard shell remains. Nuts which are removed from the shell and roasted can be

stored in sealed containers for many months. The nuts are often coarsely ground and added to other foods.

Use: The kernels are eaten raw or slightly roasted. Seeds can be dried and stored.
The nuts can be pressed for oil. The fresh oil is mixed with food.
Caution: The seed coat should not be eaten as it carries some substance producing diarrhoea.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut			13.5					

Insects:

Coccus hesperidium Linnaeus	Coccidae (HEM)	Soft brown scale
Ectatorhinus magicus Gerstaecker	Curculionidae (COL)	weevil boring into trunk of galip
Pinnaspis buxi (Bouche)	Diaspididae (HEM)	
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Pseudococcus solomonensis Williams	Pseudococcidae (HEM)	

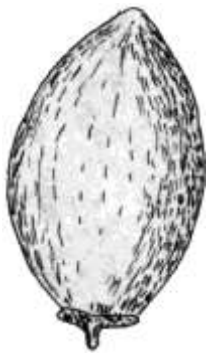
Diseases:

Heart rot	Fungus	*Phellinus noxius* (Corner) G H Cunn.

Pests:

Importance: Moderately common and popular in coastal and island areas in Papua New Guinea.



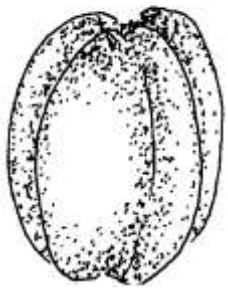


Names

English:
Tok pisin:
Tok ples: Piu, Usasi

Scientific name: *Canarium kaniense* Lauterbach
Synonyms:
Plant family: Burseraceae





Description: A large tree up to 40 m high and sometimes with buttresses. The small branches are 0.5-1 cm thick. They do not have hairs. The branches have one or two round cylinders of vascular strands when cut cross ways. (Like in a root). The leafy stalk (stipule) at the base of the leaf is oval and 1-3 cm long by 0.5-2 cm wide. The edges of this are deeply toothed and can be almost like a fringe. The leaf can have 3-5 or 6 leaflets. They do not have hairs. The leaflets are oval and 8-12 cm long by 3.5-7 cm wide. They can be papery or slightly leathery. The base of the leaflet is slightly slanting. The leaflets do not have teeth around the edge. The top of the leaf ends fairly abruptly. There are 9-15 pairs of side veins. These are slightly curved and at an angle. The flowers are near the ends of the branches. The flower clusters can be 30 cm long. They are densely covered with fine hairs. There are 5-6 fruit on a stalk. Individual fruit have very short stalks. Fruit are 5-6 cm long and 3-4 cm across. They are triangular in cross section. Normally there is only one seed inside with the other cells empty.

Distribution: It occurs mostly on the mainland and only in PNG. Plants are mostly between 1,000 and 2,000 m altitude.

Cultivation: Plants normally are self sown from seed.

Production: The fruit/nut production is seasonal. Flowering is in December and fruiting from January to March.

Use: The oily seeds are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut								

Insects:

Diseases:

Pests:

Importance: A minor wild edible nut in Papua New Guinea.

Names

English:
Tok pisin:
Tok ples: Adoa, Gatoga

Scientific name: *Canarium salomonense* B.L.Burtt
Synonyms:
Plant family: Burseraceae

Description: A large tree up to 30 m high with buttresses at the base. The buttresses branch. The bark is smooth grey and peels off in thin flakes. The small branches are round in cross section and less than 1 cm across. The wood and bark have a mild pineapple-like smell. The leaves can be 18 to 30 cm long made up of several leaflets but often without a leaflet at the end. The leaf like part (stipule) near the base of the leaf is about 1 cm from where the leaf stalk joins. It is small, ear-shaped and without the toothed edge like in *Canarium indicum*. The flowers occur on the ends of branches. The male flower clusters have more branches, more flowers and are larger (20-30 cm long) while the female flower clusters are slender, with fewer flowers and are smaller (8-20 cm long). The flowers have short soft hairs but become hairless at maturity. The male flowers are smaller (0.4-0.5 cm long) than the female (0.9-1 cm long). The flowers are pale yellow or light green. The fruit is 3-4 cm long and 1-2 cm across, slightly flattened and purplish black. Normally only one cell of the seed is developed. There are a range of varieties which differ in size, flavour and ease of opening.



From Leenhouts

Distribution: It occurs in North Solomons Province of Papua New Guinea and in the Solomon Islands from sea level up to 500 m or more. It grows in the rainforest and is cultivated near villages.

Cultivation: It grows wild and is cultivated.

Production: The nuts have a hard shell and are opened by striking on the side.

Use: The seeds are eaten.
(The resin is used for making torches.)

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects:

Diseases:

Pests:

Importance: A minor edible nut.

Names

English:
Tok pisin:
Tok ples: Kaunithina

Scientific name: *Canarium vitiense* A. Gray
Synonyms: *Canarium schlechteri* Lauterb.
Plant family: Burseraceae



Description: A slender or spreading tree. It can be 7-30 m high. The trunk can be 1.5 m across. There are 1-6 pairs of leaflets. The leaflets are 3.5-15 cm long by 2.5-6.5 cm wide. The flower buds are greenish white and the petals are white or cream. The young fruit are green or bluish. They become dark purple black at maturity.

Distribution: It occurs in dense or dry forest. It grows from sea level to 1,000 m altitude. In Samoa it grows from sea level to 700 m altitude.

Cultivation: Trees flower and fruit throughout the year.

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples: Nakeo

Scientific name: *Canarium sp.*
Synonyms:
Plant family: Burseraceae

Description: A fairly large tree 20-30 m high. The leaves are oval 15-18 cm by 7-8 cm. The leaves are dark green and shiny on the upper surface and dull and lighter green underneath. Fruit are grouped tightly together. They are small blue/black fruit oval and 2-3 cm by 3-4 cm. The young fruit are green and turn blue when mature. There is a large seed inside.

Distribution: Coastal.

Cultivation: The trees are planted from seed.

Production: Fruiting is seasonal. (Fruiting Aug. '82 in Papua New Guinea.)

Use: The outside layer of the fruit is eaten after cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea, it is a minor cultivated fruit near Kawito in the Western Province.

Names

English:
Tok pisin:
Tok ples: Bitung, Aropir, Banaga

Scientific name: *Canarium schlechteri* Laut.
Synonyms:
Plant family: Burseraceae

Description: A tree up to 25 m high. It sometimes has small buttresses. The trunk can be 30-40 cm across. The small branches are slender. On the leaf stalk there is a leafy structure called a stipule which is 3 cm from the base of the stalk. It is thread like. The leaves have 3-6 pairs of leaflets and can be softly hairy. The leaflets are oval and 12-20 cm long by 5-7 cm wide. There are 11-20 pairs of veins in the leaflets and continuing fairly straight towards the edges of the leaves. The flower clusters occur in the axils of leaves. They are 12-22 cm long. There can be up to 9 flowers. The fruiting clusters are up to 10 cm long with 1-3 fruit in a cluster. There is a saucer like structure (calyx) around the base of the fruit. The fruit are long and slightly triangular in cross section. They are 4 cm long by 2 cm across. The stone of the fruit has 6 ribs. There are 1-2 seeds inside. The seeds are edible.

Distribution: A small understory tree in lowland and foothill rainforests. It is recorded from Morobe Province and New Britain as well as Malaysia. It grows up to 250 m altitude.

Cultivation: The tree grows wild.

Production: The flowers are recorded in June, August and November. The fruit are recorded in March and May to September.

Use: The seeds have been recorded as edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects:

Diseases:

Pests:

Importance: This species has been recorded as having edible seeds. Its potential is not known, but it is only a minor food.

Names

English:
Tok pisin:
Tok ples: Djaato kenari

Scientific name: *Canarium lamii* Leenh.
Synonyms:
Plant family: Burseraceae

Description: A medium sized tree which grows to 20 m high. It is 50 cm through the trunk. The small branches are 6-7 mm thick. The leaves have 3 pairs of leaflets. The leafy structures (stipules) at the base of the leaf stalk occur 1-1.5 cm from the base and are oval and stiff and tend to run down the stem. The leaflets are sword shaped and 11-18 cm long by 6-7 cm wide. The base is unequal and rounded while the tip ends bluntly. There are 10-12 veins which are somewhat curved. The fruiting branch occurs near the end of branches and has one fruit. The fruit are oval and 6 cm long by 4 cm wide. The stone is rounded triangular in cross section. There are 1 or 2 seeds inside. (It is somewhat similar to *Canarium harveyi*).

Distribution: They occur in forests at very low altitudes.

Cultivation:

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Canarium decumanum* Gaertn.
Synonyms:
Plant family: Burseraceae

Description: A large tree with very large buttresses. These can be 8 m high and 5 m across. The tree grows to 30-60 m high. The trunk can be 1-2 m across. The small branches are 1-1.5 cm across and angular. These leave large leaf scars. At the base of the leaf stalk there are small stipules that look like small simple leaves without teeth around the edge. The leaves are arranged in spirals. They are made up of 4-6 pairs of leaflets. The leaves are 35-45 cm long and the leaflets are oval and between 5-30 cm long by 3-10 cm wide. The leaflets are stiff and papery. The base of the leaflets is rounded. The tip of the leaf tapers to a point. The flower clusters occur in the axils of leaves. The male flower clusters are 4-19 cm long with many flowers, while the female flower clusters are 5-7 cm long and with few flowers. The fruiting cluster has few fruits and there is not one flower at the end of the cluster. The fruit are somewhat triangular in cross section and 7-8 cm long by 4-6 cm wide. There can be 1 to 3 seeds inside the fruit.

Distribution: It grows in primary forests at low altitudes.

Cultivation:

Production: Plants flower from April to May and fruit June to November.

Use: The seeds or kernels are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds								

Insects:

Diseases:

Pests:

Importance: They are a minor food.

Names

English: Melville Island White Beech

Scientific name: *Canarium australianum* var. *glabrum* F.Muell., Leenh.

Tok pisin:

Synonyms:

Tok ples:

Plant family: Burseraceae



Description: A deciduous tree. It loses its leaves in the dry season. It grows to 12-25 m high and spreads to 3 m wide. The stems are erect and branching. They branches have leaf scars on them. The bark is smooth and slightly scaly. It is cream-grey. The leaves are compound and alternate. The whole leaf is 30 cm long. There are 4-7 pairs of oval leaflets and a leaflet at the end. These are 7-16 cm long by 4-7 cm wide. Leaves are dark green and smooth on top and paler and sometimes slightly hairy underneath. The veins are distinct. The edges of the leaves are finely toothed on younger leaves. The leaf stalk is 5-15 cm long. Trees are separately male and female. The flowers are like tubes and occur in clusters in the axils of leaves near the ends of branches. The flowers are small and creamy white and 0.3-0.7 cm long. The flower cluster may be 25 cm long. Male clusters are larger and more open than female clusters. The fruit are oval fleshy fruit with a hard stone inside. They are 2.5 cm long by 1.5 cm wide. They are blue-black when ripe. Inside there is a hard brown one seeded nut. The seed is 1.5 cm long.

Distribution: A tropical plant. It grows on light to medium, well drained soils. It prefers an open sunny position. It is drought and frost tender. It is most common in open forest and near the sea on sand dunes.

Cultivation: Plants are grown from seed. Seeds do not all germinate at the same time. This can be improved by filing to break the hard seed coat. Trees can be propagated by aerial layering. Grafting may also be possible.

Production: Young trees grow rapidly. In Australia trees flower September to December and fruit April to October. Flowering and fruiting time varies with location.

Use: The seeds are eaten.
The ripe fruit is eaten after cooking (roasting).

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds								
Fruit								

Insects:

Diseases:

Pests:

Importance: The seeds are eaten especially by children.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Canarium acutifolium* (DC.)Merr.
Synonyms:
Plant family: Burseraceae

Description: A tree which grows to 20 m high and occasionally to 40 m high. The trunk can be 20-90 cm across. It can have buttresses up to 3 m high. The small branches are 1.5 cm thick. The leafy structures (stipules) at the base of the leaf stalk are like threads and 1.5-3.5 cm long. The leaves have 3-5 leaflets. These are oval and 12-30 cm long by 4-11 cm wide. They are papery. The base of the leaflet is slightly oblique but rounded and the tip is long and slender. There are between 11 and 20 pairs of veins which curve near the edge of the leaf. The flower clusters are a shaped like a pyramid and in the axils of leaves. The male clusters are up to 50 cm long and the female clusters 40 cm long. There are many small flowers 4 mm long. The fruit clusters are rigid and have many fruit. The fruit are oval and round in cross section. They are 12-15 mm long by 8-10 mm wide. There is one seed inside. Three different varieties occur based on the number of stamens and number of veins in the leaflets.

Distribution: It grows in rainforest and more open forest near river banks. It suits wet clayey soil. It grows from sea level up to 200 m and occasionally up to 700 m altitude.

Cultivation:

Production: Trees flower in July to September.

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples: Vutu kana

Scientific name: *Barringtonia edulis* Seem.
Synonyms:
Plant family: Barringtoniaceae



Description: A small tree up to 15 m high. The trunk is 30 to 40 cm across. The bark is smooth and greyish brown. The leaves are glossy on both sides and are large. They are 17 to 45 cm long by 10 to 20 cm across. They are wedge shaped near the base, and wavy or with rounded edges, near the tip. The midrib and veins are raised on both leaf surfaces. The leaf stalk is about 1 cm long and there are 15 to 20 pairs of veins. This nut tree has flowers with stalks from a single unbranched stalk. These flower and nut stalks come from the end of the branch and hang down. The flower stalk can be up to 50 cm long and have about 40 flowers and nuts. The fruit can be 4 or 5 cm long and 2 cm across and when ripe the fruit skin colour is green. The seed kernel inside the hard shell can be 3 cm by 1 cm in size. This species is very similar to *Barringtonia procera* but this one has leaves with leaf stalks, the flowers are on stalks, the fruit is green when fresh and the fruit is more smooth and egg shaped.

Distribution: This species mainly occurs in Fiji. Other similar species occur in Solomons, Papua New Guinea and other Pacific countries. It occurs in forest, woodland and grassland up to 400 m above sea level. The flowering and fruiting is mostly just before Christmas, from September to December.

Cultivation:

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects:

Diseases:

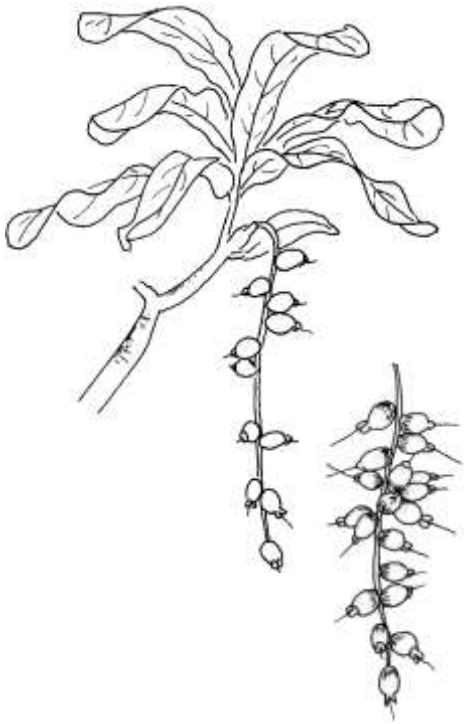
Pests:

Importance: The trees occurring in Papua New Guinea may not be *Barringtonia edulis*. Other Barringtonia species are important nuts in Papua New Guinea.

Names

English:
Tok pisin: Pao nuts
Tok ples:

Scientific name: *Barringtonia procera* R Knuth
Synonyms: *Barringtonia magnifica* Laut.
Plant family: Barringtoniaceae



Description: A small tree up to 15 m tall. The trunk is 8 cm across and the twigs are about 1 to 1.5 cm across. The leaves are smooth and hairless and can be 30 to 50 cm long by 8 to 20 cm wide. They are oblong and very shiny. They have a tapering tip which curves backwards and at the base are wedge shaped. The flower stalk is at the end of a branch, is 30 to 80 cm long and hangs down. There can be up to 120 flowers. The fruit are 8 sided and about 6-8 cm long by 3-5 cm across. The seed kernel inside the hard shell inside the fruit is about 3 cm by 1.5-2 cm cross. It is slightly flattened in one direction. This nut tree has short flower stalks (shorter than *Barringtonia edulis*) and the skin colour of the ripe fruit is purple. The leaves also are almost without stalks.

Distribution: It grows in secondary rainforest at low altitude. It is also planted in villages.

Cultivation:

Production: Trees flower and fruit throughout the year.

Use: The nuts are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects:

Diseases:

Pests:

Importance: A common and popular nut in some coastal areas of Papua New Guinea.

Names

English:

Scientific name: *Barringtonia niedenzuana* (K.Schum) R. Knuth

Tok pisin:

Synonyms:

Tok ples:

Plant family: Barringtoniaceae

Description: A small tree up to 15 m tall. Trunks are 5 to 25 cm across and twigs are 2 to 5 mm thick. The tree has a dense cone shaped group of leaves at the top. The bark is cracked and irregular. The leaves are egg shaped and 12 to 26 cm long by 4 to 9 cm wide. The leaves are like paper with a wavy or toothed edge. They are dark green on top and paler underneath. A cluster of five leaves occurs on the end of a branch. The leaves are pointed at the tip and wedge shaped at the base. The midrib and main veins are prominent on both sides while the fine veins are only prominent under the leaf. The flower stalks are 20 to 90 cm long, with about 30 flowers. The flower buds are pale green sometimes with a purple tinge. The flower petals can vary from purple to red, pink or yellow. The fruit is dark green. The fruit have 4 angles and are about 5 cm long by 1 cm across. The kernel or seed is about 3 cm long by 5 mm wide.

Distribution: It grows in rainforest especially on limestone slopes. It can also grow under the rainforest and in low damp places near mangroves. It occurs up to 700 m above sea level.

Cultivation:

Production: Flowering occurs from January to November and fruiting is mainly between April and November.

Use: The nuts are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin: Pao nuts
Tok ples:

Scientific name: *Barringtonia novae-hibernae* Laut.
Synonyms:
Plant family: Barringtoniaceae



Description: The tree grows up to 6 or 8 metres tall. The trunk is often only 10-15 cm across and near the top the tree has a few short thick branches. The leaves are large and shiny. The leaves are crowded towards the end of branches. A leaf can be 50-60 cm long and 20-24 cm across. Near the tip of the leaf the edge is wavy and often slightly toothed, with the tip bent backwards. The veins of the leaf show up clearly on both sides of the leaf. The leaf stalk is only short, about 1 cm long. A long hanging yellow flower is produced from the branches. It can be 80 cm long and is densely covered with flowers. There can be up to 120 flowers along a stalk. The flowers do not have a scent. Along this the fruits form, giving a long hanging stalk of quite large nuts. The fruit are oval shaped and about 6-8 cm long by 3-4 cm across. The seed or nut inside the fruit has lines running along its surface. This edible part is about 3 cm long by 1-2 cm across and white coloured. The seed is flattened particularly on one side. Pao nut trees tend to flower and produce nuts throughout the year. There are some different kinds. The size and shape of the nuts can vary slightly. Also some are white inside and some are red. The most obvious difference is the colour of the outside of the fruit. Some kinds are green or slightly blue whereas other kinds are a dark reddish black. The nuts have a fairly hard shell and are split open with a knife. The white part in the centre is eaten raw. It also has a fairly hard texture.

Distribution: Trees grow in tropical coastal areas and up to about 600 m altitude. They occur in primary rainforest on rich alluvial soil. They grow naturally and are also planted. In Papua New Guinea it grows in the Huon Peninsula, Manus, New Britain, New Ireland and Bougainville.

Cultivation: Pao nut trees are mostly grown from seed. Several different races or types of pao nut have been selected by villagers and these trees seem to produce fruit that is similar to the seed that was planted. Trees can be grown from stem cuttings. Trees grown from cuttings have shorter trunks and branch closer to the ground.

Production: If trees are planted in suitable sites and well looked after, they can produce fruit in a year or two. As pao nuts often do well and are most common on low off shore islands and coral waterfront villages, it may be particularly suited to coral and alkaline soils. This needs to be further studied. Flowering is not seasonal. Well grown trees can produce after one year.

Use: The kernels inside the nuts are eaten raw or roasted.
Caution: The related plant *Barringtonia asiatica* (L) Kurz which grows along the foreshore is used as a fish poison.

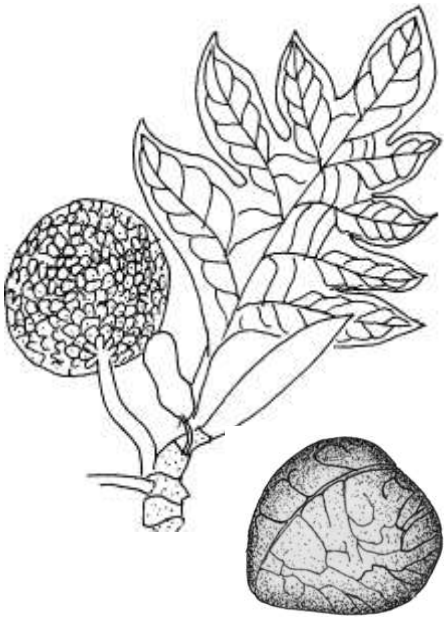
Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects: **Pests**: **Diseases**: A leaf spot occurs on the leaves.
Importance: A common and popular nut in some coastal areas of Papua New Guinea.

Names

English: Breadfruit
Tok pisin: Kapiak
Tok ples:
Scientific name: *Artocarpus altilis* (Parkinson) Fosberg
Synonyms: *Artocarpus communis* Forster & Forster f.
Plant family: Moraceae



Description: A large tree up to 20-26 m in height. The trunk can be 6 m tall before branching. The trunk can be up to 1 m across. It is an evergreen tree but can lose its leaves in dry weather. The leaves are large and vary in the amount the leaves are divided. They can be entire or divided into 5 to 11 lobes. The leaves are bright green on the upper surface with yellow veins and are pale and dull on the under surface. They have very small stiff hairs underneath. Male and female flowers occur on the same tree. The male flowers are cylindrical spikes which droop and are 12-30 cm long. The female flowers are grouped in a round head. The flower head develops into the compound fruit. The fruit are large and green. They can be 20 cm across. Seeded kinds have spines, and seedless kinds have a more smooth surface. Seeded, small seeded, and non seeded types occur. There are a number of cultivars of each. Seed can be 2 cm across and with darker lines.
Fruit can be 12-22 cm long and 9-17 cm wide. The fruit shape varies from round to oblong. Leaves vary from entire to deeply lobed and from rough to smooth and shiny. The central core and the skin are not eaten. Seeded fruit have projecting tuberances on the surface of the fruit. Seedless fruit have rounded or 5 to 6 sided processes on the surface.

Distribution: It occurs in the hot, humid, tropical lowlands. The plant is purely tropical and normally below about 650m altitude, but trees grow from sea level up to about 1150 m. Seeded types are more dominant in the west of Papua New Guinea. Trees are killed by temperatures below 5°C. It probably requires an average temperature over 22°C to grow well. It tends to grow in the temperature range 16°C to 38°C. It grows on a range of soils providing they are well drained. There is some cultivar difference in drought tolerance and salt tolerance. Uniformly warm humid climates suit it best. An annual rainfall of 200-250 cm and a relative humidity of 70-80% suits. It suits hardiness zone 11-12.

Cultivation: Seeded forms are self sown by birds or bats, and also grown from seed. The presence or absence of seeds significantly affects the production. Seeded trees are mostly propagated by seed which needs to be sown fresh, without seed drying out. Seedless trees are propagated by root cuttings. Cuttings of roots 1.5 cm to 4 cm across and 25 cm long are suitable. Cuttings can be rooted during the wet season, in sand. They should be placed horizontally. They need to be kept moist and shaded. Using intermittent mist improves root formation and cutting establishment. Rooting hormones also assists. This process takes 10 weeks or more and then rooted cuttings should be hardened off in a sunny position for up to 3 more months before planting out into the field. Young plants do best with adequate sun and not shade. Root suckers produced naturally, or by damaging the roots, are a common method of production of new material. Marcottage or budding can also be used for propagation. Because trees often occur from natural seed dispersal by fruit bats and marsupials trees are often randomly spaced and common in secondary forest. A spacing of 10-13m is suitable between trees. Trees rarely receive much attention after establishment but pruning of branches to allow easier access to fruit is sometimes undertaken.

Production: Male and female flowers grow separately on the same tree. Male flowers form an oblong catkin while female flowers form a globular head. The flowers are in the axils of leaves. Both flowers normally appear at the same time. Artificial pollination has resulted in increased yields in some places. This is both an increase in fruit size and more fruit retained on the tree to maturity. The pollen in the male flower is available 10 to 15 days after emergence. It is about 3 months from flowering to fruit maturity. Seeded fruit have 30 to 90 seeds per fruit. Seedless fruit are picked before maturity when the fruit is eaten by boiling. Harvesting mature fruit can be sweeter fruit but they need to be cooked by baking or roasting. Seeded fruit are normally allowed to drop and are then harvested. Seeds are boiled in salted water or roasted. A mature tree can yield up to 700 fruit per year. Fresh fruit are highly perishable and need to be handled carefully and efficiently. Pit preservation of breadfruit involves lactic acid fermentation. The fermentation needs to be undergone for 2 to 3 months to produce a palatable product. Breadfruit slices can be stored under refrigeration in a fresh marketable state at 14°C for up to 10 days. Segments can be boiled for 2 to 5 minutes then frozen at minus 15°C for at least 11 weeks.

Trees begin to bear after 3-6 years. Growth of the trees is vigorous, with fruiting starting after about 3 years. Trees grow to 10-15 m in 10-12 years. Mature trees can be 30 m high. Fruiting can occur over 5-8 months in some locations and this is partly due to varieties with overlapping fruit seasons. A tree can produce 50-150 fruit per year. A fruit can weigh 1-1.6 kg each. Large trees can give 700 fruit per year of 1-4 kg each. An average seed weighs 5 g.

Use: The large seeds are roasted and eaten. The flesh of the fruit is eaten cooked. The young leaves are edible. The male and female flowers are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	56.5	799	7.4		3.7	26	6.6	0.9
Fruit	74.4	506	1.5		0.4	4	25	0.2
Leaves								
Flowers								

The seeds are about 20 % of dry matter as protein with a good nutritional balance. The essential amino acid levels are high for vegetable protein.

Insects:

Abgrallaspis cyanophylli (Signoret)	Diaspididae (HEM)	
Aonidiella aurantii (Maskell)	Diaspididae (HEM)	Yellow scale
Aspidiotus destructor Sign.	Diaspididae (HEM)	Coconut scale
Bactrocera frauenfeldi	Tephritidae (DIPT)	Fruit flies
Bactrocera frenchi	Tephritidae (DIPT)	Fruit flies
Bactrocera obliquus	Tephritidae (DIPT)	Fruit flies
Bactrocera peculiaris	Tephritidae (DIPT)	Fruit flies
Bactrocera umbrosus (F.)	Tephritidae (DIPT)	Fruit flies
Ceroplastes rubens Maskell	Coccidae (HEM)	Pink wax scale
Chrysomphalus aonidum (Linnaeus)	Diaspididae (HEM)	Florida red scale
Coccus hesperidium Linnaeus	Coccidae (HEM)	Soft brown scale
Coccus longulus (Douglas)	Coccidae (HEM)	
Dysmiccocus brevipes (Cockerell)	Pseudococcidae (HEM)	Pineapple mealybug
Dysmicoccus nesophilus Williams	Pseudococcidae (HEM)	
Ferrisia virgata (Cockerell)	Pseudococcidae (HEM)	
Hemiberlesia palmae (Cockerell)	Diaspididae (HEM)	
Icerya seychellarum (Westwood)	Margarodidae (HEM)	
Kilifia acuminata (Signoret)	Coccidae (HEM)	
Maconellicoccus hirsutus (Green)	Pseudococcidae (HEM)	Hibiscus mealy bug
Milviscutulus mangiferae (Green)	Coccidae (HEM)	
Mutabilicoccus vanheurni (Reyne)	Pseudococcidae (HEM)	

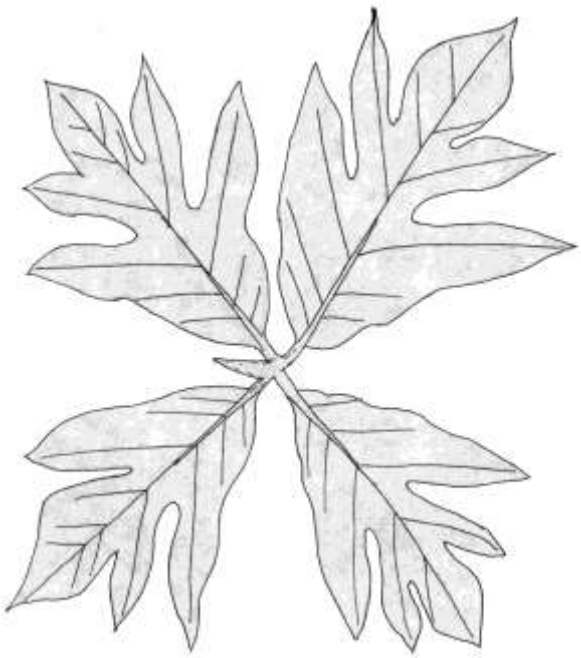
Parasaissetia nigra (Nietner)	Coccidae (HEM)	Nigra scale
Pinnaspis strachani (Cooley)	Diaspididae (HEM)	
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Pseudococcus longispinus Targioni	Pseudococcidae (HEM)	Longtailed mealybug
Pseudaulacaspis pentagona (Targ.)	Diaspididae (HEM)	White scale
Saissetia coffeae (Walker)	Coccidae (HEM)	Coffee scale
Telostylinus sp.	Neriidae (DIPT)	
Xyleborus spp.	Scolytidae (COL)	Island pinhole borer

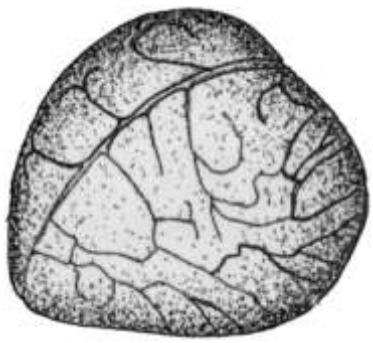
Diseases:

Leaf spot	Fungus	*Pseudocercospora artocarpi* (H & P Sydow)Dei
Rust	Fungus	*Uredo artocarpi* Berk & Br

Pests:

Importance: A quite important supplementary seasonal food in many coastal areas. The seeded forms are more common in the western part of Papua New Guinea.

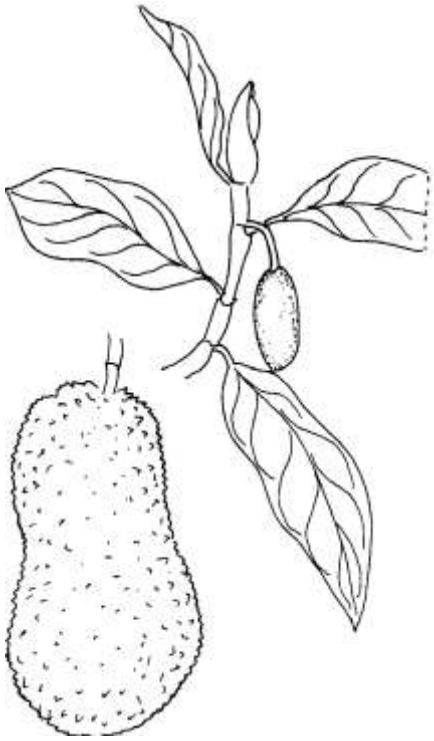




Names

English: Jackfruit
Tok pisin:
Tok ples:

Scientific name: *Artocarpus heterophyllus* Lam.
Synonyms: *Artocarpus integra* (Thunb.) Merr.
Plant family: Moraceae



Description: An evergreen tree up to 20 m tall and in the breadfruit family. Trees form many branches but have one or two main trunks. The bark is smooth and dark green. Leaves of young trees have 1 or 2 lobes but mature leaves are long (15 cm) and entire. They are leathery, deep green and glossy. Flowers occur on spikes, on stalks from the trunk or main branches. Some stalks only have male flowers, others only have female flowers while some have both male and female spikes. Generally male flowers are on short stalks among the leaves, and female flowers are on trunks. Male flowers are 5 cm long by 2 cm wide and are dull green. Female flowers are bright green. The very large spiny fruit grow on main branches and the trunk. The fruit is a composite fruit made up from the many individual flowers of the flower cluster. Fruit can be 1 m long and weigh 36 kg. They have 6 sided fleshy spines. Each seed is surrounded by a yellow fleshy sheath. Seed are 2-4 cm long and 1-2 cm wide. There can be 100-500 seed in a fruit. Unlike breadfruit, there are no seedless Jackfruit. When ripe the unopened fruit has a strong smell

Distribution: It grows in the tropical lowlands and up to about 1200 m altitude. It grows in Nepal up to 800 m altitude. It can stand some drought, but not water-logging. Trees do best where there is year round rainfall. It does best in a well drained, frost-free location that is warm and sunny. They are slightly more tolerant of cold than breadfruit. Trees can survive occasional frosts down to 0°C. They have some wind and salt tolerance. It suits hardiness zones 10-12.

Cultivation: Trees are usually sown from seeds, but it is best to sow them in their final location as the plants don't transplant easily. They have a long delicate taproot which makes transplanting difficult. Fresh seed must be used (less than 4 weeks). If fresh seed are planted immediately they grow more quickly and more seeds germinate. It is better to use larger seed. The fleshy layer around the seeds should be removed. Seeds can be soaked in water for 24 hours to give better germination. It is best to sow seeds with the embryo pointing downwards and also with the narrow end pointing downwards. Seeds germinate in 3-8 weeks. A spacing of 12 m is suitable. Where trees are used as a wind break, trees are spaced 6 m apart. Air-layering can be used, and stem cuttings are also possible. Air layering is best done in the rainy season. Rooting hormones can be used to help roots develop. The shoots used for air layering should be 2-3 years old and brown in colour. To produce air layers, a small branch 3-4 cm across, is cut below a node and only part way around the stem. A ring 5-7 cm wide is cut and a layer of sand wrapped around the stem and covered with plastic. Using 1% IBA growth substances helps shoots to strike and form roots. Roots form in about 22 days and the stem can be cut off and planted after about 2-3 months. Because trees vary in their growth rate, how quickly they flower and fruit, and in the fruit quality, it is best to grow plants by using vegetative parts from good trees. This can be done by budding or grafting onto 12 month old seedlings already established in the field. Budding and grafting are not easy with jackfruit. Because the fruit develops on the trunk, early pruning to allow 2-3 trunks to develop is helpful. As well, trees can be topped to prevent them becoming too tall and large.

Production: Jackfruit is a fast growing tree. They can be 7 m tall by 3 years old. Trees begin bearing after about 8 years. The fruiting season lasts about 4 months in subtropical places, but fruit can be produced year round in tropical places. Fruit take about 100 to 120 days from when the flower is pollinated until a fully mature fruit is developed but can take another 4 months to ripen. Trees tend to have heavy crops every second year. Pollination is by wind but hand pollination has been used to improve the amount of fruit set. Fruit can be up to 50 kg in weight. Fruit change from green to yellow when mature. Up to 250 fruit can be produced each year on large trees. Fruit do not store well but can be kept in a cool store for 4-6 weeks at 11°-12°C and with high humidity.

Use: The flesh of ripe fruits can be eaten raw.
Unripe fruit can be cooked and eaten as a vegetable.
The seeds (5%) can be roasted and eaten. (Some kinds have more seeds).
The young leaves and flowers are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit ripe	74.5	395	1.5		0.6	30	6.7	0.4
Seeds	57.6		5.6		0.8		10	
Fruit unripe	85.8		1.6		0.1		13	
Leaves								
Flowers								

Insects:

Anthococcus kerevatae Williams	Coccidae (HEM)	
Ceroplastes rubens Maskell	Coccidae (HEM)	Pink wax scale
Chrysomphalus dictyospermi (Morgan)	Diaspididae (HEM)	
Coccus longulus (Douglas)	Coccidae (HEM)	
Hemiberlesia lataniae (Signoret)	Diaspididae (HEM)	
Hemiberlesia palmae (Cockerell)	Diaspididae (HEM)	
Icerya seychellarum (Westwood)	Margarodidae (HEM)	
Milviscutulus mangiferae (Green)	Coccidae (HEM)	
Parasaissetia nigra (Nietner)	Coccidae (HEM)	Nigra scale
Parastasia guttulata Fairmaire	Scarabaeidae (COL)	
Pinnaspis buxi (Bouche)	Diaspididae (HEM)	
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Unaspis citri (Comstock)	Diaspididae (HEM)	White louse scale

Diseases:

Pink disease	Fungus	*Phanerochaete salmonicolor* (Berk & Br.) Julich
Leaf spot	Fungus	*Colletotrichum sp.*

Pests:

Importance: Gaining importance in some areas of Papua New Guinea, such as the Sepik. At present it is mainly only the seeds that are eaten.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Artocarpus vrieseanus* Miq
Synonyms:
Plant family: Moraceae

Description: A tall tree. The branches are brown with shallow cracks along their length. They also have round air pores in the bark. The leaves are thin and can be soft or papery. They are oval and have a tail at the tip. They are smooth and 20 cm wide by 25 cm long. The flower cluster has male and female flowers separately. The fruit is a composite fruit with parts fused together. It is 5 cm across. The fruit are orange, pulpy and edible.

Distribution: A coastal tropical plant.

Cultivation: Plants are mostly self sown. Presumably they grow from seeds.

Production:

Use: The fruit are eaten after cooking.
The young fruit are chewed as a substitute for betel nut.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

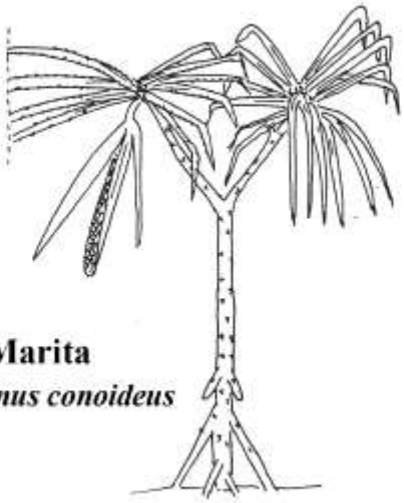
Insects:

Diseases:

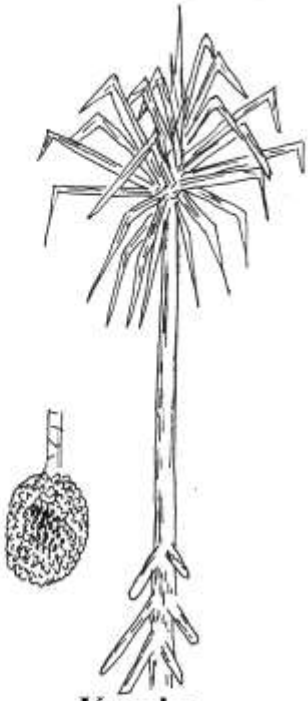
Pests:

Importance: A minor fruit in Papua New Guinea.

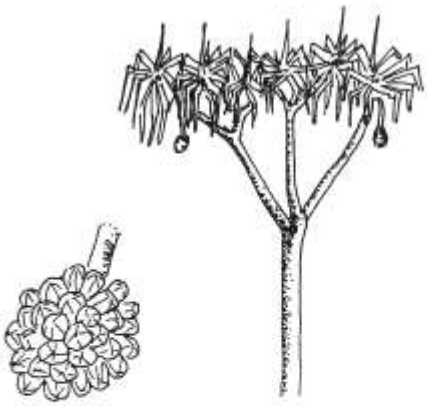
Pandanus



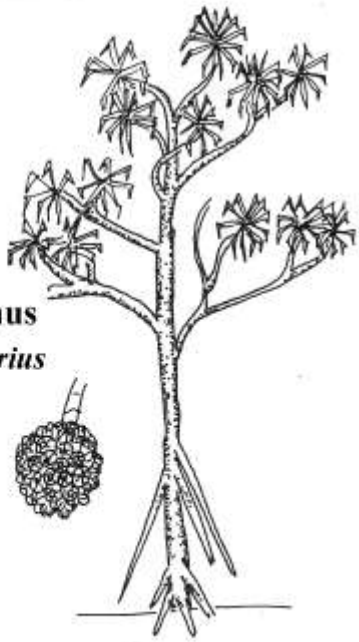
Marita
Pandanus conoideus



Karuka
Pandanus jiulianettii



Pandanus antaresensis



Coastal pandanus
Pandanus tectorius

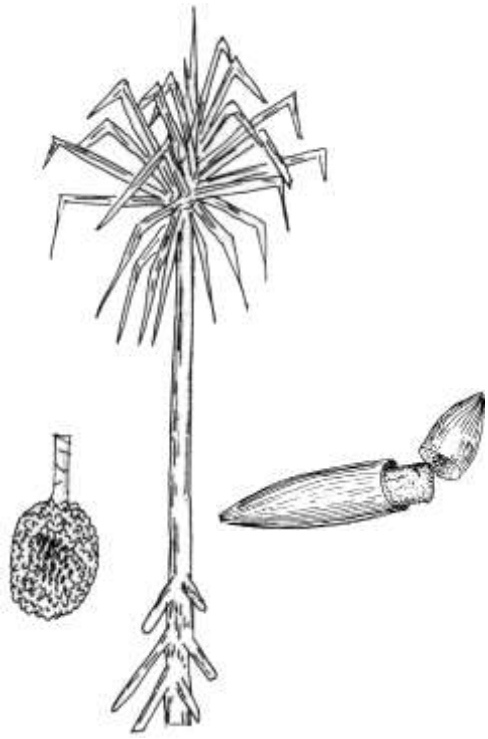


Wild karuka
Pandanus brosimos

Names

English:
Tok pisin: Karuka
Tok ples:

Scientific name: *Pandanus jiulianettii* Martelli
Synonyms:
Plant family: Pandanaceae



Description: Pandanus jiulianetii is cultivated karuka. Pandanus trees are separately male and female. With cultivated karuka, male trees are rare. About 25-30 cultivars of cultivated karuka are recognised and named within an area of cultivation. The karuka tree is a tall palm like tree with a straight trunk and aerial prop roots at the base. Sometimes it branches near the top to produce 3 or 4 crowns of leaves. The leaves grow in pairs opposite each other and they are twisted to look like a spiral going up the trunk. The leaves are long (3 m), narrow, have spikes along the edges and are often bent at the tips. The fruit is a round composite fruit 15 to 30 cm across which is made up of about 1,000 individual keys which contain the nut which is eaten. On a branch that is about to bear fruit, the leaves are upright and clumped slightly together. The fruit bunch emerges from the centre of these leaves. It hangs close to the trunk amongst the dead hanging leaves. Large leaves (bracts) almost cover the fruit bunch while it hangs there.

Distribution: Trees grow between 1800 and 2500 m altitude. They do best in the forest clearings. They also occur in Irian Jaya. Outside this range it often does not grow well. They do best in the forest clearings. The microenvironment for karuka to grows best includes fairly good soil fertility such as along the banks of small creeks; in the natural hollows that occur around the edges of hills, and around the edges of small clearings in the bush. Karuka on knobs in the grassland often only bear small nuts.

Cultivation: Trees can be grown from seed. More commonly vegetative cuttings of the top section of a branch is used. This is suitable for a tree that has several branches. When planted in moist fertile soil it quickly develops roots and becomes established. This maintains the trees true to variety. Old trees with a number of branches tend to have smaller clusters of fruit because the fruit are competing on the same plant for their requirements so this pruning inproves production. Sometimes karukas develop young suckers or shoots near the ground. When these are seen, they are broken off and replanted from these vegetative suckers. All cultivated karuka are planted. Seedling trees are slower to produce and have a taller straighter trunk. Karuka can be grown from seeds. It is best to wait till the nuts are fully ripe and start falling naturally from the tree. These nuts are taken and planted while fresh. They are planted in the shell with the bristles uppermost. Normally the seeds are established in a nursery and then transplanted to their permanent sites a few months later. Clonally propagated trees produce 5-8 years after planting. To produce good sized nuts the karuka plantation needs to be kept free of weeds. Fruiting is seasonal and probably biennial for any individual branch of the tree. One crown of leaves on the one branch of a karuka tree normally only produces one cluster of nuts (called a syncarp) during the one season. In fact, that particular branch normally only produces one bunch every second year.

Production: Karuka nuts can be harvested before they are fully ripe by climbing the tree and cutting the whole bunch. When this is done, the fruit bunch is cut in half the central pink portion

cooked and eaten and the two halves with the outside skin burnt off can be stored in a platform above the fire. These halves can be cooked over hot stones and the nuts eaten. The season is normally Dec to Feb but may occur in mid year. Trees last 50-60 years. The nuts can be eaten raw or cooked. Dried nuts store well. The season is normally Dec to Feb but may occur in mid year. Trees bear every second year. They take 5-8 years from planting to first harvest. Trees last 50-60 years. An average karuka fruit can be about 6 kg weight. It is about 25 cm high and 20 cm across. It contains about 1000 separate nuts. After burning off the outside and removing the stalk, the weight is about 5 kg. A single kernel weighs about 0.5 g. The weight of edible kernels in a fruit is about 8% of the total fresh weight or about 0.5 kg.

Use: Both the kernel inside the individual nut is eaten and the mesocarp inside the cephalium is eaten. The nuts can be eaten raw or cooked.
The flesh in the centre of the fruit can be eaten cooked.
Dried nuts store well.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut		2868	11.9					
Flesh								

Insects:

Segetes cornellii F. Willemse	Tettigoniidae (ORTH)	Longhorn grasshoppers
Segetes gracilis	Tettigoniidae (ORTH)	
Segestidea montana F.Willemse	Tettigoniidae (ORTH)	

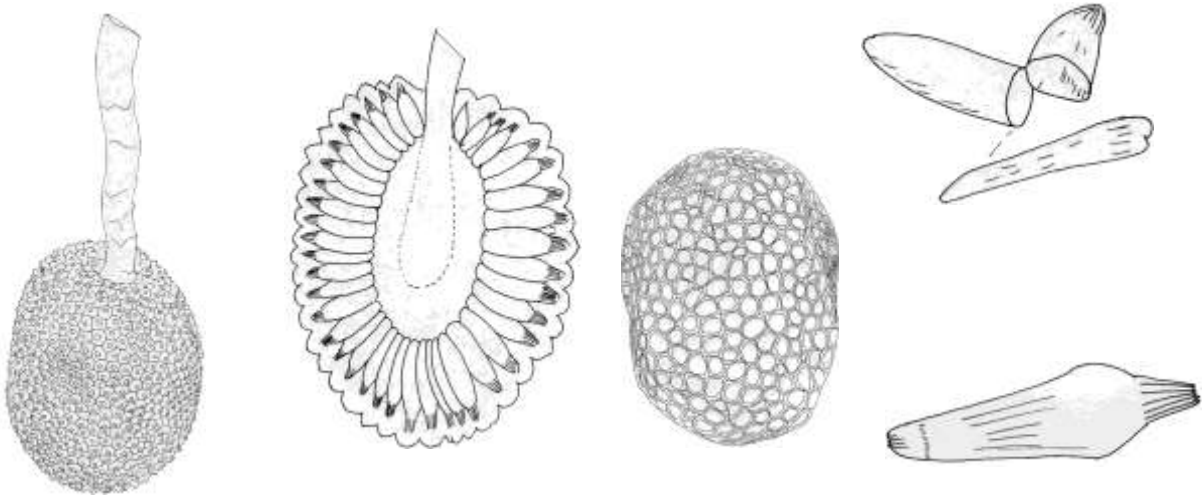
Grubs eat the spongy layer inside the fruit.

Diseases:

Black leaf mould	Fungus	*Lembosia pandani* (Rostr.) Theiss
On seeds	Fungus	*Macrophoma pandani* Berl. & Vogl.
Sooty mould	Fungus	*Meliola juttingii* Hansf.
On stems	Fungus	*Polyporus gilvus* (Schw.)Fr.
Large leaf spot		
Leaf spot		
Yellow spot mosaic	Probably virus	

Pests: Tree kangaroos

Importance: A very important nut crop in high altitude areas.



Names

English: Wild karuka
Tok pisin:
Tok ples:
Scientific name: *Pandanus brosimos* Merrill & Perry
Synonyms:
Plant family: Pandanaceae



Description: A screwpine with erect leaves which are normally not bent at the tip. The wild karuka plant looks a lot like the cultivated karuka except that the leaves are bigger and normally they point straight up instead of bending over at the top. The trunk of the tree is straight like a palm but it can have some branches near the top. The leaves are long and have thorns along the edge. Dead leaves normally hand down around the top of the tree. The leaves are close together. The leaves at the centre turn red then white at fruiting time. The fruit is a round cluster of nuts. The ends of the individual nuts come to a sharper point than in cultivated karuka. The shell of the nuts is very hard. The large fruit is made up of about 1000 nuts. The fruit hangs on a stalk against the trunk. Different varieties of wild karuka are recognised. These have different shaped nuts. Other small differences are also noticed by village growers. As a wild karuka plant is getting ready to produce a bunch of nuts the leaves at the top of the tree go tightly together and stick straight up. Then the top of the leaves become a red colour (With cultivated karuka the top of the leaves change to a white colour.)

Distribution: The usual range is from 2500 to 3100 m altitude. Some are transplanted to lower altitudes.

Cultivation: Trees are normally self sown but some are transplanted. Self sown plants are weeded, protected and owned. The wild karuka is disemminated throughout the high altitudinal forest as single widely spread trees and the dispersal agent is claimed to be marsupials (tree kangaroos etc). Some are transplanted to lower altitudes. The fruiting is seasonal and often a good season occurs every second year. Individual people within the clan are given permission to look after different sections or trees and these people clear the bush near the base of the tree and build traps to stop tree kangaroos.

Production: The fruiting is seasonal and often a good season occurs every second year. (Sometimes nuts are stored in the ground to soften the hard shell.)

Use: The kernel of the nuts is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts	10.0		8.5					

Insects:

Segestidea spp.	Tettigoniidae (ORTH)	Longhorn grasshoppers

Diseases:

Pests:

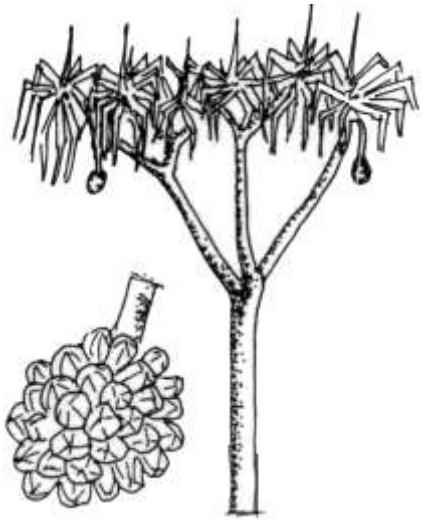
Importance: In Papua New Guinea, an important wild harvested nut for people with land at the right altitude.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Pandanus antaresensis* St John
Synonyms:
Plant family: Pandanaceae

Description: A branched screwpine with crowns normally at the same height. Fruit are large clusters made up of groups of 5 nuts. The kernels are small and hard to extract. When ripe the fruit turn red and the nuts drop individually.



Distribution: It grows in the highlands from about 1600 to 2500 m altitude.

Cultivation: Plants are often self sown but are also planted from seed.

Production: Nuts are usually harvested after they fall. Production is not distinctly seasonal. The outside fibres are burnt off then the shell splits.

Use: The kernels are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects:

Diseases:

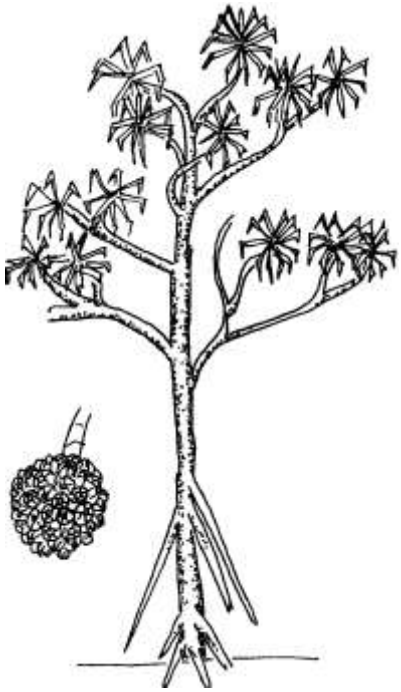
Pests:

Importance: Although the trees are fairly common in Papua New Guinea, the nuts are not highly prized because they are hard to extract.

Names

English: Coastal Pandanus
Tok pisin:
Tok ples:
Scientific name: *Pandanus tectorius* (Solander) Parkinson
Synonyms: *Pandanus odoratissimus* sensu auct.non L.f.;
Plant family: Pandanaceae

Description: An erect branched shrub 3 to 5 m high. It can be 14 m tall. The trunk has several prop roots. The leaves are spirally crowded towards the ends of branches and covered with waxy powder. They are up to 1.5 m long and 3 to 5 cm wide. The edge of the leaf and the midrib have sharp spiny teeth pointing towards the end of the leaf. The fruit are alone and hang down. They are rounded and 20 cm long. They are composed of 50 to 75 fibrous fleshy fruit with a stone in the centre. They are somewhat angular.



Distribution: It grows on the sandy edges of mangroves and along rivers. They are very common along the seashore throughout the islands of the Philippines. They are never found very far inland. It suits hardiness zones 11-12.

Cultivation: Plants are normally self sown. The preferred kinds are grown from cuttings.

Production:

Use: The fleshy portion of the lower part of the mature fruit is eaten raw.
The seeds are eaten.
Caution: The seeds can contain calcium oxalate crystals. These can be removed by cooking and straining. They irritate the mouth.
The tender shoots are eaten as a vegetable.
The tip of the aerial root is eaten raw or roasted.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	80.0		0.4					
Seeds								

Insects:

Diseases:

Pests:

Importance: Probably only rarely used in Papua New Guinea.

Names

English:
Tok pisin:
Tok ples: Bakong

Scientific name: *Pandanus dubius* Spreng.
Synonyms:
Plant family: Pandanaceae

Description: A large erect and branched screwpine with prop roots. The leaves are numerous and spirally arranged and crowded towards the ends of branches. The edges and midrib are covered with spines.

Distribution: They are widely distributed in wooded areas along the seashore of Mindanao in the Philippines.

Cultivation:

Production:

Use: The kernels of the nuts are eaten raw.
They are also cooked and stored.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects:

Diseases:

Pests:

Importance: It is probably only of occasional occurrence and minor use in Papua New Guinea.

Names

English:
Tok pisin: Okari
Tok ples:

Scientific name: *Terminalia kaernbachii* Warb.
Synonyms: *Terminalia okari* C.T.White
Plant family: Combretaceae



Description: A large tree. It can be 20-30 m tall. It usually has buttresses. The branches are in layers and the leaves are mostly near the ends of the thick twigs. The twigs are hairy when young. The young leaves are yellow-green. The leaves are large, hairy and reddish brown. The leaf stalks are 2 cm long. The leaves can be 15-28 cm long by 6-13 cm wide. They are thick and with a tip at the end. They taper towards the base. The veins often stick out underneath the leaf and are depressed on the upper surface of the leaf. The flowers occur on spikes which stick upwards. The buds are usually hairy. The flower stalks are shorter then *T. impediens.* The fruit is very large, up to 11 cm x 8 cm and slightly flattened. They are red and smooth when ripe. The fruit have reddish brown hairs when young. The fruit has a large woody stone inside. The stone inside the fruit splits into 2 more or less equal parts. The seedling leaves are 3-4 and thin.

Distribution: It is a tropical plant. It occurs in lowland areas. They will grow up to 1300 m altitude but do not produce well at this altitude.

Cultivation: Okari nut trees are normally grown from seeds. Seeds grow easily but rapidly lose their viability. The trees grow very fast and they can increase in height by up to 2 metres in one year. But trees need to be fairly old before they produce many nuts. Twenty year old trees often only produce a few nuts. Fruit are normally harvested after falling.

Production: Trees grow quickly but nut production may not start for 20 years. The kernel can be 7-8 cm long and 3-4 cm wide. The kernel is made up of coiled leaves which make up the seed. A kernel can weigh up to 10 grams in weight.

Use: The kernel inside the stone of the fruit is edible.
The seed can be pressed to extract oil.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects:

Diseases:

Pests:

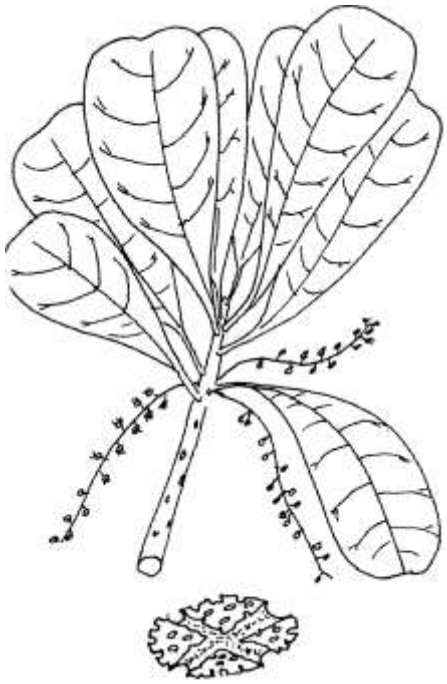
Importance: A very popular and very important nut in Papua New Guinea.

Names

English:
Tok pisin: Talis
Tok ples:

Scientific name: *Terminalia impediens* Coode
Synonyms:
Plant family: Combretaceae

Description: A tree up to 42 m tall. Often the tree has buttresses. The twigs are usually fairly large. The young parts of the tree are sometimes hairy. The young leaves are purple underneath. It has leaves that are clustered at the ends of thick twigs. Leaves can be 25 cm x 12 cm or larger and they taper towards the stalk. The leaves are often blunt at the tip. The leaves often have a purplish colour underneath. The flowers occur on spikes 10-30 cm long. The flowers are small. The flower spikes are longer than okari nut (Terminalia kaernbachii) and less hairy looking. The fruit are 7-9 cm long by 3.5-6 cm wide. They are red and have fibrous flesh. They usually do not have a wings or flanges. Inside there is a large woody stone. The stone inside the fruit splits into 2 unequal parts. The 2 kernels inside are edible.



Distribution: It occurs in the lowland forest in Papua New Guinea.

Cultivation: Trees grow wild and are preserved in gardens. They grow from seed.

Production:

Use: The kernel inside the hard shell of the fruit is edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut								

Insects:

Diseases:

Pests:

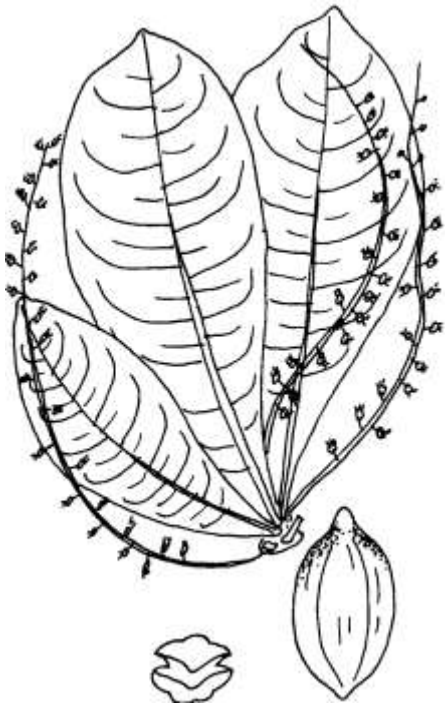
Importance: An important nut in the lowlands of Papua New Guinea.

Names

English:
Tok pisin: Talis
Tok ples:

Scientific name: *Terminalia copelandii* Elm
Synonyms: *Terminalia catappoides* C.T. White & Francis
Plant family: Combretaceae

Description: A large tree up to 40 m tall. Trees often have many buttresses. The twigs are thick and have leaf scars which are prominent. The leaves are crowded at the thickened end of the small branches. Leaves are 22-36 cm long and 9-13 cm wide. They have no real leaf stalk. Flowers are small and white on many flowered stalks 22-30 cm long and near the end of branches. Flowers towards the base of the flower spike are female and the ones towards the end are male. The fruit is 3.5-6 cm long and 2.2-3 cm wide. They are oval and slightly flattened.



Distribution: They occur in primary rainforest up to 500 m altitude. This species occurs in Malaysia, Indonesia and the Philippines as well as PNG. It is mostly known from the Western Province within PNG.

Cultivation:

Production:

Use: The fruit are recorded as edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

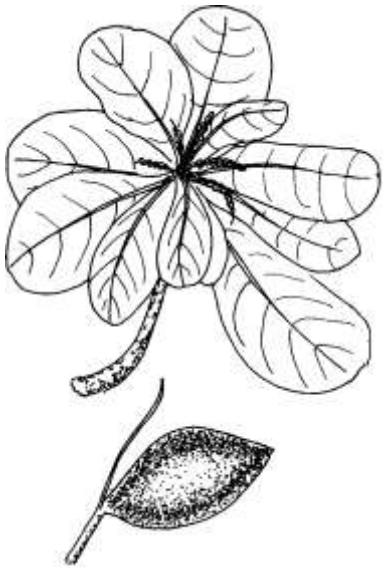
Diseases:

Pests:

Importance: The tree is not common in Papua New Guinea and mostly occurs in the Western Province. It is only a minor food.

Names

English: Java almond, Tropical almond
Tok pisin:
Tok ples:
Scientific name: *Terminalia catappa* L.
Synonyms:
Plant family: Combretaceae



Description: A large tree up to 25-40 m tall. It loses its leaves during the year. The trunk can be straight or twisted. There can be buttresses up to 3 m tall. The branches lie horizontally and come out in layers. The leaves are long, smooth and shiny with an abrupt point at the tip and a rounded base. Leaves tend to be near the ends of branches. Leaves can be 17-29 cm long and 10-15 cm wide. Young leaves have soft hairs. The leaves turn red and fall off twice a year. Flowers are greenish white and in a spike at the end of the branches. The lower flowers on a spike are female, then the others are male. The fruit is about 6 cm long by 3-4 cm wide, thick and flattened with a flange around the edge. The fruit are green and turn red when ripe. The pulp is edible.

Distribution: A tropical plant. This tree occurs on the beach front in most tropical countries in the world. They occur near the seashore from northern Luzon to southern Mindanao in the Philippines. They are sometimes cultivated as a shade tree. The tree is common in lowland areas particularly on sandy or rocky beaches. Seeds are spread by both bats and sea water as well as being planted by people. Trees are common along streets in coastal towns. They will grow from sea level up to about 800 m altitude. Plants are frost tender. They can tolerate drought. It suits hardiness zones 11-12.

Cultivation: Plants can be grown from seed. Seeds can be stored dry for a year or more. Seeds germinate freely and most seeds grow.

Production: It is fast growing. Nut production is seasonal.

Use: The kernels of the fruit are eaten raw.
An edible oil can also be extracted.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut	4.2	2987	20.0		6.3	0	2	41.0

The seed kernel is rich in zinc.

Insects: Insects can badly damage the leaves of young seedlings.

Aiteta iridias Meyr.	Noctuidae (LEP)	Larvae feed on leaves
Neotermes sp.	Colotermitidae (ISOPTERA)	
Perissopneumon		Mealy bug
Nagia episcopalis Hampson	Noctuidae (LEP)	Noctuid moth larvae

Diseases:

Leaf spot	Fungus	*Cercospora catappae*
Sooty mould	Fungus	*Lembosia terminaliae* Hansf.

Pests:

Importance: In coastal areas of Papua New Guinea trees are common and the nuts are popular especially with children.

Names

English: **Scientific name:** *Terminalia calamansanai* (Blanco)Rolfe
Tok pisin: **Synonyms:**
Tok ples: **Plant family:** Combretaceae

Description: A large tree. It grows up to 40 m tall. The tree has plank like buttresses which extend 10 m up the trunk. The small branches are often grouped in rings and thickened where they branch. The young tips of branches are ridged. The leaves are crowded near the ends of twigs and leave scars after they fall off. The leaves are hard and stiff. The leaves are oval and 8.5-16 cm long and 4-8 cm wide. They taper towards the base. Flowers are yellowish green to brown and easily fall off. They are very small. The fruit is flattened and has very broad wings. The fruit is more broad than long. It is 2-5 cm wide and 1-2 cm long. The fruit is dry and does not burst open. The seeds are brownish yellow and covered with fine short hairs and two wings up to 4 cm wide and less than 1 cm long.

Distribution: A tropical plant. Occurs occasionally in most areas of the Philippines amongst trees near the sea.

Cultivation:

Production:

Use: The fruit are eaten raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance: It is probably only of occasional occurrence and minor importance in Papua New Guinea.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Terminalia megalocarpa* Exell
Synonyms:
Plant family: Combretaceae

Description: A tree which can be up to 40 m tall. The leaves are at the tips of twigs and tend to hang downwards. The leaf stalks are quite long (307 cm). The fruit is large and up to 8 cm long. The fruit inside is thin shelled and the embryo inside has 3 or 4 twisted cotyledons.

Distribution: It is a tropical plant. It occurs in lowland forests.

Cultivation:

Production:

Use: The outer flesh of the fruit is edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: A selected yellow fleshed form is eaten in the Solomon Islands.

Names

English:
Tok pisin:
Tok ples: Kalumpit, Ganurru

Scientific name: *Terminalia microcarpa* Decne
Synonyms:
Plant family: Combretaceae

Description: A large tree. It loses its leaves during the year. The leaves are smooth and pointed at both ends. The flowers are yellowish white, on slender flower stalks which grow from the axils of leaves. The fruit are about 3 cm across, smooth, dark red and fleshy.

Distribution: It grows naturally in monsoon vine forests. Very common and widely distributed in the forests throughout the islands of the Philippines.

Cultivation: The fruit are generally collected from the ground.

Production:

Use: The fruit are eaten raw when ripe or made into jam. There is little flesh but it is very sweet.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: It is probably only an occasional introduction and very minor food in Papua New Guinea.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Terminalia sepicana* Diels
Synonyms:
Plant family: Combretaceae

Description: A tree up to 25 to 40 m tall. It often has buttresses. The leaves are clustered at the twig tips. The leaf stalks are less than 2 cm long. The leaves are 8.5 to 15 cm by 4-8 cm. They taper near the base. The flowers are 3-4 mm long and 1-3 fruit are produced per spike. The fruit are 4-6 cm long by 2.5 to 4.5 cm wide. They are green with 4-5 flanges. The fruit redden and become fleshy when ripe.

Distribution: It occurs in lowland rainforest and often in swampy areas. It occurs in Papua New Guinea and the Solomons.

Cultivation:

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Terminalia solomonensis* Exell
Synonyms:
Plant family: Combretaceae





Description: Trees from 25 to 40 m tall. The trunk can be 3.3 m around. The bark is dark brown and thick. It peels in strips from below and the lower part bends outwards. The crown is small and cone shaped. The branches are not in distinct layers. The leaves are generally in clusters on the ends of twigs. The leaf stalk is 2-3 cm long and often curved. The leaves are 10-18 cm long and 6-9 cm wide. The tip is rounded but the base is tapering. The flowers are about 3 mm long and on spikes about 18 cm long. Male and female flowers are separate on the same spike. The fruit is 4-5 cm long and 2-3.5 cm wide. It is mostly smooth and unwrinkled but sometimes flattened. It does not have a distinct wing. The fruit is red and firmly fleshy when ripe.

Distribution: It is mostly in the lowland areas but can be up to 1200 m altitude. It can grow on swampy ground.

Cultivation: In Papua New Guinea trees are in flower in July and August with fruit in December.

Production:

Use: The flesh of the ripe fruit can be eaten. They are preferred cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples: Sauge, Akama, Togtua, Mbrein

Scientific name: *Finschia chloroxantha* Diels
Synonyms: *Grevillea densiflora* Diels
Plant family: Proteaceae



Description: A tree up to 24-30 m tall with adventitious roots up to 1.5 m above the ground. Leaves are long (25 cm) and narrow (5 cm) and without hairs. The leaves are often clustered near the ends of branches so that the tree does not have a dense covering of leaves. The leaves can be 25 cm by 10 cm in size and have a vein around the edge joining the other leaf veins. The flowers occur is a long cluster up to 30 cm long and are bright orange in colour. They hang below the leaves and on the older wood. The flowers have both male and female parts in the same flower. The nuts are round and 2.5 cm by 3 cm across and brown. They have a sharp point on one side. The outside of the fruit is soft but there is a hard shell inside with one large edible seed. Flowers are rusty brown in long strings up to 20 cm long. Fruit are about 5 cm across. They have one seed inside. The nuts are round and 2.5 cm by 3 cm across and brown.

Distribution: Trees occur in lowland and mountain areas throughout Papua New Guinea up to about 1800 m altitude. They are usually in well drained primary forest. They also occur in the Solomons and Vanuatu.

Cultivation: Trees are planted from seed but also grow wild. Seeds often germinate slowly. The fruit is harvested when ripe and roasted to crack the shell to obtain the edible kernel. The seeds are cooked and eaten.

Production: Trees flower from December to March and nuts are available from March to August. The seeds can be 3-4 g weight.

Use: The kernels of the fruit are eaten. The hard shell is broken by burning after cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut								

Insects:

Diseases:

Black leaf mould	Fungus	*Chaetothyrium fusisporium* Fraser
Rust	Fungus	*Puccinia finschiae* Cummins
Black leaf mould and spots	Fungus	*Verrucispora proteacearum*

Pests:
Importance: A quite important nut tree in several areas of Papua New Guinea.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Finschia ferruginiflora* White
Synonyms:
Plant family: Proteaceae

Description: A tree up to 30 m tall with adventitious roots up to 1.5 m above the ground. Leaves are long (25 cm) and narrow (5 cm) and without hairs. Flowers are rusty brown in long strings up to 20 cm long. Fruit are about 5 cm across. They have one seed inside.

Distribution: They occur in rainforest between 1500 and 1800 m altitude.

Cultivation: Trees grow from seed.

Production:

Use: The seeds are cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut								

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea, the species has mostly been recorded in the Eastern Highlands near Aiyura and Okapa.
Another species *Finschia rufa* Warb. also has edible nuts.

Names

English: Macadamia nut
Tok pisin:
Tok ples:
Scientific name: *Macadamia ternifolia* F.Muell
Synonyms:
Plant family: Proteaceae

Description: A medium size evergreen tree. It has a bushy habit. It grows 5-10 m tall. The young shoots are pink. Young leaves are long and toothed at the edge. The leaves are 10-18 cm long by 3-5 cm wide. The leaves mostly occur in rings of three. They are stiff, leathery and dark green. Flowers are in stalked clusters 10-20 cm long. They are produced in the axils of leaves and hang downwards. The flowers are 0.8 cm long and pink. The fruit are 1.5-2 cm long and are produced in a hanging cluster. The nuts are smooth, woody, and rounded with a point at the tip.

Distribution: It is a tropical and subtropical plant. In Papua New Guinea it does well at 1000 to 1200 m altitude and will grow up to 1700 m.

Cultivation: Trees are mostly grown from seed. They can be grown from cuttings. Pruning increases branching. A spacing of 5 to 10 m is suitable.

Production: Trees produce in 7 years from seed and 3-4 years from grafted trees. Nuts on some types are produced seasonally about Dec to April. Nuts are harvested after they fall. The outside husk needs to be rubbed off then the nuts dried in the sun.

Use: The nuts are edible.
The nuts yield an oil used with salads.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts	2.5	3238	7.46		0.2		Tr	

Insects:

Gesonula mundata Walker	Acridiidae (ORTH)	Grasshopper
Oribius spp.	Curculionidae (COL)	Shot hole weevils

Diseases:

Pests:

Importance:

Names

English: **Scientific name:** *Macadamia tetraphylla* L.Johnson
Tok pisin: **Synonyms:**
Tok ples: Macadamia, Rough Shelled Bush Nut **Plant family:** Proteaceae



Description: A tree which grows 8-15 m high. It spreads to 6-8 m wide. It has a spreading bushy habit. Young growth is red. Young leaves are coarsely toothed. The leaves are 6-30 cm long by 2-5 cm wide. They occur in whorls or rings of 3-5 leaves but usually 4 in a ring. The leaves are stiff and dark green. There are coarse spines on the edge of the leaf. The flowers are in dense stalks 15-45 cm long which hang down from the axils of leaves. The flowers are 1 cm long and slender. They are pink or white and densely hairy. The fruit are 2-3.5 cm across and green and leathery. The nuts are the same size. They are brown and rough. (It produces natural hybrids with *Macadamia integrifolia*.)

Distribution: It is a subtropical plant. It can grow from temperate to tropical climates. It grows naturally in Australia in the rainforest. It can grow in full sun or light shade. It will tolerate light frost. It needs a well-drained soils and benefits from mulching. It suits hardiness zones 9-11.

Cultivation: Plants can be grown from seed. Fresh seed should be used and seeds germinate and grow easily. Budding or grafting onto seedlings is possible. They can be grown from cuttings.

Production: In Australia, the nuts are ripe January to March.

Use: The nuts are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut								

Insects:

Diseases:

Pests:

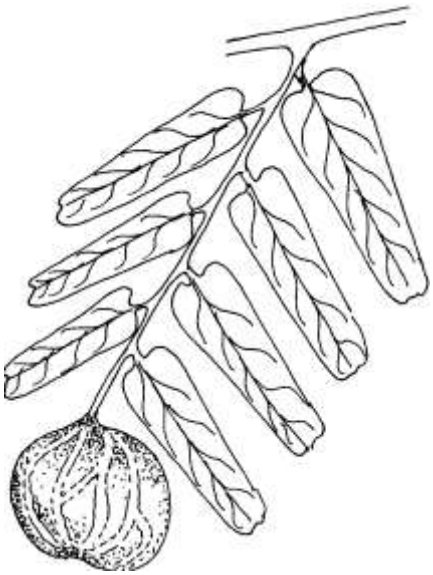
Importance: Introduced into Papua New Guinea. Although not yet common in Papua New Guinea it is probably one of the nuts worth promoting.

Names

English: Polynesian chestnut
Tok pisin: Aila
Tok ples:

Scientific name: *Inocarpus fagifer* (Parkinson)Fosberg
Synonyms: *Inocarpus fagiferus* (Park.)Fosb.
And *Inocarpus edulis* J. R. Forst. & G. Forst.
Plant family: Fabaceae

Description: A tree from 9-30 m tall with buttresses at the base of the trunk. The bark is dark grey and gives a red sap when cut. The branches droop downwards. The leaves are long (20 cm), leathery, shiny and feather veined. The leaves have short stalks and are one after the other (alternate) along the branch. The leaves are large and reddish when young and shiny green when adult. The flowers of Aila are not obvious. They are pale yellow and hang loosely on the twigs from the angles where leaves join. They have 5 narrow petals joined in a tube. The flowers smell sweetly. The fruit is irregular or kidney shaped and is a one seeded pod with ridges on the surface. It can be 8-10 cm across and 3 cm thick. The ripe fruit is yellow.



Distribution: It grows in the lowland primary and secondary forest from sea level up to 390 m altitude. It often grows near rivers and swamps and mostly as a clump of trees. Often they are very close to the water front. It also occurs in the Pacific Islands. They do better where there is no distinct dry season. Seeds are mostly planted. Seeds are also naturally distributed by bats. Plants can be propagated vegetatively by cuttings of half ripe wood. Seeds are the more common method of production. Seeds store easily for over a month but viability declines fairly rapidly in salt water. Trees prefer swampy ground but they also grow satisfactorily on higher slopes. It is presumed that plants have some salt tolerance as they often grow along the foreshore.

Cultivation: Time to first production of nuts from planting is about 8 years. An average seed weighs 40 g. Fruit production occurs throughout the year but has a main season. Uncooked seeds can be stored.

Production:

Use: Seeds are cooked and eaten.
The fleshy layer around the seed is eaten after cooking. The nuts are usually roasted although they can be boiled. Soaked nuts can be grated, mixed with coconut milk and roasted in banana leaves. Seeds can be stored by partly fermenting them in pits in the ground. Nuts can be stored for a considerable time but once shelled or cooked will only keep a short time.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed	43.0	1008	4.5			0	2	
Fruit								

Insects:

Bactrocera sp.		Fruit fly maggots
Ceroplastes rubens Maskell	Coccidae (HEM)	Pink wax scale
Coccus longulus (Douglas)	Coccidae (HEM)	

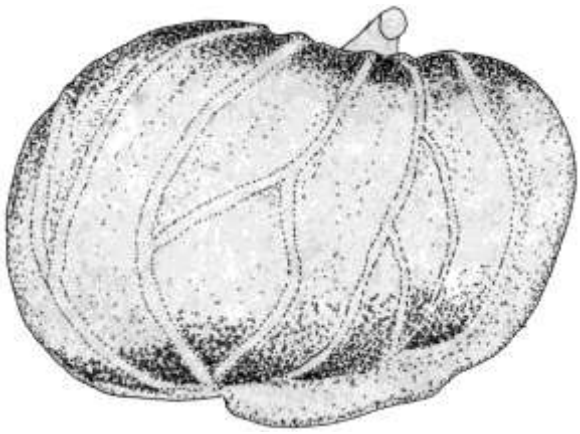
Coccus viridus (Green)	Coccidae (HEM)	Green scale
Dysmiccocus brevipes (Cockerell)	Pseudococcidae (HEM)	Pineapple mealybug
Icerya seychellarum (Westwood)	Margarodidae (HEM)	
Ischnaspis longirostris (Signoret)	Diaspididae (HEM)	Black thread scale
Lepidosaphes rubrovittata Cockerell	Diaspididae (HEM)	
Maculicoccus malaitensis (Cockerell)	Pseudococcidae (HEM)	
Neoplatyolecanium sp.	Coccidae (HEM)	
Parlatoria crotonis Douglas	Diaspididae (HEM)	
Pinnaspis aspidistrae (Signoret)	Diaspididae (HEM)	
Pinnaspis buxi (Bouche)	Diaspididae (HEM)	
Pinnaspis strachani (Cooley)	Diaspididae (HEM)	
Planococcus pacificus Cox	Pseudococcidae (HEM)	

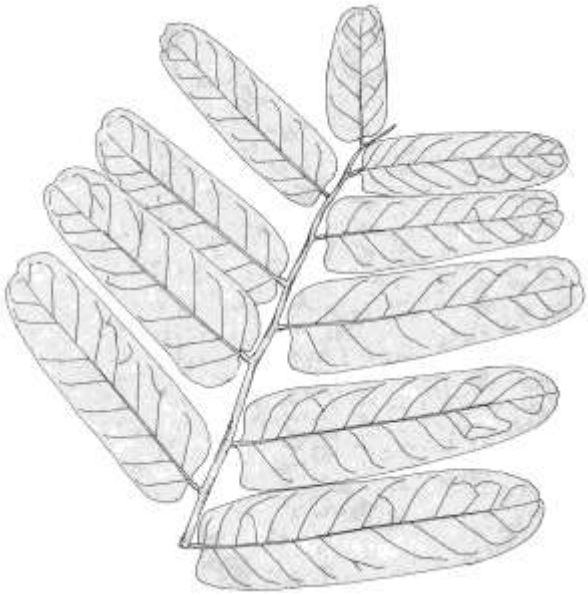
Diseases:

	Fungus	*Helotium inocarpi* P Henn.

Pests:

Importance: They occur in most coastal areas of Papua New Guinea, normally very close to the coast. Fruit are sold in markets.



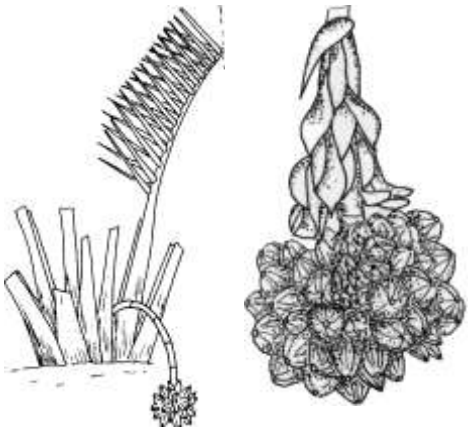


Names

English: Nypa palm
Tok pisin:
Tok ples:

Scientific name: *Nypa fruticans* Wurmb.
Synonyms:
Plant family: Arecaceae

Description: A palm with stout creeping underground stems. It forms clumps. The stems lie along the ground and are underground in soft mud. The leaves have leaflets along a 7 m long axis. The leaves occur in erect clusters. The leaflets are 0.-1.3 m long by 5-8 cm wide. The fruit are flat and 12 cm long by 10 cm across. They are crowded into a very characteristic large round fruiting head which is borne on a special erect stalk. The female flower is a round head on the end of the stalk and below it long male flowers are produced. The centre of the fruit is edible.



Distribution: They occur along tidal streams throughout the Philippines. They thrive in brackish swamps. They occur in tidal mud flats. They occur naturally along the Papuan coast of Papua New Guinea but are most likely planted along the North coast.

Cultivation: Plants can be grown from seed. Plants can be grown by dividing off suckers. To get the sap to flow in the stalk, the stalk must be banged and shaken then the end cut off and trimmed daily. Tree densities of up to 2,500 palms per hectare occur but only 700-750 are sap producing. Plants are spaced at 1.5-1.7 m giving 390 per hectare where plantings occur. Plants are pollinated by insects therefore contact insecticides need to be avoided. To collect sap the almost full grown head is cut off. About 2 mm of the tip is removed each day during sap collection. Sap flow is increased by banging the trunk and tapping the fruit stalk regularly.

Production: Palms flower and fruit after 3-5 years. Yields of sap of up to 1,500 ml of sap per day per palm over one month can be achieved. Tapping can occur for 50 years. Near Kerema in Papua New Guinea it flowers in May and fruits in July. The season is later in the Western Province.

Use: The kernel inside the nut is edible. It is normally eaten while immature.
Also the base of the "nut" is chewed.
Sugar (or vinegar) can be obtained by collecting the sap from the fruit stalk.
Young shoots are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut	88.9		1.6		0.4		2	
Sap								
Shoots								

Insects:

Nacoleia octasema (Meyrick)	Pyralidae (LEP)	Banana scab moth
Oryctes spp.	Scarabaeidae (COL)	Rhinoceros beetle

Diseases:

Black plaque on leaves	Fungus	*Rhipidocarpan javanicum* (Pat.)Theiss & Syd

Pests:
Importance: The palm occurs near mangrove swamps and along the shoreline, in Papua New Guinea. The nut is used especially by children.

Names

English: Tambor
Tok pisin:
Tok ples:
Scientific name: *Omphalea queenslandiae* F.M.Bail.
Synonyms: *Omphalea gageana* (Pax & Hoffm.)Airy Shaw
Plant family: Euphorbiaceae



Description: A large woody vine which climbs high up into trees. It has a red sticky sap when cut. The vine can become 10 - 15 cm across and grow to 20 m long. Leaves are alternate. Young leaves are deeply five lobed and the base of the leaf can extend down the stem. Leaves are 10-18 cm across and 15-20 cm long. Leaves are dark green and leathery. At the base of the leaf there are conspicious glands. Flowers are white, greenish or red. The flowers are of one sex with several male flowers clustered around one female flower. A cluster of fruit is borne on a branch up to 5 cm long near the base. Fruit is 6-10 cm across and fleshy with 3-4 lobes. The fruit surface is smooth and yellow when ripe. The seed coat is hard, brown and ridged. The kernel is white.

Distribution: It occurs from sea level up to at least 1800 m altitude in hot places near the equator and to 800 m in Queensland. It grows in the rainforest.

Cultivation: It is normally self sown. Plants can be grown from seed or from cuttings of firm new growth. Plants require a sunny position in well drained soil. It can not withstand frost.

Production: Fruit production is seasonal. Fruit are ripe February to May. A kernel of a nut weighs about 3 g.

Use: The kernels are eaten after cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut	28.5	1991	11.5		2.1			3.4

Insects:

Diseases:

Pests:

Importance: The nut occurs occasionally in forest areas both in the highlands of Papua New Guinea and on the islands.

Names

English: Cape nutmeg
Tok pisin:
Tok ples:

Scientific name: *Horsfieldia australiana* Blake
Synonyms:
Plant family: Myristicaceae

Description: A tree. It grows 10-120 m high and spreads 3-6 m wide. It has a dense spreading crown. The bark is slightly rough and cream and blotchy. It flakes and has fine cracks along it. The stem has a distinct ridge which zigzags from leaf to leaf. The leaves are simple, alternate and smooth and leathery or papery. They are oblong and 16-28 cm long by 4.5-7 cm wide. They are shiny dark green on top and paler underneath. The tip of the leaf is rounded or slightly pointed. There are 12-15 pairs of side veins. The leaf stalk is thick and curved. It is about 1 cm long. Male and female flowers occur on separate trees. The flowers are very small and orange-yellow. Male flowers have a spicy scent and are 0.2 cm across. They occur in dense clusters in the axils of leaves. The female flowers are nearly round and in flower clusters 1.5-2.5 cm long. The fruit are smooth and oblong. They are 4 cm long by 2.5 cm across. They hang in clusters along the stalk. They are pale yellow when ripe. The fruit stalk is very short. Inside is one seed covered by a fleshy orange-red aril. The seed is 1.5 cm long.

Distribution: Tropical. It grows naturally in thick monsoon forest near freshwater streams. It is often on moist organic soils in sandstone country. They need deep, well drained soils. It requires ample moisture.

Cultivation: Plants can be grown from seed. The seed should be sown fresh.

Production: In Australia, trees flower from August to October and fruit from November to January (January to March).

Use: The kernel of the fruit is eaten raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut	3.6	2384	11.0		4.0			2.2

Insects:

Diseases:

Pests:

Importance: This species is being grown commercially in Darwin, Australia for its edible seeds.

Names

English:

Scientific name: *Elaeocarpus polydactylus* Schltr. gp 4 Schltr.

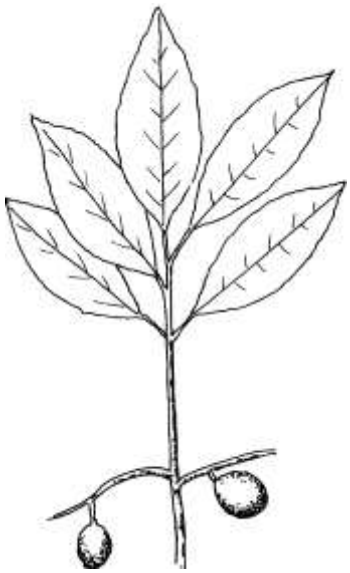
Tok pisin:

Synonyms:

Tok ples:

Plant family: Elaeocarpaceae

Description: A tree or shrub up to 13 m tall. The leaves are 3-6 cm wide and 6-11 cm long and leathery. Flowers are few and are 5-11 cm long. Fruit are 1.5 cm x 1 cm. They are green when unripe and blue when ripe.



Distribution: It grows in regrowth forest at 1850-2550 m above sea level. It mainly occurs in the Western and Eastern Highlands Provinces of Papua New Guinea.

Cultivation: Trees grow wild from seed.

Production:

Use: The kernels inside the seeds are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects:

Diseases:

Pests:

Importance: An occasionally eaten wild edible nut in some areas of Papua New Guinea.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Elaeocarpus womersleyi* Weibel
Synonyms:
Plant family: Elaeocarpaceae

Description: A large tree up to 34 m tall mostly with buttresses. The leaves are arranged alternatively, are simple and have a toothed margin. The flowers and fruit are in groups on a small branch. The fruit can be up to 10 cm across with green flesh and a stone inside which has a hard corrugated surface. The hard stone has 3 valves and is cracked to release the kernel.



Distribution: It occurs from sea level up to at least 2400 m altitude but is most common in mid altitude regions. It is common in bush regrowth in old gardens.

Cultivation: It normally grows wild but is occasionally planted from seed.

Production: Fruit production is seasonal probably late August to September.

Use: The kernel of the nut is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut								

Insects:

Rhyparida coriacea Jac.	Chrysomelidae (COL)	A leaf eating beetle

Diseases:

Rust	Fungi	*Aecidium elaeocarpi* Racib.
	And	*Aecidium elaeocarpicola* Cummins
	And	*Aecidium morobense* Cummins
Sooty mould		

Pests:

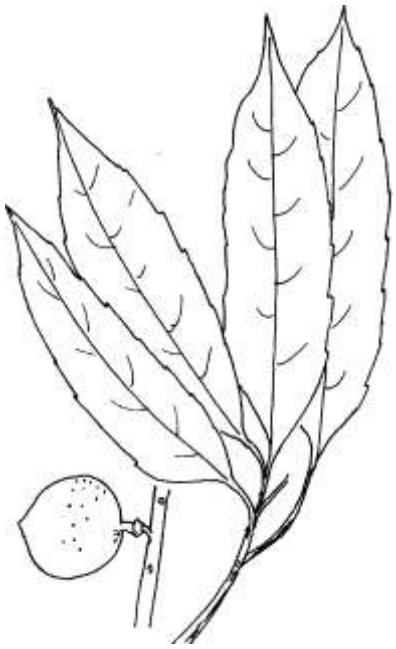
Importance: In Papua New Guinea, an occasional nut tree in quite a few highland areas. It is mainly just harvested and used when found.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Elaeocarpus pullenii* Weibel
Synonyms:
Plant family: Elaeocarpaceae

Description: A tree up to 30 m tall. The leaves are long (18 cm x 8 cm) and shiny. They are clustered near the ends of twigs. The leaf stalks are long (5 cm) and twigs are bluish. The fruit is large (5.5 cm x 4.5 cm) with a bluish skin. Inside a 3 cornered hard stone has one seed inside



Distribution: It occurs in rainforest and near streams. It is known from 700 to 1100 m above sea level.

Cultivation: It grows wild.

Production:

Use: The seed is recorded as being eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seed								

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea, an occasionally eaten wild edible nut.

Names

English: Queensland almond, Karanda nut

Scientific name: *Elaeocarpus bancrofti* F. Muell & F.M.Bailey

Tok pisin:

Synonyms:

Tok ples:

Plant family: Elaeocarpaceae



Description: A medium sized to tall tree. It grows 15-30 m tall and spreads 8-15 m across. The bark is dark grey and scaly. Young shoots are covered with fine silky hairs. The leaves are oblong to sword shaped and 7-15 cm long by 2-6 cm wide. They are dark green and glossy on top and paler underneath. The edges of the leaf are entire. The flower racemes are 4-8 cm long with flowers 1.5 cm long. These flower arrangements grow in the leafless part of the stem. The flowers are white and bell shaped. The edges of the flower petals have lobes.
The fruit is 2.5-3.5 cm across and rounded. They are greenish black. The kernel of the fruit is edible. The shell around the kernel is very hard.

Distribution: It is native to NE Australia. It grows in tropical rainforests. It requires well drained soil and plenty of moisture. It is sensitive to drought and frost.

Cultivation: Plants are grown from seed.

Production: Seedlings grow quickly. In Australia flowering occurs from March to June and fruit are mature in July to October.

Use: The kernel of the fruit is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Kernel	37.6	1000	2.3					

Insects:

Diseases:

Pests:

Importance:

Names

English: Blue quandong
Tok pisin:
Tok ples:

Scientific name: *Elaeocarpus angustifolius* Blume
Synonyms: *Elaeocarpus grandis* F. Muell.;
Plant family: Elaeocarpaceae



Description: A medium sized to tall tree. It grows 35-40 m high. There are buttresses 5-6 m up the trunk. It has an open crown. The bark is light grey. The young shoots are pale green. The leaf stalks are long 15 mm, slender and narrowly winged near the tip. The leaves are partly deciduous. The leaves are oval and 7-18 cm long by 3.5-5 cm wide. They are dark green and glossy on top and paler underneath. They are thin textured. The edges of the leaves have fine teeth. Old leaves turn bright red. The flowers are borne on twigs behind the leaves. Flowers are 1.2-1.5 cm across and placed along a stalk on side branches.
This flower arrangement is 5-15 cm long. The flowers are greenish white. The petals have a fine fringe. The fruit is 2-3 cm across and round. It is shiny bright blue or purple. The flesh is often fibrous. The seeds have a hard pitted coat. The fruit are edible.

Distribution: It occurs in lowland secondary forest from India to Fiji. It grows in rainforests and along stream banks. They require well drained soil and need plenty of moisture. In Nepal it grows between 600-1100 m altitude. It grows in hardiness zones 10-12.

Cultivation: Seed only germinate irregularly. Cracking the hard seed coat helps seeds grow more quickly. Seeds have also been made grow better by fermenting them and by storing them in plastic bags. Plants can be grown from cuttings.

Production: Plants are very fast growing. In Australia plants flower in March to June and then in December and fruit are mature in August to January.

Use: The fleshy layer around the hard stone is edible, when ripe.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English: Arnhem Land quandong
Tok pisin:
Tok ples:

Scientific name: *Elaeocarpus arnhemicus* F. Muell.
Synonyms:
Plant family: Elaeocarpaceae

Description: A tall shrub or small evergreen tree. It grows 6-15 m tall and spreads 3-5 m across. The crown has a spreading pattern. The bark is pale grey and smooth. Young shoots are hairy and the stems reddish. The leaves are oblong and 3-8 cm long by 3-4 cm wide. They are blunt at the end. They are dark green above and dull green underneath. The edges of the leaves are notched. The flower racemes are 2-8 cm long and the flowers about 0.5 cm long. The flower arrangements occur in the axils of the upper leaves and the flowers are greenish white with a fringe. The fruit is 1.2-1.5 cm long with a central stone. It is oval and bright blue.

Distribution: It is native to N Australia and Papua New Guinea. Plants grow naturally along stream banks in tropical places. They extend into drier areas. It often grows in rocky areas. It needs a sunny position and a well drained soil. It can tolerate some frost. It is very tolerant of drought and salt.

Cultivation: Plants are grown from seed.

Production: Seed do not germinate regularly. Plants can also be grown from cuttings. In Australia fruit mature November to January.

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: Qandong
Tok pisin:
Tok ples:

Scientific name: *Elaeocarpus culminicola*
Synonyms: *Elaeocarpus michaelii*
Plant family: Elaeocarpaceae

Description: A shrub or bushy tree. It grows up to 10 m tall. The leaves are glossy and bright green. They are leathery and 12 cm long by 6 cm wide. The edges of the leaf have coarse teeth. The flower racemes are 7 cm long and the flowers 1.5 cm long. The flowers are pink and bell shaped. The fruit are blue, oval and 1.5 cm long.

Distribution: A tropical plant. It needs a sunny sheltered position.

Cultivation: Plants can be grown from fresh seed. The seed germinates erractically.

Production: In Australia, flowering occurs August to September and fruit are ripe February to March.

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Names

English: Castanopsis chestnut
Scientific name: *Castanopsis acuminatissima* (Bl.)A DC
Tok pisin:
Synonyms:
Tok ples:
Plant family: Fagaceae



Description: This tree grows up to 40 metres tall and it can have a trunk 1 metre through at the base. Most trees have several suckers growing from their base and the roots of the tree are close to the surface. It is a widely spreading tree. The bark is quite rough and yellowish. The leaves are mainly horizontal with recurved tips. They are rich green on the upper surface and copper brown underneath. The male and female flowers occur separately but they both occur on the one tree. The tree has flushes of growth with new leaves having a slightly reddish colour. The fruit are borne on spikes 15 to 25 cm long carried near the ends of twigs. They are covered with a prickly envelope. The nut has a spiky type of covering around it and as it ripens this peels back and the nut falls. The nut is pointed, brown and slightly hairy. It is about 1.5 cm long and has two large "seeds" inside.

Distribution: It occurs throughout much of Papua New Guinea and can form pure stands in lower montane rainforest between 500 and 2000 m altitude. The most common place is between 1100 and 2300 metres above sea level but they can occur down to 500 metres or sea level. Often these chestnut trees are more common on the boundary between the grassland and the forest. They form a thick covering of leaves which stops many smaller plants from growing underneath. As well they commonly grow in groups or clumps made up only of chestnut trees. From planes, these Castanopsis forests can be picked out because they have a distinctive yellowish brown colour. Under the trees there is usually a thick layer of fallen leaves.

Cultivation: The seeds grow easily. Self sown plants can often be found under large trees. These can be transplanted to where you want to grow a tree. A nursery can be used by planting seeds and then transplanting them when they are big enough. Although suckers are common near the base of trees they do not grow easily.

Production: Pollination is most probably by wind. Nut production is seasonal. Large numbers of nuts are produced in a good season. The nut is about 1.5 cm long and pointed at the end. A nut is quite small. One nut weighs about 1 gm and the edible seed inside weighs about 0.5g.

Use: The seeds are eaten preferably after cooking. They are boiled. Small numbers of the nuts are eaten raw by children. If small amounts are available they are boiled in a container. If large quantities are available they are cooked in earth ovens. Cooked they taste like rice. Pigs readily eat the nuts so people tie them up under the trees in the bush during the nut season.
Caution: Mouth ulcers and anaemia have been reported from eating large numbers of raw nuts.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects: **Pests**:
Diseases:

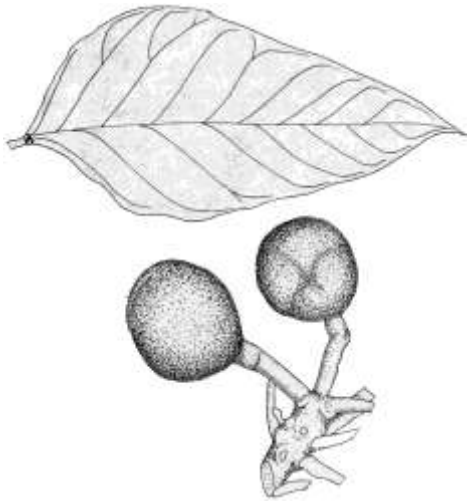
Leaf spot	Fungus	*Aporhytisma urticae*
Slimy brown mould		

Importance: A fairly common nut tree in most highland areas of Papua New Guinea, but more important in some areas.

Names

English: Candle nut
Tok pisin:
Tok ples:
Scientific name: *Aleurites moluccana* (L.)Willd.
Synonyms:
Plant family: Euphorbiaceae

Description: A large tree up to 40 m tall and 1 m through at the base. The bark is rough. The leaves are large and can be round, triangular or have several lobes. The leaves have a pale colour. The leaves are alternate, silvery green and crowded near the tips. Young leaves are hairy and sometimes lobed. The leaves, leaf stalks and flowers are all covered with short soft hairs. There are 2 distinct brown glands where the leaf blade and stalk join. The flowers are small and white and in large groups on the ends of branches. Male and female flowers are separate but on the same tree. The female flowers are on the end surrounded by small male flowers. The fruit is a large (4 to 5 cm across) green 2 lobed berry with 1 or 2 large (2.5 cm across) seeds with a hard corrugated shell. They do not open naturally to release the seeds.



Distribution: It is a tropical tree. It mostly grows in the lowland rainforest but can be at up to 2000 m altitude. It suits drier climates. It does well on well drained sandy soil. It suits hardiness zones 10-12.

Cultivation: The trees grow wild but are transplanted. Often candle nut trees are just self sown, growing in the bush where the seeds fell. These small trees can be transplanted to a more suitable place if needed. Seeds are very hard shelled. To get seeds to start growing more quickly, the seed coat needs to be cracked. To do this a single layer of seeds are put on the ground covered with dry grass then burnt. Immediately after burning while the seeds are still hot they are thrown into cold water, and then planted. This cracks the shells allowing more rapid germination. Without this it may take many months for this hard shell to break down and germination to commence. Trees can also be grown from cuttings.

Production: The tree grows quickly. 30-45 kg of nuts can be produced on a tree in one year. Trees can start producing after one year.

Use: The nuts are normally roasted. The hard, oily nut is used for thickening in Asian dishes. They are used in a sauce for the greens eaten with rice.
Caution: The nuts contain a moderately poisonous substance so should be cooked before eating. The raw kernels of candle nut are poisonous. They are a strong purgative. Before eating they must be well cooked. Mostly the nuts are roasted in the fire until the shell is blackened and half burnt, then the kernels are taken out by cracking the shells. The nuts should probably only be eaten in moderate amounts. Because the kernels are high in oil, they can be burnt as candles.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut	1.4	2836	20.6		22.6			3.2

Insects:

Chrysomphalus aonidum (Linnaeus)	Diaspididae (HEM)	Florida red scale
Coccus longulus (Douglas)	Coccidae (HEM)	

Dysmicoccus nesophilus Williams	Pseudococcidae (HEM)	
Eucalymnatus tessellatus (Signoret)	Coccidae (HEM)	
Hemiberlesia lataniae (Signoret)	Diaspididae (HEM)	
Hemiberlesia palmae (Cockerell)	Diaspididae (HEM)	
Pinnaspis strachani (Cooley)	Diaspididae (HEM)	
Planococcus pacificus Cox	Pseudococcidae (HEM)	

Diseases:

Leaf spot	Probably fungus	

Pests:

Importance: A reasonably important nut in several areas of Papua New Guinea.



Other minor nuts

often from others places
and introduced for trials

Minor and introduced nuts

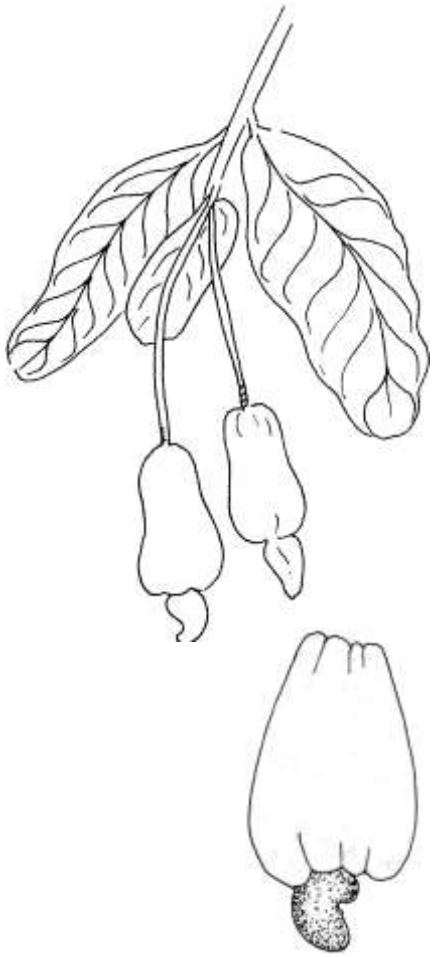
English name	Tok Pisin	Scientific name	Page
Cashew		*Anacardium occidentale*	**351**
European chestnut		*Castanea sativa*	**353**
Fragrant screwpine		*Pandanus odoratissimus*	**354**
Moreton Bay chestnut		*Castanospermum australe*	**355**
Pecan		*Carya illinoinensis*	**356**
Hazel		*Corylus avellana*	**357**
Walnut		*Juglans regia*	**358**
Pangi	Sis	*Pangium edule*	**359**
Pistachio nut		*Pistacia vera*	**360**
Almond		*Prunus dulcis* var. *amygdalus*	**361**
Java olive		*Sterculia foetida*	**362**
Peanut tree		*Sterculia quadrifida*	**363**
		Sterculia schumanniana	**364**
		Sloanea tieghemii	**365**

Names

English: Cashew
Tok pisin:
Tok ples:

Scientific name: *Anacardium occidentale* L.
Synonyms:
Plant family: Anacardiaceae

Description: A spreading evergreen tree up to 7-14 m tall. It has spreading branches. The canopy can spread 12 m. The roots grow deeply and spread widely. The bark is rough. The trunk is 15-20 cm across. The leaves are alternate. The leaves are pale green and large. They are 10-15 cm long by 6-8 cm wide. They have fine veins. They are narrow at the base. The leaf stalk is 1-2 cm long. The leaves are shiny. The flowers are produced on the ends of the branches. They are red in colour. About 14 % of the flowers are both male and female and the remainder are male. Many of the flowers which contain female flower parts do not form fruit. The nut is borne below the "apple" which is really a fleshy stalk. The nut is kidney shaped. It is about 3 cm long.



Distribution: It is a tropical plant. It suits the lowland tropics but will grow up to about 1200 m altitude. It only bears well in dry areas because of blight of the flowers. It needs warm frost free locations. It grows with temperatures between 22-26°C. A rainfall of 1750 mm per year is considered suitable but good yields have been obtained with rainfall of 750 mm. Wider spacing is needed in drier areas. It can grow on poor soils. It needs good drainage. It is drought resistant. In South India it grows up to 1000 m altitude. It suits hardiness zones 11-12.

Cultivation: It is usually grown from seeds. Seeds germinate poorly and slowly. Only nuts which sink in water (or a solution of 150 g of sugar in a litre of water) should be planted. Seeds are sun dried for 2-3 days to improve germination. Seeds can be sown in a nursery then transplanted or more commonly are sown directly. Trees are spaced 7-10 m apart. The crop is cross pollinated mostly by insects. It can be propagated by air layering. For good production complete fertiliser or appropriate organic material should be applied. Pruning to shape the tree is often undertaken in the first 2 or 3 years. Cashews are often planted scattered in gardens or amongst other trees. Clearing under the tree prevents fire and makes finding nuts easier. Allowing nuts to fall before harvesting ensures only ripe nuts are collected. Resin in the cashew nut shell can damage hands and discolour the nuts. Roasting the nuts before removing the kernel avoids this.

Production: Trees commence bearing after 3 years. Fruit production is seasonal. The fruiting season is normally October to January. Mature nuts are produced in 2-3 months. Yields of 80-200 kg per hectare of nuts are normal. Trees produce maximum after 10 years and trees last for about 100 years.

Use: The fleshy "apple" is edible but acid until very ripe. It is used for jams and drinks.
The nut is eaten after roasting.
The young shoots and leaves are edible.
Caution: The oil of the nut can blister the skin till roasted.

The apple is used to make alcoholic drinks.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut	4.0	2478	17.5		2.8			4.8
Fruit	84.7	213	0.8		1.0	0.12	265	0.2
Leaves								

Insects:

Apirocalus cornutus Pasc.	Curculionidae (COL)	Horned weevil
Eupholus cinnamoneus Pasc.	Curculionidae (COL)	Weevil
Helopeltis clavifer (Walker)	Coreidae (HEM)	Cacao mirid
Oribius cruciatus Fst.	Curculionidae (COL)	Shot hole weevil
Selenothrips rubrocinctus (Giard.)	Thripidae (THYS)	Cacao thrips
Scopelodes nitens B Bak.	Limacocidae (LEP)	Cup moth
Symphilites sp.	Cerambycidae (COL)	

Diseases:

Algal spot	Algae	*Cephaleuros virescens* Kunze
Twig dieback	Fungus	*Glomerella cingulata*

Pests:

Importance: At present mainly on research stations in Papua New Guinea. It is very important in India and common in Africa. The shell contains anacordolic which affects the salivary glands and can paralyse the jaw.

Names

English: European Chestnut
Tok pisin:
Tok ples:

Scientific name: *Castanea sativa* Mill.
Synonyms:
Plant family: Fagaceae

Description: A large deciduous tree up to 30-40 m high. It spreads to 6-15 m across. The stem is erect and stout. It has spreading branches and a wide rounded crown. The bark is grey-brown. The bark is ridged in a right handed spiral. The large leaves have toothed edges. The leaves are oblong to sword shaped and have prominent veins. The leaves can be 20 cm long. Leaves turn yellow to brown in autumn. Male and female flowers are separate. The male flowers are brownish and hang down like a cat's tail. They are 20 cm long. The female flowers are joined together into a distinctive little tube. Normally male flowers are lower in the current season's shoots while the female (or both sexes) flowers are nearer the end of the shoot. The pollen can have an unpleasant smell. The brown nuts are inside green, spiny coverings. These burrs open to reveal the nut. The outer shell is shiny light brown. It needs to be cut off with a sharp knife. A softer layer appears inside surrounding the nut.



Distribution: A Mediterranean climate plant. It can withstand frost. Trees do produce in the highlands of South India so may produce in the highlands of PNG. It requires light to medium, well drained soils. It is drought tender. It is slightly hardier than a peach and has less chilling requirement than a walnut. It is not suited to heat or humidity. It suits hardiness zones 5-9.

Cultivation: Trees are mostly grown from seeds, but it is better to use grafted trees onto chestnut seedlings. Trees can be grown from cuttings. They can also be grown by layering. Seeds should be from cross pollinated trees and should be stored in a refrigerator at just below freezing for several months to break the dormancy, before planting. Some trees need to be cross pollinated, but some kinds will self between male and female flowers on the one tree. Pollination is by wind so trees should be near each other. Normally trees are trained to have a single trunk with at least 1.5 m to the lowest branch.

Production: This is the fastest growing of the chestnuts. Trees can live for centuries. Seedling trees can bear after 3-10 years. Up to 100 kg of nuts can be produced per year. There is little seasonal fluctuation in nut production. The nuts fall naturally. The nuts need to be partly dried to improve the taste and stop rots. The nuts can be stored in closed boxes, with newspaper to absorb the moisture. If kept cool they will store for 6 months. Kernels can be kept for much longer if cooked and frozen. To do this the nut is placed in boiling water for 2 minutes then peeled and cooled and frozen.

Use: The kernel of the nuts is eaten boiled or roasted.
They are also slowly dried then ground and made into porridge.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut	51.7	720	2.0		0.9	0	27	

Insects: **Diseases**: **Pests**:
Importance: Seeds have been introduced into Papua New Guinea for growing trials only

Names

English: Fragrant screwpine
Tok pisin:
Tok ples:
See Pandanus tectorius.

Scientific name: *Pandanus odoratissimus* L.f
Synonyms: *Pandanus amaryllifolius* Roxb.;
Plant family: Pandanaceae

Description: A screwpine or erect branched shrub 3 to 5 m high. The trunk has several prop roots. The leaves are spirally crowded towards the ends of branches and covered with waxy powder. They are up to 1.5 m long and 3 to 5 cm wide. The edge of the leaf and the midrib have sharp spiny teeth pointing towards the end of the leaf. Trees are of one sex. The male flowers are in loose spike of flowers with a fleshy axis and enclosed by a spathe. These have several 5-10 cm long spikes along them. The female flowers are solitary and 5 cm across. The fruit are alone and hang down. They are rounded and 20 cm long. They are composed of 50 to 75 fibrous fleshy fruit with a stone in the centre. They are somewhat angular with fruit in groups of 6-7 forming a large cluster. There are several forms or kinds which vary in details.

Distribution: Plants occur in coastal areas especially just behind the shoreline. They grow along the coasts in India. It grows at Mumbai, India. It suits hardiness zones 11-12.

Cultivation: Plants are normally self sown.

Production:

Use: The strongly scented flavouring essence is distilled from male flowers.
The fleshy base of the fruit is eaten in one kind. The lower part of the fruit is sucked.
The kernels are eaten in another kind. Kernels are eaten raw or lightly cooked.
The growing shoot can be eaten after thorough washing in salt water.
Drinks are made using the male flower.
Caution: The fruit can cause irritation in the mouth when eaten.
The young tender leaves near the flower are eaten raw or cooked. They are used to flavour drinks and desserts.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Nacoleia octasema (Meyrick)		Banana scab moth

Diseases:
Pests:

Importance: Moderately common in coastal areas in Papua New Guinea, but nut only eaten in some places.

Names

English: Moreton Bay Chestnut

Scientific name: *Castanospermum australe* A Cunn & Fraser ex Hook

Tok pisin:

Synonyms:

Tok ples:

Plant family: Fabaceae

Description: An evergreen tree up to 18-35 m tall. It spreads to 5-12 m across. The stem is erect and stout. The bark is grey to brown and smooth. The leaves are glossy dark green. The leaves are 30-45 cm long. Leaves have 11-15 leaflets. These are slightly curved. The leaflets are 7-12 cm long by 2-5 cm wide. The leaves or cut bark have a cucumber like smell. Flowers are in clusters 5-15 cm long on old wood. They are yellow to orange. The flowers are pea shaped and grow one after another along a stalk in dense clusters. The fruit are broad, bean-like pods. The pods are up to 20 cm long and thick. They can be 4-6 cm wide and woody. Inside the pods, the seeds are in a white pith. There are 1-5 seeds in a pod. The seeds are large and starchy with a shiny brown coat. They are 3-5 cm long.



Distribution: Introduced and grown along the coast in Papua New Guinea in some areas. It suits rainforest and creek bank sites. It needs light, well drained soil in a protected sunny position. It is drought and frost tender and is damaged by wind. Trees need a temperature above 7°C but can stand very short periods down to 0°C. It suits warm temperate to tropical regions. It suits hardiness zones 10-12.

Cultivation: It grows from seeds which often commence germinating while still in the pod on the ground. Seeds germinate very easily. Seed need to be sown when the temperature is at least 13-18°C.

Production: In Australia fruit are produced from March to November.

Use: The seeds are eaten after extensive processing (They are soaked for 10 days, pounded and baked.) They may still contain some poison.
Caution: In Australia several deaths and stomach upsets have been reported in cattle which have eaten the seeds.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	51.4	824	4.0		6.1			0.3

Insects:

Diseases:

Pests:
Importance: The tree is introduced to Papua New Guinea and may not be much used for food.

Names

English: Pecan
Tok pisin:
Tok ples:
Scientific name: *Carya illinoinensis* (Wang.) K.Koch
Synonyms:
Plant family: Juglandaceae



Description: A large tree up to 55 m high. Trees lose their leaves during the year. Branches extend upwards giving the tree an open, rounded crown and the tree can be 8 m wide. The stem is stout and erect. The bark is grey and furrowed with an ornamental appearance. The leaves are bright green, compound leaves. The leaves are 30-50 cm long. The leaves are made up of 7-10 leaflets. These are long and curved sword shaped. The leaflets have short leaf stalks. The leaves turn yellow before they fall. The flowers are greenish and small. Trees normally have male and female flowers separately on the same plant, but because the flower parts develop at separate times, cross pollination normally occurs. Male flowers grow on catkins near the branches on the previous year's growth. The fruit are dark brown nuts that are carried in clusters of 4-12. The fruit can be 6 cm long. It has a thin shell. At maturity the fruit splits into 4 valves and reveal the smooth brown kernel. There are many cultivars.

Distribution: It is native to S. United States. It requires a dry subtropical climate. It does best in loamy soil in an open sunny position. It is frost resistant but drought tender. They need to be in areas with warm summers. Trees grow naturally near streams in arid areas. They need deep fertile, well drained soil. Thick shelled varieties are more cold tolerant. Trees can tolerate temperatures above 38°C. Trees need to have 700 hours with a temperature under 7°C. It is grown extensively in China. It suits hardiness zones 6-11.

Cultivation: Plants are normally grown from seeds. It can be grown from root-shoots. Seeds need to be fresh or they won't grow. Nuts which will grow, sink when put into water. Trees can be pruned to stop them growing too tall. Often trees are pruned to 15 m high. Trees easily suffer from zinc deficiency. Thin shelled selections are grown using cuttings grafted onto seedlings. Cross polination normally means better nut production. Different pollinating kinds are inter planted to ensure pollen is shed while female flowers are receptive.

Production: Trees grow slowly at first while they form a taproot, then they grow more quickly. During the first 8-15 years they do not produce nuts. Trees can live for 1000 years. Grafted trees produce more quickly.

Use: The nuts are eaten raw or cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts	3.2	3188	9.3		2.4	8	2	4.5

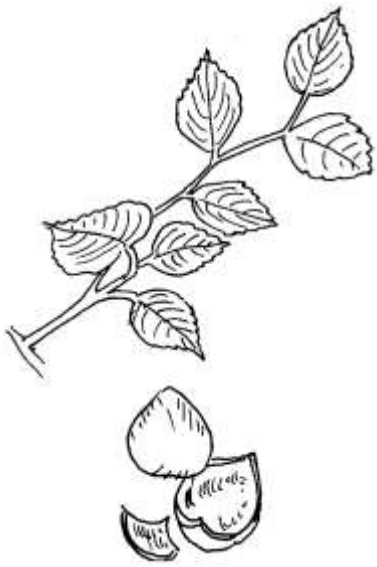
Insects:
Diseases:
Pests:
Importance: Nuts have been imported into Papua New Guinea for trial plantings. Trees at Aiyura bear irregularly.

Names

English: Hazel nuts
Tok pisin:
Tok ples:

Scientific name: *Corylus avellana* L.
Synonyms:
Plant family: Betulaceae, Corylaceae

Description: A small deciduous tree up to 7 m high. It spreads to 3-5 m across. The stem is erect, with smooth, brown bark and hairy twigs. The trees sucker a lot, which produces a clumpy bush. The leaves are rounded, tapering to a point, with a heart shaped base. They are 10 cm long, and dull, dark green. The edges of the leaves have saw-like teeth. The leaves are hairy. Male and female flowers are separate, on the one tree. Male flowers are greenish-yellow stalks, like cat's tails. They are 8 cm long and hang downwards. The female flowers are very small, and in groups of four. The fruit are brown nuts 2 cm across. A green husk covers the nut, but then shrinks to allow the nut to darken and ripen. Plants within the Hazel nut group hybridise easily, giving rise to new kinds.



Distribution: A temperate climate plant. They are very frost resistant. They need a certain minimum cold requirement for good production of nuts, so are basically unsuited to the tropics. They need 800-1600 hours of chilling, about the same as apples. They grow in light, well-drained soils, in a protected, partly shaded position. They are drought tender. The flowers can withstand frosts down to -8°C and the wood down to -20°C or -30°C. It suits hardiness zones 4-8.

Cultivation: Plants are grown from seed. Once established, they can be grown from suckers, layering or cuttings. They are often pruned to a single trunk, to make harvesting easier. Trees normally cannot be pollinated from flowers on the same tree. They mostly require cross pollination by wind from suitable pollinator trees. Trees transplant fairly easily. A spacing of 3 m x 3 m is suitable.

Production: Nuts are produced 3-4 years after planting. Layered plants produce nuts in 2-3 years. Yields of 4-6 kg of nuts per tree, are average. Nuts fall when mature. Nuts store well. They should be kept dry and cool.

Use: The nuts are eaten.
The seeds are eaten both raw and dried.
The kernels have a fatty oil which is edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts	5.2	2810	12.0		3.8		3	1.9

Insects:

Diseases:

Pests:
Importance: Seeds have been introduced into Papua New Guinea for trial plantings only and are not really a suitable plant for the country.

Names

English: Walnut
Tok pisin:
Tok ples:

Scientific name: *Juglans regia* L.
Synonyms:
Plant family: Juglandaceae

Description: It is a large deciduous tree up to 30 m high. The trunk can be 120 cm across. The trunk is straight. The leaf stalks are 5-7 cm long. Leaves are often 30 cm long and with 5-9 leaflets. Leaflets can be 6-15 cm long by 3-6 cm wide. They are smooth except for a tuft of hair in the axils of the veins. Flowers are small and greenish. Male flowers are compact in hanging spikes. Female flowers are on short stalks. The fruit has a green leathery husk. Nuts are hard shelled and about 4 cm across. The surface is figured. The kernels are edible.



Distribution: It is native to China and S.E. Europe. Trees can stand hard frosts when no flowers are on the tree. It is a cold temperate plant. It grows in Vietnam between 500 and 1,500 m altitude. As it does not bear in the highlands of India it is unlikely to succeed in PNG. In India it produces in Garhwal Himalayas. In China they are common in the northern regions. They are grown in China between 23-42°N. They grow on mountain slopes between 500-1800 m altitude. It suits hardiness zones 4-10.

Cultivation: Trees can be grown from seeds but quality is often variable. It is best to used grafted trees. They can be pruned. Pruning should be done during the summer as calluses form more easily preventing bleeding. They easily become boron deficient.

Production: Seedling trees can produce nuts in 8-12 years. Grafted trees can produce in 4 years. Trees can live for 150 years.

Use: The kernels of the nuts are eaten raw or cooked.
The young green fruit can be pickled in vinegar and eaten.
Oil is extracted from the fruit. The remainder can be used in bread.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts	4.4	2903	14.4		2.5	4	3	2.7
Fruit								

Insects:

Diseases:

Pests:

Importance: Seeds have been introduced into Papua New Guinea for trial plantings only.

Names

English: Pangium
Tok pisin: Sis
Tok ples:

Scientific name: *Pangium edule* Reinw. ex Blume
Synonyms:
Plant family: Flacourtiaceae



Description: A large tree reaching a height of 25-40 m and about 50-100 cm across the trunk. The crown of the tree can spread to 50 m across. It has buttresses. The branches normally droop over. The leaves are very large and smooth. They can vary between 10 to 60 cm long by 8 to 40 cm across. They can be entire or lobed, pointed at the tip and rounded or heart shaped at the base. Leaves in young trees have 3 lobes. Often leaves are in a spiral arrangement near the ends of branches. Flowers are separate sexes and often on different trees. The flowers are yellowish white and have a faint smell. They are about 4 cm wide. The fruit are large, up to 15 cm long, brown and contain several seeds embedded in yellowish edible pulp. The seeds are about 5 cm long. The fruit has a strong smell.

Distribution: It is native to SE Asia. It is a plant of the hot humid tropics. They are widely distributed in primary forests and clearings at low and medium altitudes from southern Luzon to Palawan and southern Mindanao in the Philippines. It mostly grows below 300 m altitude but can be up to 1000 m. It is in the lowland and mid altitude rainforests often near creeks. It prefers slightly acidic soils.

Cultivation: Plants grow wild and are also cultivated from seeds. Seeds can float for a long time in water.

Production: Trees start to fruit when about 10-15 years old. Trees live for a long time. Fruiting is seasonal and the fruit season tends to be May to August.

Use: The old leaves are eaten after shredding and being cooked.
The fleshy portion around the seeds is eaten raw or cooked.
The seeds are eaten after steeping and roasting in an extensive process to remove poison.
Sometimes seeds are buried and fermented for about 40 days.
Caution: All parts of the plant can contain large amounts of poison (Prussic acid). This must be thoroughly removed by processing. Mature fruit are less poisonous than young fruit.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds								
Fruit								
Leaves								

Insects:

Diseases:

Pests:
Importance: Seeds are sold in markets. The tree is moderately common in coastal areas of Papua New Guinea, but the nut is not always eaten. It is popular near Madang.

Names

English: Pistachio nut
Tok pisin:
Tok ples:

Scientific name: *Pistacia vera* L.
Synonyms:
Plant family: Anacardiaceae

Description: A small deciduous tree up to about 10 metres tall. It can have one or several trunks. Trees tend to dropp and spread. Leaves are large and greyish. They have 3-5 leaflets. These are roundish and 5-10 cm long. Trees produces clusters of small green nuts. Male and female flowers are borne on different trees. Male and female flowers occur on separate trees. The fruit are red and wrinkled. The kernel is 3 cm long by 1.5 cm wide. It is protected by a thin shell. The seed is edible.



Distribution: It suits hot dry places. They do well in light calcareous soils. They need fertile, well-drained soils. They can tolerate drought. Winters need to be cool to break bud dormancy. Trees need 600 to 1,500 hours of chilling. Trees do not do well in areas with high humidity. They grow in places with temperatures from -10°C in the winter to 40°C in the summer. In western Asia they grow to 1500 m altitude. It suits hardiness zones 8-10.

Cultivation: Mostly grown from seed. The seed should be presoaked in alkalized water or for 3-4 days in warm water before sowing. Germination can be slow and irregular. Cuttings of half ripe wood from young trees can be used. Trees can be grown by layering. Because male and female flowers occur on separate trees both male and female trees must be present. One male tree to 5 female trees is suitable. It is possible to graft a male branch onto a female tree. The pollen is carried by wind. The flowers are small and green in clusters in the axils of leaves. The nuts are normally knocked off the trees then harvested off the ground.

Production: Seedlings take 8 years to bear. Budded and grafted trees can bear in 4 years. Trees can live for centuries under suitable conditions.

Use: The nuts are eaten after roasting and salting. They can be eaten raw.
An edible oil can be produced from the seed.
The fruits can be used for marmalade.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts	5.9	2598	17.6		7.3	55	7	2.2
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English: Almond
Tok pisin:
Tok ples:
Scientific name: *Prunus dulcis* var. *amygdalus* Batsch
Synonyms:
Plant family: Rosaceae



Description: A small tree. It grows 5-7 m tall. Leaves are narrower than those of peach but long and toothed around the edge. Flowers can be 5 cm across and are slightly pink. Leaves are folded in the bud. The fruit is green and leathery. The edible kernel is in a hard shell covered with a downy covering.



Distribution: It needs reasonable soil drainage. It is suited to areas with a long, hot dry summer.

Cultivation: Seeds grow more quickly if chilled in a fridge for 2 weeks then planted in warm damp sand (26°C). Trees often need to be pollinated by another kind of almond.

Production: Trees commence fruiting after 3-4 years. Trees can live for 50 years on their own rootstock.

Use: The kernels of the nuts are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts	4.7	2336	16.9		4.2	0	Tr	3.1

Insects:

Diseases:

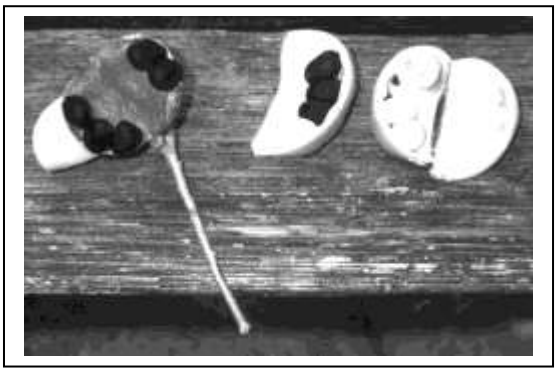
Pests:

Importance: Introduced to Papua New Guinea but no other information.

Names

English: Java olive
Tok pisin:
Tok ples:

Scientific name: *Sterculia foetida* Linn.
Synonyms:
Plant family: Malvaceae/Sterculiaceae



Description: A medium sized tree. It grows to 10-20 m high. The tree has a straight trunk and branches to form a small crown. The bark is brown and flakes off. It loses its leaves during the year. The leaves are crowded at the ends of branches. They are compound and with 7 to 9 leaflets borne in a ring at the end ot the leaf stalk. Each leaflet is 10-18 cm long by 3-5 cm wide. They have a pointed tip. The leaf stalk is 15-24 cm long and grooved. The flowers are strongly scented. They are red, dull yellow or purple. They are 2-4 cm wide in clusters 15-20 cm long and shaped like a pyramid. Male and female flowers are separate. The fruit are large, woody, nearly smooth and oval. They are 7.5-10 cm long and flattened. They turn red when ripe. The ripe fruit splits open showing large black seeds. The seeds are edible.

Distribution: Plants grow in the tropical lowland in dry woodlands. They are common throughout the islands of the Philippines along the seashores and partly open forests at low and medium altitudes. In Nepal it grows up to 300 m altitude. It suits hardiness zones 10-12.

Cultivation: Plants are grown from seed.

Production:

Use: The seed kernels are eaten raw.
They can also be roasted like chestnuts. They can be soaked to remove the skins before roasting.
The seeds can be used for oil.
Caution: The seeds eaten in large numbers can cause diarrhoea and headaches.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds			21.0					

Insects:

Diseases:

Pests:

Importance:

Names

English: Peanut tree, Red-fruited Kurrajong
Tok pisin:
Tok ples:

Scientific name: *Sterculia quadrifida* R. Br.
Synonyms:
Plant family: Malvaceae/Sterculiaceae

Description: A small to medium sized tree. It grows up to 5-12-20 m tall. It has an open rounded crown. It is a straggly plant and the smaller stems are thick. The bark is smooth and grey. The leaves are long and heart shaped. They are 9-23 cm long by 5.5-17.5 cm wide. They are dark green and rough with prominent veins. They are paler and finely hairy underneath. The leaves fall off during the year. The leaf stalk is 4-10 cm long. The flowers are small, greenish-yellow and not easily noticed. They are produced in flower heads towards the ends of branches. The sepals of the flower remain joined forming a tube which is bell-shaped. They are 0.5-1 cm long by 0.5 cm wide. The outer surface is green and hairy. Several flowers occur together in flower arrangements that are 3-10 cm long. The fruit are groups of leathery pods or capsules carried stiffly on the stems. The fruit are 5-8 cm across by 3-4 cm long. The skin is rough velvety and leathery and turns red when ripe. The ripe pods split to show the light shiny inner surface and black seeds. There are 2-8 shiny seeds. The seeds are 1-2 cm long. The seeds are edible.

Distribution: A tropical plant. It grows naturally in coastal monsoon vine thickets and on sand dunes behind the beach. It can be grown on a wide variety of well-drained soils. It suits hardiness zones 10-12.

Cultivation: Plants are grown from seed.

Production: Young plants are fast growing. In Australia, flowering occurs from February to November and fruiting from April to December.

Use: The seeds are eaten raw. When peeled they have a pleasant peanut like taste.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nut	40.7	1249	12.3		2.6		2	6.5

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples:
Scientific name: *Sterculia schumanniana* (Laut.) Mildb.
Synonyms:
Plant family: Malvaceae/Sterculiaceae



Description: A medium sized tree up to 20 m high. The trunk is often crooked and the tree slender. The trunk can be 45 cm across. It has buttresses. The crown of the tree is often broad. The branches are slender, light brown and often with grooves. The leaves are alternate, simple and at the ends of branches. They are oblong and have a tail. The blade can be 20 cm long by 8 cm wide. There are 6-7 pairs of side veins. The leaf stalk is 2.5 cm long and and thicker at both ends. The flowers are bell shaped. Plants can have male, female or both sex flowers. These hang in loose stalked branches. These can be in the axils of leaves but are mostly on buds from stems and main branches. The flowers are dull red. The fruit are often in clusters. They have 3-5 velvety sacs. The fruit is bright orange-red at maturity. The seeds inside are black. They are 1.8 cm long by 1 cm wide.

Distribution: It is a tropical plant. It occurs in the lowlands.

Cultivation: It grows wild.

Production:

Use: The nut-like fruit are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects:

Diseases:

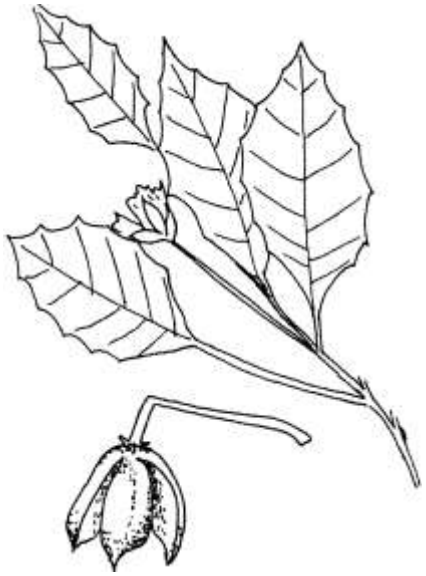
Pests:

Importance:

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Sloanea tieghemii* gp 4 (F.Muell)A.C.Sm.
Synonyms: *Sloanea archboldiana* Smith
Plant family: Elaeocarpaceae



Description: A small shrub or a large tree. It can be 2-30 m high. Larger trees have buttresses. It has alternate leaves which are almost opposite. The leaves are 3-5 cm x 2-3 cm and not consistently hairy. The edge of the leaves is fairly smooth. The leaf stalk is 0.5-2 cm long and is usually thickened at each end. The flowers are small but showy.

Distribution: They grow from 2200 to 2800 m altitude. It often grows naturally in old gardens and regrowth sites.

Cultivation: They mostly grow wild from seed. They can be grown from ripe wood cuttings.

Production:

Use: The kernels of the nuts are eaten after cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Nuts								

Insects:

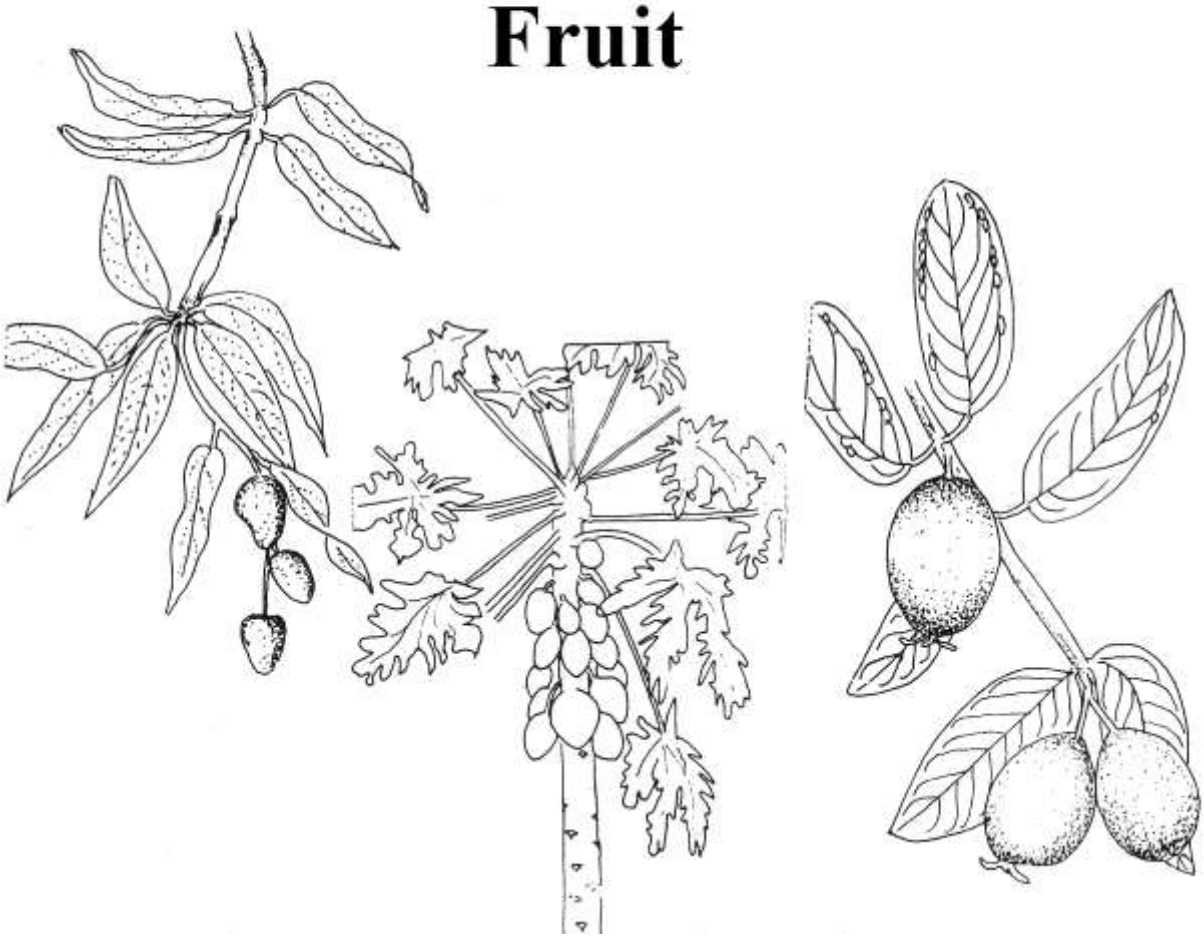
Diseases:

Pests:

Importance: Scattered trees occur in highland areas of Papua New Guinea.



Fruit



Fruit and other often sweet foods

English name	Tok Pisin	Scientific name	Page
Sugarcane	Suga	*Saccharum officinarum*	**369**
Pawpaw	Popo	*Carica papaya*	**371**
Mountain pawpaw		*Carica pubescens*	**373**
Pineapple	Painap	*Ananas comosus*	**374**
	Bukubuk	*Burckella obovata*	**376**
Watermelon		*Citrullus lanatus*	**377**
	Marita	*Pandanus conoideus*	**379**
		Pandanus englerianus	**381**
		Pandanus krauelianus	**382**
		Pandanus lamekotensis	**383**
		Pandanus lauterbachii	**384**
Cherimoya		*Annona cherimola*	**386**
Atemoya, Custard apple		*Annona cherimola* x *A squamosa*	**387**
Soursop	Sapasap	*Annona muricata*	**389**
Bullock's heart		*Annona reticulata*	**391**
Sweetsop		*Annona squamosa*	**392**
Pacific lychee	Ton, Taun	*Pometia pinnata*	**394**
Avocado	Apokat	*Persea americana* var. *americana*	**395**
Guava		*Psidium guajava*	**397**
Cherry guava		*Psidium cattleianum*	**399**
Golden apple		*Spondias cytherea*	**400**
		Spondias philippensis	**402**
Carambola	Faiv kona	*Averrhoa carambola*	**403**
Bilimbi, Tree cucumber		*Averrhoa bilimbi*	**405**
Pomelo, Pummelo		*Citrus grandis*	**407**
West Indian Lime		*Citrus aurantifolia*	**408**
Grapefruit		*Citrus paradisi*	**409**
Orange	Swit muli	*Citrus sinensis*	**410**
Lemon	Muli	*Citrus limon*	**411**
Citron		*Citrus medica*	**412**
Mandarin		*Citrus reticulata*	**413**
Wild lime		*Citrus hystrix*	**414**
Sour orange		*Citrus aurantium*	**415**
Clymenia		*Clymenia polyandra*	**416**
Lime berry		*Triphasia trifolia*	**417**
	Mundroi	*Corynocarpus cribbianus*	**418**
		Baccaurea papuana	**419**
Tree tomato, Tamarillo		*Cyphomandra betacea*	**420**
Naranjilla		*Solanum quitoense*	**422**
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Surinam cherry		*Eugenia uniflora*	**424**
Beach cherry		*Eugenia reinwardtiana*	**425**
Watery rose apple		*Syzygium aqueum*	**426**
Malay apple	Laulau	*Syzygium malaccense*	**427**
Java apple		*Syzygium javanicum*	**428**
Rose apple		*Syzygium jambos*	**429**
Pink satinash		*Syzygium sayeri*	**430**
Lockerbie Satinash		*Syzygium branderhorstii*	**431**

See more page 432

Names

English: Sugarcane
Tok pisin: Suga
Tok ples:

Scientific name: *Saccharum officinarum* L.
Synonyms:
Plant family: Poaceae



Description: A tall thick stemmed clumpy grass. It has many nodes. It grows 1-6 m tall. It spreads 100 cm wide. A large number of different cultivars occur. The leaves are long and narrow. They taper to the tip. They are rigid and droop at the tip. The cane varies in thickness, length of nodes, colour etc. The stalks have distinct nodes and the bottom of the leaf is wrapped in a sheath around the stalk. The flower is brownish. It is surrounded by dense silky white hairs.

Distribution: It is a tropical plant. It occurs throughout the country of Papua New Guinea. It needs a temperature over 21°C for sprouting. It is frost sensitive. In Nepal it grows up to about 1400 m altitude. It suits hardiness zones 9-12.

Cultivation: Plants are mostly grown from tops of canes. They can be grown from sections of the stalk or division of the root stock. It requires a good fertility and good rainfall. Plants can be ratooned or cut back if the soil fertility is high. Tall cultivars need staking.

Production: Plants mostly take 14-18 months until they are ready for harvest.

Use: The stems are chewed.
The flowers can be cooked and eaten before the flower opens.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Stem	78.8	343	0.3		0.7		2	
Flowers								

Insects:

Borers

Bathytricha truncata Walker	Noctuidae (LEP)	Large sugarcane moth borer
Chilo terrenellus Pag.	Pyralidae (LEP)	Sugarcane borer
Maliarpha separatella Rag.	Pyralidae (LEP)	White rice stem borer
Ostrinia furnacalis	Pyralidae (LEP)	Maize stem borer
Rhabdoscelis obscurus (Boisd.)	Curculionidae (COL)	Cane weevil borer
Sesamia grisescens Wal.	Noctuidae (LEP)	
Sesamia arfaki B-B.	Noctuidae (LEP)	

Sap suckers

Aleurodes comata	Aleurodidae (HEM)	
Aphis sacchari	Aphididae (HEM)	Sugarcane aphid
Ceratovacuna lanigera (Zehntner)	Aphididae (HEM)	Sugarcane woolly aphid
Neomaskiella bergii (Sig.)	Aleyrodidae (HEM)	Sugarcane white fly
Perkinsiella spp.	Delphacidae (HEM)	Sugarcane leafhoppers
Saccharicoccus sacchari (Cock)	Pseudococcidae (HEM)	Pink sugarcane mealybug
Tettigella sp.	Cicadellidae (HEM)	

Leaf eating insects

Anomala comata	Rutelidae (COL)	
Aracerus sp.	Anthribidae (COL)	
Araeocorynus sp.	Anthribidae (COL)	
Arrhenes dschilus	Hesperiidae (LEP)	
Brontispa lateralis	Chrysomelidae (COL)	
Mythimna unipuncta Haw	Noctuidae (LEP)	
Euryphlepsia sp.	Cixiidae (HEM)	
Hypolixus ritsemae Pasc.	Curculionidae (COL)	
Lophops saccharicida K.	Lophopidae (HEM)	
Melanitis constantia Cr.	Nymphalidae (LEP)	
Opogona spp.	Hieroxestidae (LEP)	

Grasshoppers

Atractomorpha crenaticeps Bl.	Acrididae (ORTH)	
Austracris sp.	Acrididae (ORTH)	Spur throated locust
Locusta migratoria (L)	Acrididae (ORTH)	Migratory locust
Heteropternis obscurella (Bl.)	Acrididae (ORTH)	
Stenacatantops angustifrens (Walk.)	Acrididae (ORTH)	
Valanga irregularis (Walk.)	Acrididae (ORTH)	Giant grasshopper

Diseases:

Redrot leaf sheath	Fungus	*Athelia rolfsii*
Brown stripe	Fungus	*Bipolaris stenospila*
Eye spot	Fungus	*Bipolaris sacchari*
Yellow spot	Fungus	*Cercospora koepkei* Kruger
Brown spot	Fungus	*Cercospora longipes*
Red leaf streak	Fungus	*Cercosporella sp.*
Pineapple disease	Fungus	*Ceratocystis paradoxa* (Dade) Moreau
Veneer blotch	Fungus	*Deightoniella papuana* D Shaw
Pokkah boeng	Fungus	*Gibberella fujikuroi*
Red rot	Fungus	*Glomerella tucumanensis* (Speg)Arx & Mull
Ring spot	Fungus	*Leptosphaeria sacchari*
Yellow spot	Fungus	*Mycovellosiella koepkei*
Downy mildew	Fungus	*Peronosclerospora sacchari*
Rind disease	Fungus	*Phaeocytostroma sacchari*
Tar spot	Fungus	*Phyllachora sacchari*
Rust	Fungus	*Puccinia kuehnii* (Kruger)Butler
Red leaf streak	Fungus	*Ramulispora sacchari*
Leaf scorch	Fungus	*Stagnospora sacchari*
Ramu stunt		
Red stripe	Bacteria	*Pseudomonas rubrilineans*
Fiji disease	Virus	Sugarcane Fiji disease virus
Mosaic	Virus	

Pests:
Rats



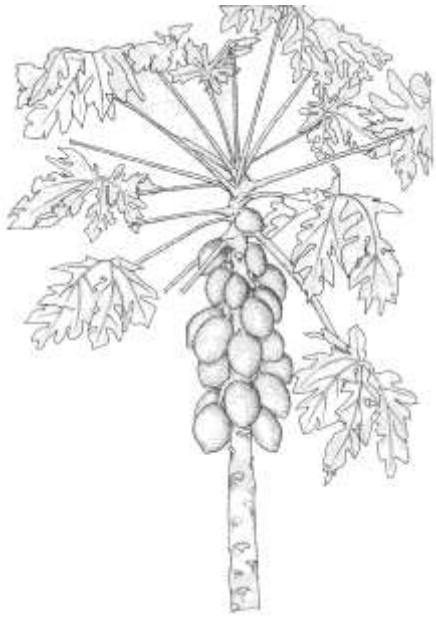
Rat damage to sugarcane

Importance: A very important snack and social food in all areas of Papua New Guinea. Papua New Guinea has the largest range of sugarcane varieties in the world and has contributed these to most of the sugarcane grown in the world.

Names

English: Pawpaw
Tok pisin: Popo
Tok ples:

Scientific name: *Carica papaya* L.
Synonyms:
Plant family: Caricaceae



Description: Pawpaw is one of the very well known fruits of the tropics. The straight soft stemmed plant grows up to 3-5 metres tall and only occasionally has branches. The stem is softly woody and has scars from fallen leaves along it. At the top of the plant there are a clump of leaves. The leaves are large (50 cm wide) deeply lobed and on long leaf stalks. The leaf stalks are 90 cm long. There is a crown of leaves at the top of the trunk. Trees can be male, female or bisexual. The male flowers are small and white and on long stalks. Female and bisexual flowers are on short stalks. These have no fruit, round fruit and long fruit respectively. There are three forms of long fruit. The seeds are black.

Distribution: It is a tropical plant. Pawpaws will grow from sea level up to about 1700 m altitude in the equatorial tropics. In cooler regions they have to be planted but in humid tropical regions are commonly self sown. Sunlight allows germination when forest is cleared. Plants cannot stand frost. Also they cannot stand waterlogging. Plants die after 48 hours in standing water. It suits hardiness zones 11-12.

Cultivation: Pawpaw seeds grow easily and plants grow quickly. Fresh seeds can be used, or if dry seeds are used they should be soaked before planting. To produce well they need a reasonably fertile soil. Seeds can be sown directly or the seeds can be put in a nursery and the seedlings transplanted. Seeds in a nursery should be about 1-2 cm deep. Seedlings can be transplanted when they are about 20 cm high. Plants should be about 3 m apart.

Production: Seeds emerge in 2 to 3 weeks. Vegetative growth before flowering is 4-8 months. Fruit is produced as one or more per leaf axil, about every 1-2 weeks, under good growing conditions. So with good growth 100 fruit can be produced from one plant in a year. Fruit development from pollination to maturity is about 2-3 months. On the coast in tropical equatorial regions, pawpaws start producing fruit after about 4 or 5 months but in the highlands this may not start for 12-18 months. The first fruit produced and ripe, are ready 6-11 months from planting. Practical tree life is about 2 to 3 years, although trees may live for 10 - 12 years. Continuous fruit production depends on fertility, temperature and moisture being adequate to maintain active growth. The fruit is produced year round but the growth and development rate decreases with temperature. Also the size and quality of fruit declines at lower temperatures. Pollination is by wind and insects. Normally cross and self pollination both occur. Pollination is not normally limiting. Seeds are widely dispersed by birds, bats and people. Seeds remain viable for a few months and also germinate freely.

Use: Fruit can be eaten ripe and raw.
Green fruit can be cooked as a vegetable.
The young leaves can be eaten cooked, but are bitter.
The flowers and the middle of the stem can be eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	88.0	163	0.5		0.4	290	54	0.18
Leaves	75.4	378	8.0		0.77		140	

Insects:

Adoxophyes melichron	Tortricidae (LEP)	Leaf roller
Amblypelta spp.	Coreidae (HEM)	Amblypelta bugs sucking sap
Aonidiella orientalis (Newstead)	Diaspididae (HEM)	Armoured scale
Aspidiotus destructor Sign.	Diaspididae (HEM)	Coconut scale
Aspidiotus excisus Green	Diaspididae (HEM)	Armoured scale
Bactrocera musae (Try.)	Tephritidae (DIPT)	Fruit fly
Bactrocera bryoniae (Try.)	Tephritidae (DIPT)	Banana fruit fly
Bactrocera neohumeralis Hardy	Tephritidae (DIPT)	Fruit fly
Ceroplastodes chiton Green	Coccidae (HOM)	
Chrysomphalus dictyospermi (Morgan)	Diaspididae (HEM)	Armoured scale
Coccus hesperidium Linnaeus	Coccidae (HEM)	Soft brown scale
Coccus longulus (Douglas)	Coccidae (HEM)	Soft scale
Drepanococcus chiton (Green)	Coccidae (HEM)	Scale
Dysmicoccus nesophilus Williams	Pseudococcidae (HEM)	Mealy bug
Ferrisia virgata (Cockerell)	Pseudococcidae (HEM)	Mealy bug
Howardia biclavis (Comstock)	Diaspididae (HEM)	Armoured scale
Icerya seychellarum (Westwood)	Margarodidae (HEM)	Scale
Ischiopsopha bifasciata Quoy & Gaim var. *hyla* Heller	Cetoniinae (COL)	Damaging fruit
Macrosiphum euphorbiae (Thomas)	Aphididae (HEM)	Potato aphid
Morganella longispina (Morgan)	Diaspididae (HEM)	Armoured scale
Oxyderes cyrtus Jordan [ex Araecerus]	Anthribidae (COL)	
Pseudaulacaspis cockerelli (Cooley)	Diaspididae (HEM)	Soft scale
Pseudaulacaspis pentagona (Targ.)	Diaspididae (HEM)	White scale
Rhabdoscelus obscurus Boisduval	Curculionidae (COL)	Cane weevil borer
Rhinoscapha maclayi MacLeay	Curculionidae (COL)	Weevil boring stems
Saissetia coffeae (Walker)	Coccidae (HEM)	Coffee scale
Steatococcus samaraius Morrison	Margarodidae (HEM)	Scale
Tiracola plagiata Walk	Noctuidae (LEP)	Cacao armyworm eating leaves

Diseases:

Butt rot	Fungus	*Athelia rolfsii*
Leaf spot	Fungus	*Cercospora papayae*
Shot hole leaf spot	Fungus	*Corynespora cassiicola* (Berk & Curt)Wei
Leaf spot(Anthracnose)	Fungus	*Glomerella cingulata* (Stonem) Spauld & Schrenck
Powdery mildew	Fungus	*Oidium caricae*
Leaf spot	Fungus	*Phyllosticta sp.*
Root rot	Fungus	*Phytophthora palmivora* Butler
Leaf spot & fruit rot	Fungus	*Mycosphaerella caricae*
Fruit rot	Fungus	*Botrydiplodia theobromae*
Fruit rot	Fungus	*Fusarium oxysporum*
Stem rot	Bacteria	*Pseudomonas cepacia*
Mosaic	Virus	

Pests: Fruit bats

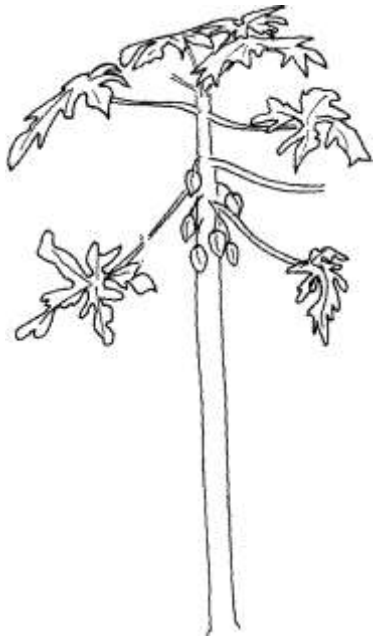
Importance: In Papua New Guinea it occurs in all lowland areas in gardens and bush. Trees are near houses in the highlands. The fruit is popular for snacks and baby food.

Names

English: Mountain papaya
Tok pisin:
Tok ples:

Scientific name: *Carica pubescens* (A. DC.) Solms-Laub.
Synonyms: *Carica candamarcensis* Hook.f.
Plant family: Caricaceae

Description: A small tree. The tree has a silvery grey trunk. The tree is soft and not woody. It grows 1-2 m tall. The trunk has leaf scars. The leaves are smaller than ordinary pawpaw and deeply lobed. They are 8 sides and lobed. Laves are 20-26 cm long by 34-40 cm wide. The leaf stalks are 17-34 cm long. Male and female flowers can be on the same or different plants. Many plants have both sexes. The fruit are small and angular. The fruit are 8-10 cm long. The fruit contain small round black skinned seed. The fruit is edible but tart.



Distribution: They will grow to a higher altitude than common pawpaws. They grow at least between 1750 and 2200 m altitude. They can stand light frosts. They like a warm, dry site. They need shelter from the wind. It can grow in cooler tropical and subtropical climates. It suits a temperate between 10°C and 24°C. It benefits by plenty of rain. In the Andes it will grow above 2600 m altitude. It suits hardiness zones 10-11.

Cultivation: They are grown from seed. Plants can be male, female or both sexes. Seeds germinate easily. They can grow in 30 days. Occasionally cuttings are used.

Production: Trees are fast growing. Trees from seed can start flowering after one year. Trees produce in 2-3 years. A tree can produce 50-60 fruit in a season. A spacing of 3 m is probably suitable. One plan can produce 50-60 fruit over a growth period of 4 months.

Use: The fruit are eaten. It often needs to have sugar added. It is also made into jam.
The fruit is usually cooked and used as a vegetable.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

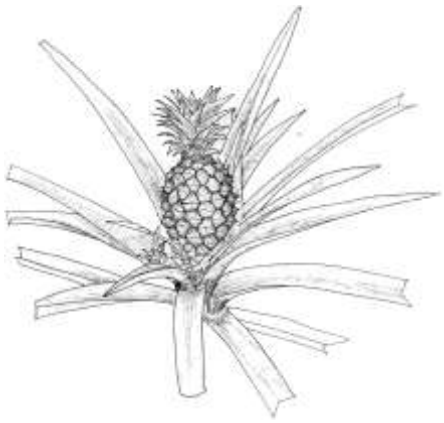
Importance: Only a few plants occur in Papua New Guinea and fruit is rarely used.

Names

English: Pineapple
Tok pisin:
Tok ples:

Scientific name: *Ananas comosus* (L.)Merrill
Synonyms:
Plant family: Bromeliaceae

Description: A perennial herb with a rosette of long, thick, spiky leaves up to 1 m high & spreading 1-1.5 m. The leaves are arranged in spirals. Some kinds have thorns along the edges of the leaves. The plant produces suckers both near the base of the stem and also higher up the stem near the fruit. These are called slips and these, and the suckers, are broken off and used for planting. The main plant dies after producing a fruit but the suckers keep growing. The plant produces a flower and fruit at the end. The fruit is made up of about 150 berry-like fruitlets that are almost fused together. There is a small crown of leaves on top of the fruit. The fruit can be 25 cm long and weigh 0.5-4 kg. The two main kinds of pineapples are the rough leafed variety which has spines on the leaves and produces a smaller but sweeter fruit. The other kind is the smooth leaf kind with spineless leaves and larger fruit.



Distribution: It is a tropical plant. They grow from sea level up to 1800 m altitude near the equator. It can survive brief periods down to freezing but cold retards growth, delays fruiting and causes fruit to be more acid. A friable well drained soil with high organic matter is best. Plants cannot stand waterlogging. It can survive drought but adequate soil moisture is necessary for good fruit production. Pineapples need an annual average temperature between 17.2°C and 26.9°C. In the equatorial tropics this is mostly between sea level and 1800 metres altitude. Pineapples need well drained and fertile soil. They suit an acid soil and can develop rots in soils where lime has been added. The soil acidity can be between pH 3.3 and 6.0. The best range is pH 4.5 to 5.5. Soils which are not sufficiently acid can be treated with sulphur. It suits hardiness zones 9-10.

Cultivation: The suckers and slips can be used for planting as well as the top of the fruit. The time to maturity is the fastest for the suckers near the bottom of the plant and slowest when the top of the fruit is planted. Therefore use suckers that grow from the stem near the ground, for earliest yield. Other suckers or the top of the fruit can be used. Pineapples can grow well under shade. Pineapple flowering hormone can be used for fruit production with thorny varieties and calcium carbide for smooth kinds. Fruiting is less seasonal in the highlands than in the lowlands. Pineapples can be planted with 35,000 to 43,000 plants per hectare or 3 or 4 plants per square metre. If plants are spaced more widely they produce more suckers. Fruits become more acid where plants are closely spaced. If too many suckers are left growing from the main plant then smaller fruit will be produced. They can grow in partial shade and in this situation the plants are normally more green. The red colouring of pineapple leaves is due to a deficiency of the nutrient nitrogen. This shows up more quickly in plants in full sunlight.

Production: Plants usually produce for about 4 years. Fruiting is less seasonal in the highlands than in the lowlands in the tropics. The growth rate for pineapples gets slower as the temperature gets less. So plants grown in the highlands or at higher latitudes take longer to get ready for harvest. It takes 60 days from when the flower starts to form until it appears. Then there are 5 months until the fruit is ready for harvest. The time from planting to harvesting ranges from 11 months up to 32 months depending on temperature. The fruit are smaller, poorer shape and more acid where the temperatures are lower or there is less sunlight.

Use: The fruit is eaten fresh or used for juice. The young heart leaves can be eaten. Unripe fruit are also cooked and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	84.3	194	0.5		0.4	60	25	0.1
Leaves								

Insects:

Coccus viridus (Green)	Coccidae (HEM)	Soft scale on pineapple
Dysmicoccus brevipes (Cockerell)	Pseudococcidae (HEM)	Pineapple mealy bug
Kilifia acuminata (Signoret)	Coccidae (HEM)	Soft scale on pineapple
Leptococcus metroxyli Reyne	Pseudococcidae (HEM)	Mealy bug on pineapple
Locusta migratoria (Linnaeus)	Acrididae (ORTH)	Migratory locust
Maconellicoccus hirsutus (Green)	Pseudococcidae (HEM)	Hibiscus mealy bug
Planococcus pacificus Cox	Pseudococcidae (HEM)	Mealy bug on pineapple
Pseudococcus longispinus (Targioni)	Pseudococcidae (HEM)	Mealy bug on pineapple
Pulvinaria ubicola (Cockerell)	Coccidae (HEM)	Soft scale on pineapple
Scapanes australis grossepunctatus Sternb	Dynastidae (COL)	N G Rhinoceros beetle
Scapanes australis australis (Boisd.)	Dynastidae(COL)	New Guinea Rhinoceros beetle

Diseases:

Associated with leaf blotch	Fungus	*Cochliobolus lunatus*
	And	*Strachylidium bicolor* Link ex Fries
	And	*Trichobotrys pannosa* Penz & Sacc.
Water blister or leaf blotch	Fungus	*Cerotocystis paradoxa* (Dade) Moreau
Leaf spot	Fungus	*Asterina sp.*
	And	*Nigrospora sp.*
Wilt outside leaves	Fungus	*Pythium vexans*

Pests:

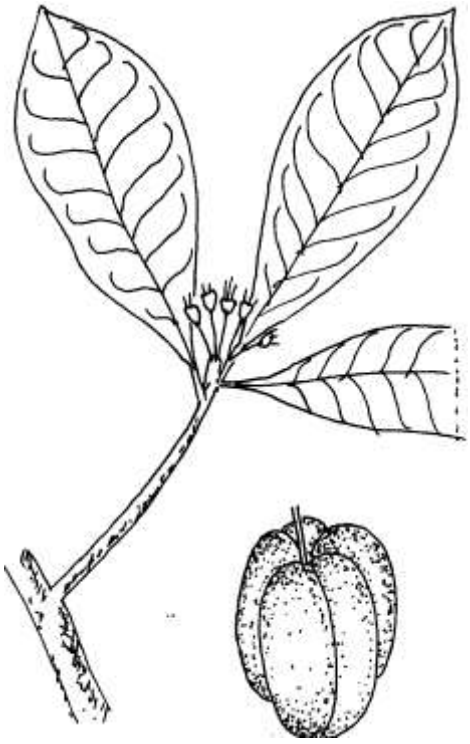
Importance: Pineapples are a common and popular fruit.

Names

English:
Tok pisin: Bukubuk
Tok ples:

Scientific name: *Burckella obovata* (Forst.) Pierre
Synonyms:
Plant family: Sapotaceae

Description: A tree which can be up to 30 m tall and with buttresses. The trunk can be 3 m across. A white sticky sap is produced from the broken ends of twigs and leaves, which is typical of this family of trees. Leaves tend to be clustered near the ends of branches. Leaves are simple and shiny. The leaf tip is tapered to a point and the base is wedge shaped. The leaf stalk is 1-4 cm long. The flowers occur 20-50 together without flower stalks and in a cluster near the ends of branches. The fruit is large (9 cm across) and green. It has a very thin skin. The flesh is white. Fruit normally have 4 or 5 furrows around it. The fruit has 3-5 cells but often only one or two seeds mature. The seed is oval shaped and about 4 cm long. Fruit shape can vary; some being more round and others more elongated. The fruit are carried near the ends of the branches. The fruit has a sweet smell. Fruit quality varies significantly in size and edibility throughout the regions where the tree occurs. Good fruit have a texture like an avocado and a taste like a sweetsop but less sweet.



Distribution: Trees grow wild in coastal areas or Papua New Guinea. They are also planted. It will probably grow up to about 1100 metres altitude. It occurs in Papua New Guinea, the Solomon Islands and Vanuatu. It has been introduced to Fiji.

Cultivation: Trees are grown from seed. There is normally only one fertile seed in each fruit. Both domesticated and wild trees occur. Trees grow wild in coastal areas. They are also planted.

Production: Fruiting is not seasonal although two main seasons may occur in a year. Fruit bruises easily so is hard to transport. It needs to be stored in soft containers lined with leaves or packaging. To avoid fruit damage, fruit are often harvested while not quite ripe. It can be stored for a short time if baked and is also stored in pits where it is fermented.

Use: The fruit is eaten raw. Occasionally the fruit is baked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

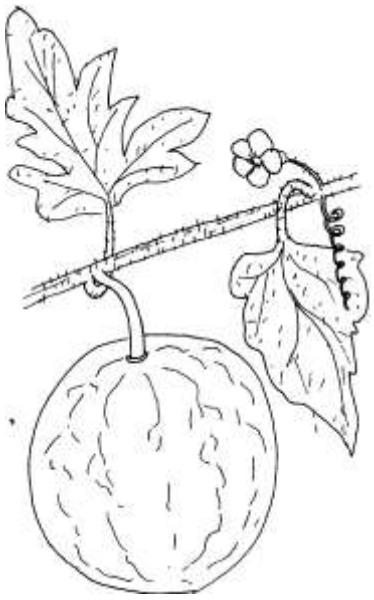
Importance: In Papua New Guinea, it is a popular fruit in the Gazelle and occurs in a number of coastal islands.

Names

English: Watermelon
Tok pisin:
Tok ples:

Scientific name: *Citrullus lanatus* (Thunb.)Mansf.
Synonyms: *Citrullus vulgaris* Schrad.
Plant family: Cucurbitaceae

Description: An annual climber with deeply divided leaves and tendrils along the vine. It trails over the ground and has hairy, angular stems. The leaves are on long leaf stalks. The leaves are deeply divided along their length. These lobe are rounded and can themselves be divided. The leaves are 5-20 cm long by 2-12 cm across. The tendrils are divided. The plant has separate male and female flowers on the same plant. The flowers are pale yellow and smaller than pumpkins. The flowers occur in the axils of leaves. The male flowers appear first. Fruit are large and round or oval. They can be 60 cm long. Fruit have a hard smooth skin. Several fruit colours and shapes occur. Often they have a dark green mottle. The fruit has reddish juicy flesh and black or red seeds. The seeds are oval shaped and smooth



Distribution: They grow best on the coast in the tropics but will grow up to about 1000 m altitude. They will not stand waterlogging and do well on sandy soils. Plants are frost sensitive. It suits hardiness zones 10-12.

Cultivation: They are suitable mainly for the dry season. A spacing of 1.5 to 2 m is suitable. They grow easily from seed. They do best when fully exposed to the sun. Seed can be dried and stored.

Production: Harvesting commences after 4-5 months. The main fruit season is November to January.

Use: The fruit is eaten raw when ripe.
Small unripe fruit can be cooked as a vegetable.
Seeds are also eaten. They are dried, soaked in salt water then roasted. Oil is extracted from the seeds.
Occasionally very young leaves are eaten.
The skin of the fruit is sometimes candied in vinegar then eaten with fish.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	94.0	92	0.4		0.3	20	5	0.1
Seeds	5.1	2330	28.3		7.3	0	0	10.2

Insects:

Atherigona orientalis Schiner	Muscidae (DIPT)	Stem fly
Aulacophora coffeae Hornst.	Chrysomelidae (COL)	Pumpkin beetles
Bactrocera cucurbitae Coq	Tephritidae (DIPT)	Melon fruit fly
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Tiracola plagiata Walk	Noctuidae (LEP)	Cacao armyworm

Diseases:

Leaf spot	Fungus	*Cercospora citrullina* Cooke
Leaf spot	Fungus	*Colletotrichum orbiculare*
	And	*Leptosphaerulina trifolii*
Black rot	Fungus	*Mycosphaerella melonis*
Powdery mildew	Fungus	*Oidium sp.*
Damping off	Fungus	*Pythium irregulare*
Mosaic	Probably virus	

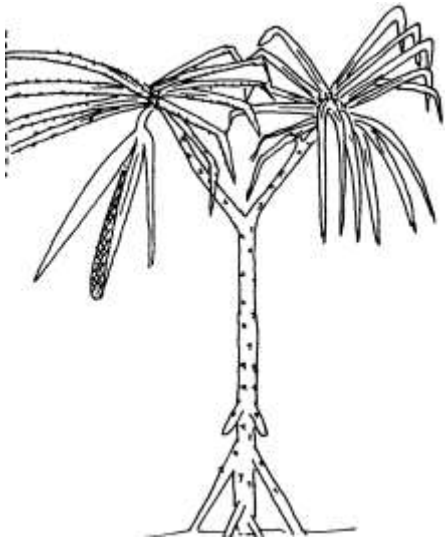
Pests:

Importance: The seeds are a popular food in China. Common and popular in lowland areas of Papua New Guinea.

Names

English: Marita
Tok pisin: Marita
Tok ples:

Scientific name: *Pandanus conoideus* Lamarck
Synonyms:
Plant family: Pandanaceae



Description: A short much branched screwpine with many prop roots. The prop roots have prickles. Trees may have up to 8 or 10 main branches. Trees grow up to about 5 metres tall. There are many short sharp spikes on the trunk and branches. The leaves are between 1 and 2 metres long and about 10cm wide. The leaves grow opposite each other but are twisted to look like a spiral. There are thorns along the edges of the leaf. It produces a large (1 m long) dark red to yellow fruit with a hard rough/spiky surface. The fruit is hard and has small lumps or spikes over the surface. The fruit grows at the ends of the branches between the leaves and it has 3 straight leaf like bracts along the edges.

Distribution: It grows throughout PNG from sea level up to 1650 m altitude. It becomes common above 500 m. It occurs in Maluku in Indonesia.

Cultivation: Marita pandanus are normally planted from suckers or cuttings. The cuttings are using ends of branches. Suckers produce more quickly. A new shoot normally sprouts out of the branch just below where the end was cut off. The cutting will soon develop roots and become established when it is planted. A more popular method is to use a sucker or shoot growing from the plant down near the ground. The sucker is separated from the parent plant then replanted in its new place. These suckers grow more quickly and can bear fruit after 18 months to 2 years. A cutting off a branch may take up to 4 or 5 years before it produces a fruit. Marita is often planted along the roads and walking tracks. It is also planted in most gardens and serves as a reminder that the land is owned by the person who planted the marita. So plants are dispersed instead of being grown in a plantation.

Production: A marita fruit is harvested when the colour starts to change to a brighter red or yellow. Sometimes it also starts to crack slightly at this stage. The fruit is cut from the branch. Marita is a seasonal crop but the fruiting season is not a short clearly marked one. The main season goes from about October to March but individual trees can bear almost throughout the year. Near the sea the marita season is longer and more spread out but as the places increase in altitude above sea level the season becomes more distinct. The marita season is an important occasion. During the season people often use marita twice a day.

Use: The ripe fruit is cooked then the juice mixed with water to make a sauce. To do this, a ripe marita fruit is normally split into 3 sections along its length. Then the central yellow stalk and pith area are dug out. The outside hard red layer is then cooked. Preferably it is cooked using hot stones although sometimes it is boiled in a saucepan. After cooking for about half an hour the hard pits are squeezed from the soft red juice by squeezing through the hands. Water is added to make an oily red soup. The soup is then eaten. Sometimes it is eaten by dipping green leaves or sago into the soup. At other times it is eaten with a spoon made from the marita leaf. Some people just suck the cooked juice from the seeds. As well, some people use the oily juice to cook food in. The pits or seeds are thrown away, normally to pigs. A harvested marita fruit will only keep for about one week. After cooking it will only last for about 12 hours.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

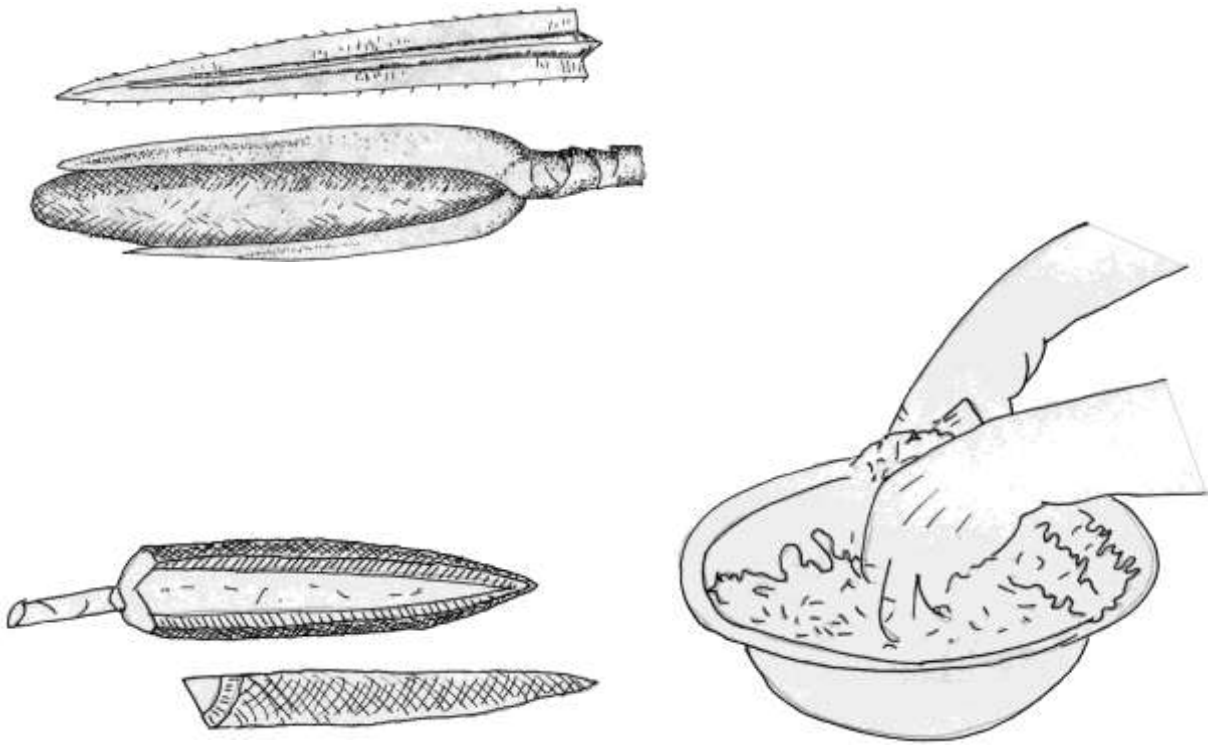
Nacoleia octasema (Meyrick)	Pyralidae (LEP)	Banana scab moth
Segistidea spp.	Tettigoniidae (ORTH)	Longhorn grasshoppers eat leaves
		Borers get into the stem

Diseases:

Black leaf mould	Fungus	*Lembosia pandani* (Rostr.) Thiess
Leaf spot	cause unknown	
Yellow mottle	cause unknown	
Soft squashy rot of fruit	cause unknown	

Pests:

Importance: In Papua New Guinea, a popular and common seasonal food in mid altitudinal zones.



Names

English:
Tok pisin:
Tok ples:

Scientific name: *Pandanus englerianus* Mart.
Synonyms:
Plant family: Pandanaceae

Description: An erect branching tree up to 12 m tall. The trunk is up to 12 cm across and has prop roots. The bark has many sharp prickles. Leaves are long (200 cm) and narrow (8-12 cm) and toothed along the edge. The fruit is long (40-60 cm) x 10-14 cm across and red.

Distribution: It occurs in coastal areas in New Ireland and New Britain.

Cultivation: Trees are planted.

Production:

Use: The red outer layer of the fruit is cooked with hot stones to make a sauce.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea, it is used for an important sauce very similar to "marita" in the mid altitude zones.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Pandanus krauelianus* K.Schumann
Synonyms:
Plant family: Pandanaceae

Description: A screwpine or Pandan. The leaves are oblong and 2 m long by 3-3.5 cm wide. They have short spines along the edges. They taper at the tip. The fruit is made up or lots of fused fruit. They are cylinder shaped and 20-30 cm long by 5-8 cm wide. The fruit are yellow when mature. The small sections are 1.5-2.5 cm long by 3-5 mm wide.

Distribution: It grows in mountainous regions along rivers.

Cultivation:

Production:

Use: The fruit contains an oil used to flavour food in cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples: Kiat, Kariat, Baig, Keg

Scientific name: *Pandanus lamekotensis* Mgf.
Synonyms:
Plant family: Pandanaceae

Description: A tree. It grows 4-7 m high. It has 5-8 branches. The leaves are 250 cm long by 9 cm wide. The leaves on the fruiting branches are smaller. There are fine thorny teeth along the edge. The fruit is a round composite fruit. When mature it is 22 cm long by 25 cm wide. It is deep orange to red. The fingers are 6-8 cm long by 3-4 cm wide. Their surfaces are not deeply furrowed. There are 10-17 nuts. Many are empty. The weathered fruit becomes very fibrous. The ripe fruit are eaten.

Distribution: It grows on Lamekot Island in Papua New Guinea. It grows on the swampy banks of creeks.

Cultivation: It starts producing fruit when 1 m high so the first fruit rests on the ground.

Production:

Use: The ripe fruit are sucked and can be made into jam.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English: **Scientific name:** *Pandanus lauterbachii* K. Schum. & Warb.
Tok pisin: **Synonyms:**
Tok ples: **Plant family:** Pandanaceae

Description: A shrub or small tree up to 5 m tall. It spreads 2-3 m across the crown. It does not have prop roots. The leaves are simple and 1-2 m long. Leaves are 4-6 cm wide and strap shaped. They are dark green and shiny above and paler underneath. The edges of the leaves and the underside on the midrib have teeth. Trees are separately male and female. The male flower is 50-90 cm long. It hangs down anmd has broad white bracts. The female flowering stalk is 70-90 cm long. It is branched and has 7-9 spikes. The fruit is up to 10-17 cm long by 8-12 cm wide. They hang in bunches of 7-9 heads. They contain several seeds. Each segment is tipped with a prickly point. The seeds are about 1.5 cm long. The flesh is edible.

Distribution: They grow naturally in rainforests in NE Queensland in Australia, usually near streams. It is also in PNG. It grows in rainforest near mangroves.

Cultivation: Plants can be grown from seed. They can also be grown from young plantlets near the base of other plants.

Production:

Use: The flesh is edible but it can sting the mouth.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance:

Custard apple family

This hybrid is often called Custard apple

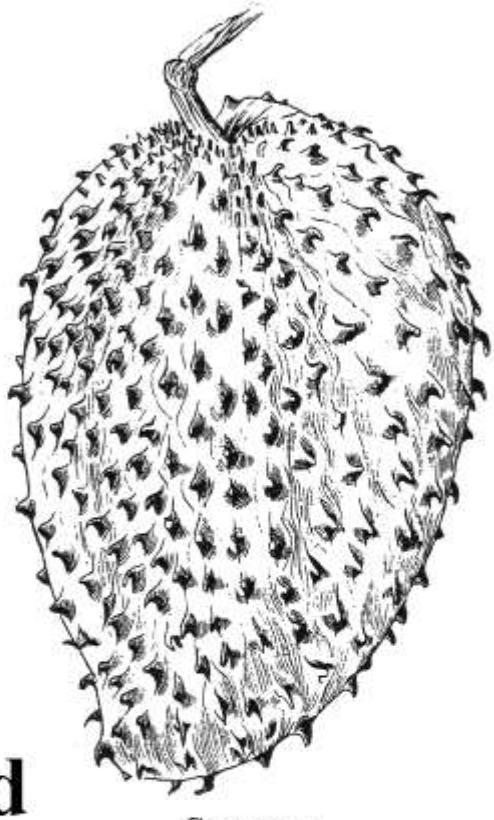




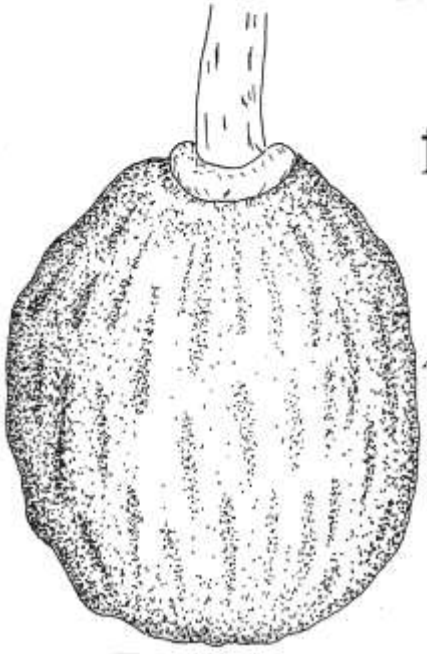
Atemoya
Annona cherimolia x A squamosa

The Mountain soursop Annona montana is not shown and may not yet be in Papua New Guinea

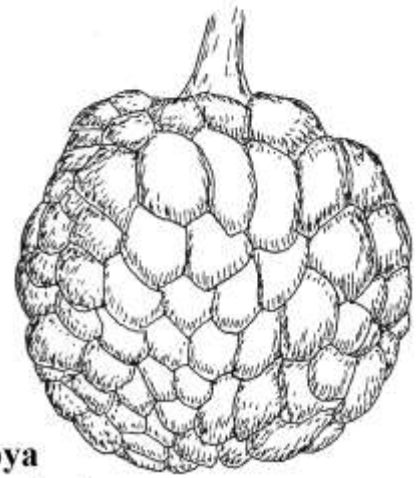
Sweetsop
Annona squamosa



Soursop
Annona muricata



Bullock's heart
Annona reticulata



Cherimoya
Annona cherimola

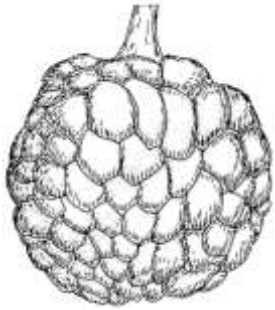
Names

English: Cherimoya
Tok pisin:
Tok ples:

Scientific name: *Annona cherimola* Mill.
Synonyms:
Plant family: Annonaceae

Description: A small deciduous tree up to 6 -10 m tall. In some locations trees keep their leaves throughout the year. It has a brown velvety tomentum on the under surface of the leaves. The leaves are 8-20 cm long and up to 10 cm wide. There is a single leaflet. The flowers occur either singly or 2-3 together along the branches. The female parts of the flower open first then the male parts. The fruit is 8-15 cm across with black or brown seeds in white flesh. The fruit is cone or heart shaped. It can be 10-20 cm long by 10 cm wide. Fruit can weigh 0.5 kg. The skin can have finger like markings. The flesh is juicy and each segment has one seed. There can be 20-40 large brown seeds in each fruit.





Distribution: Not suited to the lowland hot tropics. It grows at higher altitudes in the equatorial tropics. They suit places with cool nights. It is better suited to a dry climate but not desert. Cherimoya needs to be in areas with high humidity during the flowering period. Otherwise they suit areas that are cool and fairly dry. It is essentially a sub tropical fruit and grows in higher altitudes in equatorial regions. Temperatures should be above 14° to 15°C. Mature trees can stand light frosts. Good deep soils are best but clays that are well drained are suitable. It is a subtropical or warm temperate plant. It can only tolerate light frosts. Young trees are very frost sensitive. They need 50 to 100 hours of mild chilling to remain productive. Trees do best in a sunny position. A pH of 6.5 to 7.6 is best. It suits hardiness zones 10-12.

Cultivation: Trees are usually grown from seeds but cuttings of ripe wood will root in sand. It can be grafted or budded. Seeds can only be stored for 2-3 days when fresh but can be stored for several years if kept dry. Seeds will then still grow or they can be planted fresh. Seeds are planted about 3 cm deep in fine soil. They will germinate in about 21-40 days. Seedlings are often transplanted into pots or plastics bags after 3-4 months then into nursery beds when one year old. They are easy to transplant and even trees 3 or 4 years old can be transplanted when the leaves have fallen off. It is best done while trees are still dormant.

Fruit setting is often greatly improved by hand pollination. In some places natural pollinating agents do not occur. Hand pollination of the flowers can give more even shaped fruit and also ensure more fruit are formed. To do this, flowers are gathered in a small brown paper bag and kept till the pollen falls. Then with a small brush the pollen is put on freshly open flowers. The three petals of the flower are gently held open and the pollen spread around on the female flower parts (pistils). (Pollen can be stored overnight in a refrigerator if necessary.) Several trees should be planted near each other to allow them to pollinate. Young trees need support. For best growth they need adequate moisture during the growing season and good soil nutrition. Pruning during the dormancy period is done to allow strong branches for fruit bearing.

For better kinds of trees it is necessary to use budding or grafting. Rootstocks of *Annona reticulata* or *A. squamosa* can be used. Grafted trees fruit after about 6 years while seedling trees fruit after 11 years. Shield budding done at the beginning of the growing season is often used.
Trees can be spaced 8 metres apart. They can be pruned to give a better shaped tree and this should be done when leaves have fallen. Fruit are carried on both current years growth but also more prolifically on mature wood. Several trees should be planted near each other for pollination. As the roots are very sensitive, fertiliser should not be used at transplanting.

Production: Trees are fairly fast growing. Trees can fruit in 4 years. Trees mostly only produce fruit every second year. Fruit turn a pale green or cream colour as it ripens. As fruit ripen they develop a bloom on the skin and the carpels begin to separate. Fruit can be stored under refrigeration. The stalk should be cut from the tree and fruit need to be handled carefully. Fruit can only be stored for short periods. They need to be stored above 13°C.

Use: Fruit can be eaten raw or used to make drinks.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	73.5	395	1.3		0.5	1	9	

Insects:

Graphium agamemnon L.	Papilionidae (LEP)	Green spotted triangle larvae eating leaves

Diseases:

Rust	Fungus	*Sphaerophragmium boanense* Cummins

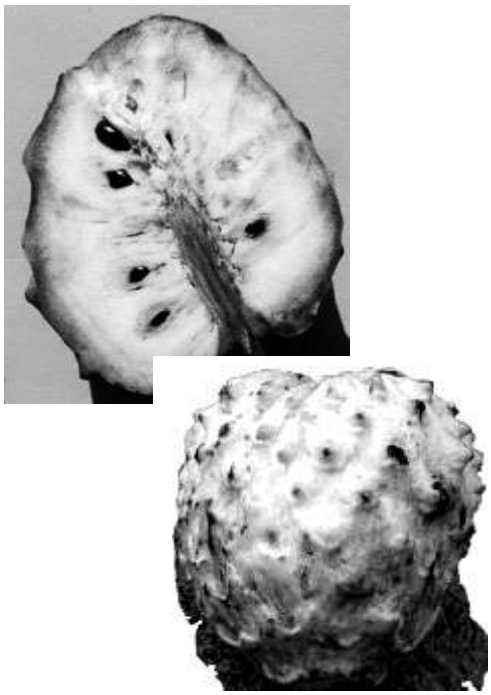
Pests:

Importance: Occasional trees occur in higher areas within Papua New Guinea.

Names

English: Atemoya, Custard apple
Tok pisin:
Tok ples:
Scientific name: *Annona cherimola* x *A squamosa*
Synonyms:
Plant family: Annonaceae

Description: A small tree. It can be 3-10 m tall. The fruit is large and with segments. It is sweet. These are hybrid trees which bear characteristics between cherimoyas and sweetsops. They are semideciduous losing many of their leaves during the year. Flowering often occurs as a new flush of leaves is produced. The flesh of the fruit is soft and creamy and sweet.



Distribution: They are semideciduous and suit the subtropics. The plant is suited to the highlands above 1000 m altitude in the tropics. Low relative humidity (less than 70%) shortens the receptive period of the stigmas and results in flowers falling off. Humidity can be increased by closer spacing, windbreaks and misting. As trees are shallow rooted, windbreaks are important to prevent trees falling over. Trees will grow on a range of soils but more consistent yields come from trees on sandy to sandy loams. Waterlogged soils cause flowers to fall off. They require uniform soil moisture from flowering to harvest.

Cultivation: A spacing of 6 m apart is suitable. Grafting is used for propagation. Tree pruning and training is done to avoid weak branches which break. Potassium is required in reasonable amounts. Trees are also sensitive to zinc and boron deficiencies. With high yielding varieties, some fruit thinning may be required to maintain fruit size. Flowering corresponds with a new flush of growth and so can be controlled by pruning or removing leaves. The stigmas of the flowers are only receptive for a few hours and this often results in poor fruit set. Hand pollination improves fruit set. This is done by transferring pollen with a brush.

Production: It takes about 30 days for a flower to fully open and from fruit development to maturity takes 4-5 months.

Use: The fruit are eaten fresh. They are also used for drinks and ice cream.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	78.7	309	1.4		0.3	1	43	

Insects:

Diseases:

Pests:

Importance:

Names

English: Soursop
Tok pisin: Sapasap
Tok ples:

Scientific name: *Annona muricata* L.
Synonyms:
Plant family: Annonaceae



Description: It is a low bushy tree 8-10 m high. The leaves are long (14 cm) and narrow (4 cm). The leaves are thick and slightly shiny on top. The flowers are large (2-3 cm), rounded and produced on short stems on the branches. They occur singly, or in groups of three. The flowers have two layers of thick fleshy petals. The fruit are 10-30 cm long. The fruit is spiny and the flesh is juicy. Many black seeds are embedded in the white flesh. Fruit are often distorted due to only some of the ovules being fertilised. Beetles are normally thought to do the pollinating. This means fruit end up heart shaped when unevenly pollinated. The flesh of the fruit is white. Several kinds with different sweetness, shape and juiciness occur.



Distribution: A tropical plant. It grows in tropical lowland a ltitude. It can tolerate quite poor soils and a humid climate. It cannot toler can withstand temperatures down to freezing (0°C) for a short time but salt e sea can kill the trees. They need a well drained soil and cannot tolerate w es continue to grow and produce satisfactorily in fairly poor compact soil. B ility increases the amount of fruit. They can grow well in hot humid areas b alled Blossom blight can cause flowers to fall off. It suits hardiness zones 10

Cultivation: Trees are grown either as seedling trees or grafte e grown from cuttings or air layering. Trees are easy to grow and maintain e grown from seeds. Seeds can be planted fresh or stored. Seeds grow in a Trees grown from seeds vary in the quality of the fruit. Seedlings are tran bags when 15 cm tall. Trees can also be grown from cuttings or by grafti er trees to be selected and produced. Seedlings are suitable for grafting a es need to be about 5m apart. Flowers are pollinated by insects. Hand pollination of flowers can increase the number of fruit that are produced. Fruit are soft and fleshy and difficult to transport.

Production: Trees grow quickly. Trees commence bearing by the third year. It bears fruit almost continually throughout the year, but there is normally one season when more fruit are getting ripe. Fruit can weigh up to 4-5 kg each. A tree can produce 12-24 fruit in a year.

Use: Fruit can be eaten fresh or used in ice-cream and for drinks.
Young fruit can be cooked as a vegetable.
Leaves are edible cooked.
CAUTION The seeds are toxic, so should be removed before processing.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	82.4	294	0.88		0.3		16	0.1
Leaves								

Insects:

Ceroplastes chiton Green	Coccidae (HEM)	Scale insects

Graphium agamemnon L.	Papilionidae (LEP)	Larvae of Green spotted triangle
Planococcus citri (Risso)	Pseudococcidae (HEM)	Citrus mealy bug

Diseases:

Sooty mould	Fungi	*Capnodium sp.* and *Microxyphium sp.*
Blossom blight	Fungus	*Colletotrichum gloeosporioides* Penz.
Pink disease	Fungus	*Phanerochaete salmonicolor*
Algal leaf spot	Alga	*Cephaleuros virescens*

Pests:

Importance: A quite popular fruit in many coastal areas of Papua New Guinea and other tropical countries.

Names

English: Bullock's heart
Tok pisin:
Tok ples:

Scientific name: *Annona reticulata* L.
Synonyms:
Plant family: Annonaceae



Description: A small tree up to 7.5 m tall. It has several branches near the base. Trees loose their leaves at some times of the year. New shoots have short brown hairs but older wood is smooth and shiny. The leaves are long and spear shaped with short leaf stalks. Around the edge of the leaf is a clear edge. The leaves smell when crushed. Flowers are greenish yellow. They occur in groups where the leaves join the stalk. Flowers occur on new wood growth. The fruit are reddish brown in colour and 10-12 cm across. There is a fine hexagonal pattern over the fruit. Inside there are large brown seeds. The fruit are edible but the seeds are not eaten.

Distribution: It occurs in the tropical lowlands and grows up to at least 1200 m altitude. It can grow on poorer soils with different levels of acidity. It cannot stand waterlogging. It is less suited to dry climates. In Nepal it grows to 900 m altitude. It suits hardiness zones 10-12.

Cultivation: Plants are normally grown from seeds. Seedling trees vary quite a bit. Seedlings are easy to transplant. A spacing of 4-7 m is suitable. Better kinds can be grown using budding or grafting.

Production: Trees begin fruiting at 3-5 years. Fruit setting is often improved by hand pollination. Fruit can vary from 0.25 to 2.25 kg each. Fruit production is seasonal. The season is normally Dec. to March.

Use: The ripe fruit is eaten fresh.
Caution: The seed kernel is poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	66.4	462	2.06		0.5	10	50	

Insects:

Helopeltis clavifer (Walker)	Coreidae (HEM)	Cacao mirid
Paratella sp.	Flatidae (HEM)	
Terentius nubifasciatus Walker	Membracidae (HOM)	

Diseases:

Pests:

Importance: Commonly seen on Manus Island and in some other coastal areas in Papua New Guinea.

Names

English: Sweetsop
Tok pisin:
Tok ples:

Scientific name: *Annona squamosa* L.
Synonyms:
Plant family: Annonaceae



Description: A bushy deciduous tree up to 6 m high. It has irregular spreading branches. The leaves are oblong and narrow, often 12 cm long by 4 cm wide. The leaves have fine hairs underneath. The leaves are dull green and smell when crushed. The flowers droop or hang from branches either singly or in groups of 2 or 3. The flowers are greenish colour. The fruit are 8-10 cm across and greenish in colour. The fruit is covered with round fleshy scales which drop off as the fruit ripens. Inside the fruit are several shiny black seeds about 1.5 cm long. The fruit flesh is white and soft.



Distribution: It suits lowland drier climates. It grows naturally in the dry hills around Port Moresby in Papua New Guinea. The trees will probably grow satisfactorily up to about 1000 metres altitude in equatorial zones. Sweetsops cannot stand frost but they are able to survive droughts better than many fruit trees. Trees do not like waterlogged soils. Sweetsops can grow on fairly poor, dry, stony soils. In Bolivia they grow in areas with rainfall or 500-1,000 mm per year. It suits hardiness zones 10-12.

Cultivation: They are normally grown from seeds and the seeds retain their viability for several years. It is better to grow sweetsops from fresh seeds and it is best to soak seeds for 3 days before sowing. Seeds germinate and start to grow 50 to 70 days after planting. The fruit is borne on old and new wood. As the fruit is more commonly on new wood, pruning is an advantage. Trees can be budded or grafted. A small branch of a selected variety is grafted onto another seedling sweetsop. Plants are very hard to get to grow from cuttings. A spacing of 6 m apart is suitable for sweetsop trees. The fruit is eaten raw. The sweet soft fleshy layer around the seeds can be eaten raw. When the fruit is ripe it is easy to separate the different soft fleshy parts of the fruit. Often it is easiest and best to harvest the fruit when they are nearly ripe and then let them ripen in a warm place.

Production: The tree is slow growing. Trees can start to produce fruit 2 years after they are planted.

Use: The fruit is eaten raw. It is also used in ice cream.
Caution: The seeds, leaves and roots are poisonous. Both an alkaloid, and hydrocyanic acid have been shown to occur in these parts of the plant.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	76.4	441	2.09		0.6	1	40	0.1

Insects:

Helopeltis clavifer (Walker)	Coreidae (HEM)	Cacao mirid
Paratella sp.	Flatidae (HEM)	

Terentius nubifasciatus Walker.	Membracidae (HOM)	

Diseases:

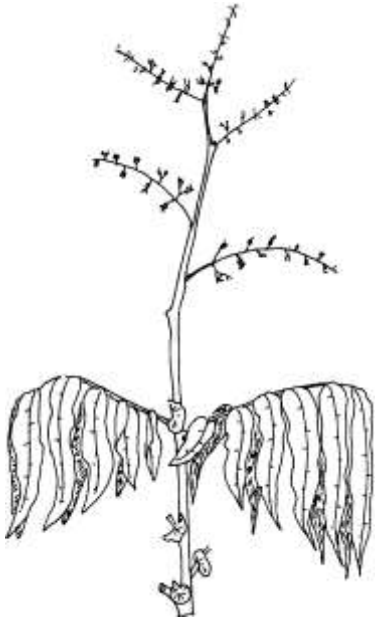
Blossom blight	Fungus	*Glomerella cingulata*
Pink disease	Fungus	*Phanerochaete salmonicolor*

Pests:

Importance: It is fairly common in coastal areas of Papua New Guinea especially near Port Moresby.

Names

English: Pacific lychee
Tok pisin: Ton, Taun
Tok ples:
Scientific name: *Pometia pinnata* J.R. & G.Forster
Synonyms:
Plant family: Sapindaceae



Description: An evergreen tree. It can grow into quite a large tree up to 40-50 metres high. At the base of the tree there are often large buttresses and the bark is a bright orange brown colour and rough and scaly. The hard timber is widely used. The young leaves and twigs of the tree are bright red. The lowest pair of leaflets are small and clasp the stem like stipules. There are often 5-11 pairs of leaflets along a stalk and the leaflets at the centre are often the largest. The leaflets droop from long stalks. The flowers are produced in clusters on stalks that are up to 50 cm long and grow near the ends of the branches. The flowers are small and yellowish green and do not have any scent. The skin of the ripe fruit peels off like a mandarin. The edible part is a clear layer around the seed, like in a rambutan. An inedible kind also occurs. The fruit is about 6 cm across and the seed about 3 cm across.

Distribution: It is native from Malaysia to Polynesia. It occurs in lowland and lower montane forest. They occur from sea level to 700 m altitude. They grow along riverbanks and near swamps. (The inedible kind occurs on the ridges and is the more useful timber tree.)

Cultivation: Dispersal of self sown trees is probably by bats or fresh water. Trees are produced from seeds. Seedlings are transplanted from a nursery site. Ton are planted from seed. Also self sown seedling are transplanted and some trees occur wild in the bush. The seeds are probably spread around by fruit eating bats. It probably takes about 5 years from planting until the trees bear fruit. The aril around the seed is eaten raw. Roasted seeds are recorded as eaten in other countries.

Production: Plants grow quickly. Fruiting is distinctly seasonal with a short and clearly defined season, early in the year. There also appears to be a significant fluctuation between years on the amount of fruit set. This does not follow a clearly biennial pattern. In Santa Cruz it has been observed that fruit set does not always follow flowering. The cause is not known. The season is very short and is between November and March.

Use: The fleshy layer (aril) around the seed is eaten raw.
Caution: The edible form of ton must be chosen. The actual seeds have been reported to be poisonous.
The seed are roasted and eaten in parts of the Solomons.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Seeds								

Insects:
Diseases:

Leaf spot		

Pests:
Importance: A very popular fruit in season. It occurs in several coastal areas in Papua New Guinea.

Names

English: Avocado
Tok pisin:
Tok ples:
Scientific name: *Persea americana* var. *americana* Mill.
Synonyms:
Plant family: Lauraceae



Description: A small to medium sized tree. It grows 8-10 m high. Trees can grow to 25 m high. The leaf stalk is 1.5-5 cm long. Leaves are entire, oval and 5-40 cm long. Flowers are greenish, small and on the ends of branches. Clusters of flowers may contain 200-300 flowers. Normally only 1-3 fruit develop from each cluster. The fruit is pear shaped or round. It can be 7-20 cm long. The fruit are greenish-yellow with some red colouration. The fruit has greenish yellow flesh and a large round seed. There are 3 named races - West Indian, Guatemalan and Mexican.

Distribution: Trees grow from sea level up to 2250 m altitude in the tropics. It cannot stand waterlogging. Branches are easily damaged by wind. It needs to be in a frost free location or where frosts are rare. West Indian varieties thrive in humid, tropical climates and freeze at or near O°C. It does best with neutral or slightly acid soil. West Indian avocadoes can stand some salinity. They need a well aerated soil. Growth is disrupted when soil temperatures are below 13°C. It suits hardiness zones 9-11.

Cultivation: Seeds remain viable for 2-3 weeks. Fresh seed held at 25°C day to 15°C night will germinate in 3 weeks. It is best to propagate vegetatively. Tip cuttings, layers and grafts can be used. Because different types have pollen at different times of day, for best pollination a mixture of trees which have pollen and flowers receptive at different times gives bet fruit set. Although trees will grow in shade, they need sun for fruiting. The leaves do not rot easily and can accumulate under trees. Other plants cannot be grown under avocado trees.

Production: Seedlings grow quickly and continuously in warm, moist conditions. Seedlings bear after 5-8 years. Grafted trees can fruit in 1-2 years. A good tree produces 400-600 fruit each year. A fruit can weigh 50 g to 1 kg. In the subtropics trees often produce 2 main flushes of fruit per year. From fruit set to maturity can take 6-12 months. Fruit ripen off the tree in 4-14 days.

Use: The pulp of the fruit is eaten raw or cooked.
It is mixed with salads.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	74.4	805	1.8		0.7	480	11	0.4

Insects:

Abgrallaspis cyanophylli (Signoret)	Diaspididae (HEM)	Armoured scales
Adoxophyes sp.	Tortricidae (LEP)	leaf roller
Amblypelta spp.	Coreidae (HEM)	Amblypelta bugs
Aspidiotus destructor Signoret	Diaspididae (HEM)	Coconut scale

Ceroplastes destructor Newstead	Coccidae (HEM)	Soft scale
Ceroplastes rubens Maskell	Coccidae(HEM)	Pink wax scale
Chrysomphalus dictyospermi (Morgan)	Diaspididae (HEM)	Armoured scale
Coccus hesperidium Linnaeus	Coccidae (HEM)	Soft brown scale
Coccus longulus (Douglas)	Coccidae(HEM)	Soft scale
Colgar tricolor Dist.	Flatidae (HOM)	
Dysmicoccus nesophilus Williams	Pseudococcidae (HEM)	mealy bug
Eupholus spp.	Curculionidae (COL)	Eupholus weevils
Euricania villica	Ricaniidae (HEM)	plant hopper
Ferrisia virgata Cockerell	Pseudococcidae (HEM)	Striped mealy bug
Fiorinia fioriniae (Targioni)	Diaspididae (HEM)	Armoured scale
Gascardia destructor De Lotto	Coccidae (HEM)	Soft wax scale
Graphium agamemnon L.	Papilionidae (LEP)	Green spotted triangle
Helopeltis clavifer (Walker)	Miridae (HEM)	Cacao mired
Hemiberlesia lataniae (Signoret)	Diaspididae (HEM)	Armoured scale
Hemiberlesia palmae (Cockerell)	Coccidae (HEM)	Soft scale
Homeoxipha fuscipennis	Gryllidae (ORTH)	
Hyposidra talaca (Wlk.)	Geometridae (LEP)	
Icerya seychellarum (Westwood)	Margarodidae	
Idopsis grisea Faust.	Curculionidae (COL)	
Milviscutulus mangiferae (Green)	Coccidae(HEM)	Soft scale
Milviscutulus spiculatus Williams	Coccidae(HEM)	Soft scale
Morganella longispina (Morgan)	Diaspididae (HEM)	Armoured scale
Oribius spp.	Curculionidae (COL)	Shot hole weevils
Paratella miniata Mcl.	Flatidae (HEM)	
Perissopneumon		mealy bug
Pinnaspis strachani (Cooley)	Diaspididae (HEM)	Armoured scale
Planococcus citri (Risso)	Pseudococcidae (HEM)	mealy bug
Pseudodoniella typica China & Carvalho	Miridae (HEM)	
Saissetia coffeae (Walker)	Coccidae(HEM)	Coffee scale
Selenothrips rubrocinctus (Giard)	Thripidae (THYS)	Cacao thrips
Terentius nubifasciatus Walker	Membracidae (HOM)	
Xyleborus perforans (Wollastan)	Scolytidae(COL)	Island pinhole borer

Diseases:

Root rot	Fungus	*Phytophthora cinnamomi* Rands
Algal spot	Algae	*Cephaleuros pulvinatus* Schmidle
Root rot	Fungus	*Phellinus noxius* (Corner) G.H.Cunn.
	And	*Rigidoporus microporus* (Sw.ex Fr.) Overeem
	And	*Fusarium solani*
Leaf spot	Fungus	*Corynespora sp.*
Pink disease	Fungus	*Phanerochaete salmonicolor*
Algal spot (red rust)	Alga	*Cephaleuros virescens*
Sooty mould	Fungus	
Could get anthracnose	Fungus	*Colletotrichum gloeosporoides*

Pests:

Importance: It is an important fruit tree in many tropical and subtropical countries. The tree and fruit is getting quite wide acceptance at least in the highlands of Papua New Guinea.

Names

English: Guava
Tok pisin:
Tok ples:

Scientific name: *Psidium guajava* L.
Synonyms:
Plant family: Myrtaceae



Description: A small tree or shrub 8-10 m high. It is evergreen. It has smooth bark which is mottled. The bark peels off in smooth flakes. The plant branches close to the ground. The branches are four angled. Trees are shallow rooted. The leaves are opposite, dull green and somewhat hairy. They are oval and somewhat pointed at both ends. They are 15 cm long by 2-5 cm wide. The leaves have short leaf stalks. The flowers are white and showy and borne in loose irregular types of arrangements of one to three flowers. The petals are 1.5 to 2 cm long. Both self and cross pollination occurs due to insects. The flowers grow in the axils of leaves on new growth. The fruit are rounded and 4 to 5 cm long. They are green but turn yellow when ripe. The outer covering is firm and encloses a pink or nearly white sweet smelling edible pulp. This contains many seeds. It better selected varieties both the skin and the seeds are fully edible. Fruit vary from very acid to very sweet.

Distribution: It is native to C and S America. Guavas thrive in both humid and dry tropical climates. They do best in sunny positions. They grow wild and are also cultivated. It grows well from sea level up to 1600 m and occurs up to 1900 m. In Nepal it grows up to 1400 m altitude. It is killed by frost. They fruit better where there is a cooler season. Temperatures near 30°C give best production. They are very widely distributed in open places and secondary forests throughout the islands of the Philippines and Papua New Guinea and can become weedy under some conditions. They produce better in soils with good organic matter. They prefer a well drained soil but can stand some waterlogging. A pH of 5 to 7 is suitable. Trees cannot tolerate salty conditions. It suits hardiness zones 9-12.

Cultivation: They are mostly grown from seeds but seedling trees vary in quality. Seeds remain viable for a year or longer. Seeds germinate in 2-3 weeks but can take 8 weeks. Selected trees can be propagated by budding or grafting. They can also be propagated by layering, root cuttings or stem cuttings if hormones are used. For stem cuttings the tips are used and grown under mist at 28-30°C with bottom heat. Suckers can also be used. Using vegetative methods of propagation enables better fruit kinds to be preserved. In the lowland tropics trees are self sown. As fruit are produced on new season's growth, pruning does not affect fruiting greatly. Trees should be managed to give the maximum number of new vigorous new shoots. Trees can be pruned for shape. Trees can be grown at 2.5 m within rows and 6 m apart between rows.

Production: Seedling trees may begin to bear 2-3 years after transplanting. Pruning back the tips slightly increases fruit production. Fruit taste best if ripened on the tree. Ripening can be hastened by placing them in a brown paper bag with a banana or apple. Mature fruit which have not changed colour can be stored 2-5 weeks at temperatures of 8-10°C and relative humidity of 85-95%. Mature fruit ripen in 2-3 days at normal temperatures and will keep for 7 days.

Use: The young leaves are eaten raw or cooked.
The fruit are eaten raw.
The fruit can be used for jams and jellies. Half ripe fruit are added to help the jelly set.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	77.1	238	1.1		1.4	60	184	0.2
Leaves								

Insects:

Abgrallaspis cyanophylli	Diaspididae (HEM)	Armoured scale
Aleurodicus dispersus Russel	Aleurodidae (HEM)	Spiralling whitefly
Amblypelta spp.	Coreidae (HEM)	Amblypelta bugs
Apirocalus cornutus Pasc.	Curculionidae (COL)	Horned weevil
Aspidiotus destructor	Diaspididae (HEM)	Coconut scale
Bactrocera bryoniae (Tryon.)	Tephritidae (DIPT)	Fruit fly
Bactrocera frauenfeldi Schiner	Tephritidae (DIPT)	Fruit fly
Bactrocera musae (Try.)	Tephritidae (DIPT)	Banana fruit fly
Bactrocera trivialis Drew	Tephritidae (DIPT)	Fruit fly
Ceroplastes destructor Newstead	Coccidae (HEM)	Soft waxy scale
Chrysomphalus dictyospermi	Diaspididae (HEM)	Armoured scale
Coccus longulus	Coccidae (HEM)	Soft scale
Dysmicoccus brevipes	Pseudococcidae (HEM)	Mealybug
Dysmicoccus nesophilus	Pseudococcidae (HEM)	Mealybug
Eucalymnatus tessellates	Coccidae (HEM)	Soft scale
Ferrisia virgata	Pseudococcidae (HEM)	Striped mealybug
Helopeltis clavifer (Walker)	Coreidae (HEM)	Cacao mirid
Hemiberlesia lataniae	Diaspididae (HEM)	Armoured scale
Hemiberlesia palmae	Diaspididae (HEM)	Armoured scale
Icerya purchasi	Coccidae (HEM)	Soft scale
Lymantria rosina Pag.	Lymantriidae (LEP)	Moth larvae
Oribius destructor Marsh.	Curculionidae (COL)	Shot hole weevils
Parasaisettia nigra	Coccidae (HEM)	Soft scale
Perissopneumon sp.	Pseudococcidae (HEM)	Mealy bug
Planococcus citri	Pseudococcidae (HEM)	Mealy bug
Planococcus pacificus	Pseudococcidae (HEM)	Mealy bug
Pulvinaria psidii	Coccidae (HEM)	Soft scale
Ragwellelus festivus Miller	Miridae (HEM)	Cardamom mired
Rastrococcus vicorum	Pseudococcidae (HEM)	Mealy bug
Saissettia coffeae	Coccidae (HEM)	Brown coffee scale
Saisettia neglecta	Coccidae (HEM)	Soft scale
Steatococcus samaraius	Coccidae (HEM)	Soft scale
Syntherata janetta White	Saturniidae (LEP)	Moth larvae
Unaspis citri	Diaspididae (HEM)	Armoured scale

Diseases:

Fruit rot	Fungus	*Athelia rolfsii*
Fruit rot	Fungus	*Botrydiplodia theobromae*
Anthracnose of fruit	Fungus	*Glomerella cingulata* (Ston.)Spauld & Schr.
Fruit canker	Fungus	*Pestalotiopsis psidii*
Algal spot	Algae	*Cephaleuros virescens* Kunz.

Pests:

Importance: The trees are widely spread throughout the country and fruit are popular particularly with children. Trees mostly grow naturally in coastal areas.

Names

English: Cherry guava
Tok pisin:
Tok ples:
Scientific name: *Psidium cattleianum* Sabine
Synonyms: *Psidium littorale* var. *longipes* (O. Berg) Fosb.
Plant family: Myrtaceae



Description: An evergreen shrub. It grows 3-6 m high. The young shoots are rounded. They can be hairy or smooth. The leaf stalk is 4-15 mm long. Leaves are dark green and shiny above and 4-6 cm x 2-3 cm. The edges of the leaves curl backwards. The leaves are wedge shaped at the base. There are several glands under the leaf. Flowers are white and singly in the axils of leaves. The flower stalk is 3-7 mm long. It has small round red or purplish fruit. The flesh is white. There are several hard seeds inside. The seeds are 3 mm long by 2.5 mm wide. The fruit are edible

Distribution: It is native to Brazil. It does quite well in highland areas in the tropics. It grows from sea level to 1900 m. It is more frost resistant than common guava. It can be grown on a range of soils. It is fairly drought resistant. It suits hardiness zones 8-12.

Cultivation: Plants are grown by seed, suckers or cuttings. Pruning helps fruit production. It can be pruned to form a hedge.

Production: Fruit production is seasonal. There are probably two crops per year.

Use: Fruit are eaten raw or used in jams and jellies.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	80.7	289	0.6		0.2	9	37	

Insects:

Diseases:

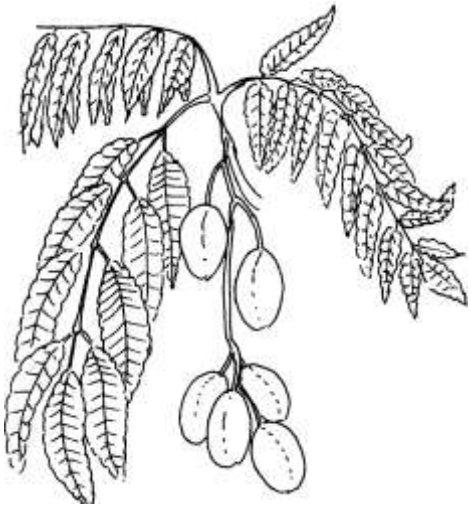
Pests:

Importance: At present not widely grown in Papua New Guinea, but fruit are liked and it will probably get wider acceptance.

Names

English: Golden apple,
Tok pisin:
Tok ples:

Scientific name: *Spondias cytherea* Sonnerat
Synonyms: *Spondias dulcis* Soland. ex Forst.f.
Plant family: Anacardiaceae



Description: Often a Golden apple tree grows to a large tree which can be up to 30 m high but is more often 15 m high in cultivation. It has a trunk 60 cm across which can have buttresses. The bark on the trunk of the tree is fairly smooth. The twigs break off easily. The wood is soft and not much use. The leaf is made up of 4 to 12 pairs of leaflets which have fine teeth around the edge. The leaves are 20-30 cm long. The leaves are smooth and dark green on top and pale green underneath. The leaves are alternate. The leaves of the tree fall off for a part of the year. The old leaves wither to a bright yellow colour. The flowers are produced near the ends of the branches and mostly the flowers develop before the new young leaves grow. The flowers occur as several flowers on long stalks. The flower panicle is 15 to 30 cm long. The flowers are small and white. They look something like a mango flower. The fruit is yellow, oval and up to 7cm long and 4cm across. Sometimes the outside of the fruit has a mottled black colour. There is one large stone inside divided into 5 cells with a seed in each. The stone is branched and has fibres.

Distribution: It is a tropical plant. They occur in well drained soils or in dry forests. It occurs in the lowland rainforest and in valleys up to about 950 m altitude in the equatorial tropics. They suit warm tropical and subtropical climates and are frost tender. Flowering is normally during the dry season. This may be important for fruit set. The trees also grow in Indonesia, the Philippines, Thailand and a number of other Pacific countries. It has also been taken to other tropical countries. This species covers a full range from being a wild unutilised tree in some areas to a planted, pruned and highly regarded village fruit tree in other areas. It is better suited to deeper alluvial soils and rarely occurs on limestone with a thin clay soil cover. Trees often grow as a pioneer tree on landslides. The wild trees are probably spread around by birds, pigs and people

Cultivation: Trees are mostly grown from seed and often grows wild. Flowers are bisexual and there are no apparent pollination problems. The seeds do not produce true to type so that poor and sour fruit are often produced. Seed normally germinate within one month. It is possible to grow plants from cuttings although it is difficult. Large cuttings should be used. Doing this would enable better types of fruit to be regrown. It can also be grown using budding. Seedling trees are larger and more vigorous than budded or grafted trees. Tree spacing varies from 7.5 m to 12 m. Young trees benefit by shade during their first year. The top can be cut off trees to give a lower and more spreading tree. Large cuttings can be used with difficulty. Trees can be topped to give a lower tree with spreading branches.

Production: Trees may bear from 4-5 years old from seed. Cuttings take 2-3 years. Fruiting occurs seasonally from Jan. to April in the southern hemisphere.

Use: Fruit are eaten after peeling. They are eaten raw or pickled.
Leaves are edible raw or cooked.

The kernel of the seed may be edible.
(Some fruit are poor size and very sour.)
The fruit are also used for sweet drinks and made into jams and chutneys.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	70.0	657	0.6					
Leaves								

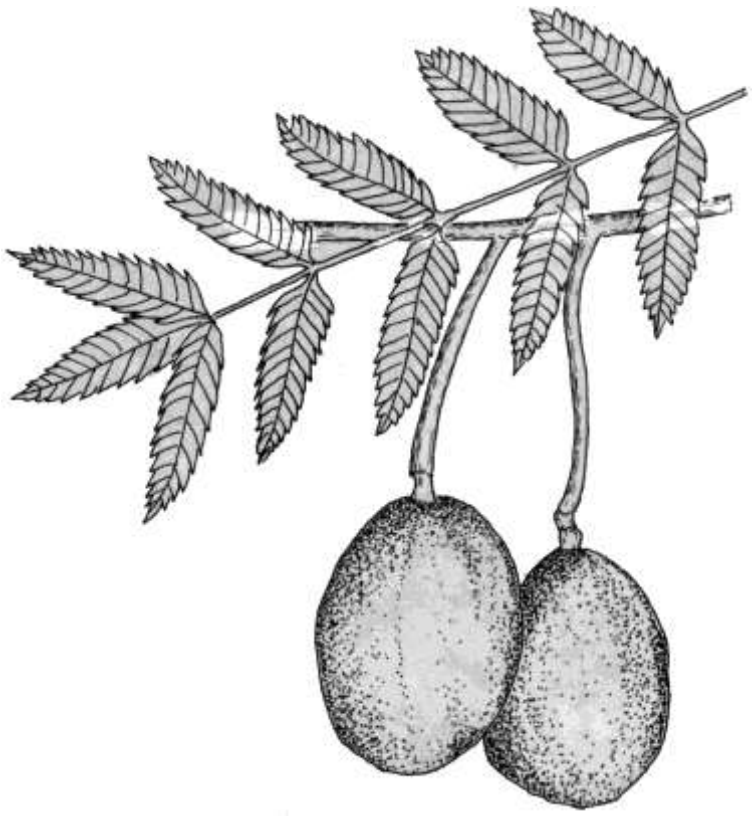
Insects:
Often has leaves eaten by caterpillars.
Leaves are also attacked by a beetle

Aspidiotus destructor Sign.	Diaspididae (HEM)	Coconut scale
Chrysomphalus dictyospermi (Morgan)	Diaspididae (HEM)	Armoured scale
Hemiberlesia palmae (Cockerell)	Diaspididae (HEM)	Armoured scale
Icerya seychellarum (Westwood)	Margarodidae (HEM)	
Planococcus pacificus Cox	Pseudococcidae (HEM)	Mealy bug

Diseases:

Pests:

Importance: Moderately common in lowland rainforests in Papua New Guinea and also grown in villages. Fruit quality varies. It is common and popular in Vietnam.



Names

English:

Scientific name: *Spondias philippensis* (Elmer) Airy Shaw & Forman

Tok pisin:

Synonyms:

Tok ples:

Plant family: Anacardiaceae



Description: A small or creeping tree often gaining support from other trees. Can be up to 30 m high and 7 cm across the trunk. Leaves have 1-4 pairs of leaflets. The leaflets are somewhat leathery. The white flowers are in panicles. The fruit are yellow when ripe and 1-2 cm across

Distribution: They grow between 30 and 400 m altitude in the tropics. They are mostly in the rainforest.

Cultivation: Trees grow wild from seed.

Production:

Use: The fruit are edible but sour.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

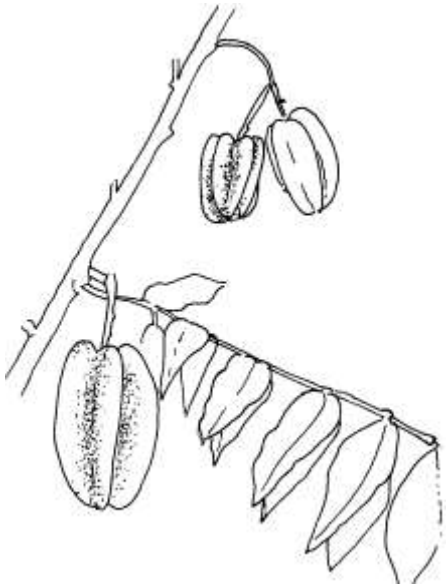
Importance: Recorded in the Sepik district of Papua New Guinea. A very minor wild edible fruit.

Names

English: Carambola, Star Fruit
Tok pisin: Faiv kona
Tok ples:

Scientific name: *Averrhoa carambola* L.
Synonyms:
Plant family: Oxalidaceae

Description: A small evergreen tree up to 6-12 m high. The trunk of the tree is short and crooked and has branches near the base. The bark is smooth and dark grey. A leaf is made up of 2 to 11 leaflets with a leaflet at the end. The leaves are darker and more shiny on the top surface. The flowers are small (8 mm long) and red and white in clusters on the small branches. The fruit are star shaped with five or six angled ridges. They are yellow and up to 16 cm long and 9 cm wide. The flesh is white. There are one or two shiny light brown seeds about 1 cm long, in the bottom of each lobe. Some carambola have short styles (female flower parts) and these types need to be cross pollinated by insects. This means two types need planting. Long style types can fertilise themselves. Fruit flavour can vary from very acid to very sweet.



Distribution: Five corners need a warm tropical climate so they are mostly seen in the coastal lowlands below about 500m altitude. They will grow up to 1200m in the equatorial tropics. Mature trees can tolerate slight frost. Five corner can grow on several different types of soil. The soil should be well drained. Plants cannot stand waterlogging. It is suited to moist places but performs better in areas where there is some dry season rather than in places with heavy, constant rain. Trees are fairly wind resistant providing the winds are not cold. Trees are stressed by temperatures near 0°C as well as above 37°C. It grows in Nepal to about 300 m altitude. It suits hardiness zones 10-12.

Cultivation: Trees are grown from seed. Seeds grow easily but in fact only a small number of seeds are fertile. Well developed seeds should be chosen. Seeds are planted in a seed bed and planted out when 15-20 cm high. Because seeds are produced by cross pollination, variation is common. It is therefore better to use budding or grafting. Taking buds off good trees, or grafting twigs from them, onto 1 year old seedling roots, is the commonest method. Marcottage or air layering can also be used, although it is difficult. A spacing of 6 m x 6 m is suitable. Trees need to be grafted if sweeter kinds of fruit are to be selected. Because the seeds are covered by a fatty layer, washing them with soap improves the germination

Production: Seedling trees fruit after 4-5 years. They can produce 400 fruit per tree. Flowers open after 14-21 days and fruit mature after 14-15 weeks. Trees live for a long time and some fruit is produced at most times of the year. Flowers and fruit can be found on the tree at most times, although there is often 2 or 3 main flushes of flowering and fruiting. Fruiting tends to be seasonal about March to May in the southern hemisphere. The tree does not require pruning or any special care once established. Flowers are cross pollinated by bees, flies and other insects. Hand pollination does not help fruit set much. Fruit once ripe will keep for 7-20 days but can be stored longer at 12°C.

Use: Fruit can be eaten raw or used for drinks.
They can be used for souring dishes. They are also used for jams, jellies, preserves and pickles. (They are also useful for cleaning brass.)
Caution: The fruit contain soluble oxalates.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	90.8	149	0.5		1	300	40	0.1

Insects:

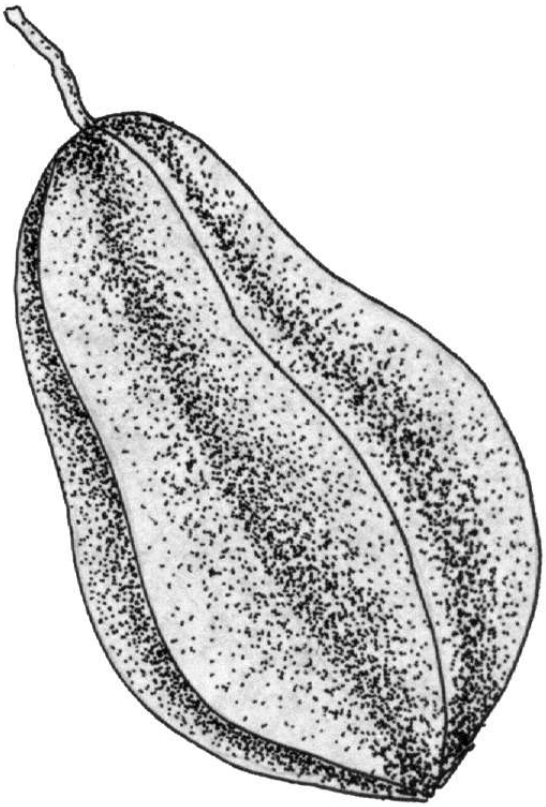
Bactrocera sp.	Tephritidae (DIPT)	Fruit fly maggots

Diseases:

Leaf spot	cause unknown	
Fruit rot	Fungus	*Colletotrichum gloeosporoides* Penz

Pests:

Importance: Trees are moderately common in coastal areas of Papua New Guinea. Types vary in their sweetness.

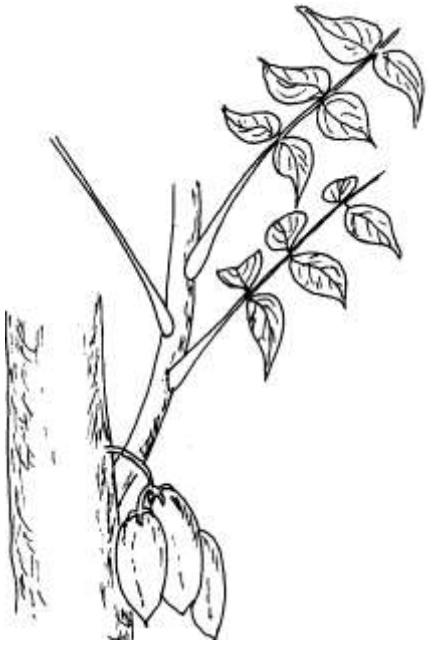


Names

English: Bilimbi, Cucumber tree
Tok pisin:
Tok ples:

Scientific name: *Averrhoa bilimbi* L.
Synonyms:
Plant family: Oxalidaceae

Description: A small evergreen tree up to 7-10 m high. It can spread 3 m across. The stem is erect and short. Leaves are large. Leaves have from 5 to 17 or 34 pairs of leaflets. Leaves are pale green. The leaves are often clustered near the branch tips. Flowers are crimson. They are produced on old branches and the stem. The flowers are in 15 cm long clusters. These then bear clusters of cucumber shaped fruit on the trunk and older branches. Fruit are 8-10 cm long and yellow or green. They are soft and fleshy with a few flat seeds in the centre. Fruit are sour but edible.



Distribution: The tree is drought resistant. It will grow from sea level up to at least 750 m altitude in the tropics. It prefers well composted, moist soil, in a protected, partly shaded position. It is frost tender. It suits hardiness zones 10-12.

Cultivation: Trees are mostly grown from seeds. It grows wild in secondary forest in many coastal areas in tropical Asia.

Production: Flowers are produced all year round. Flowering is more common in dry seasons.

Use: The fruit are used for souring dishes.
They can also be used for jams, drinks, pickles and in curries.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	94.2	84	0.8		1	30	16	

Insects:

Bactrocera sp.	Tephritidae (DIPT)	Fruit fly maggots

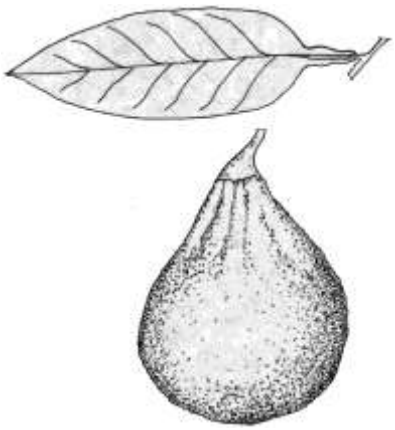
Diseases:

Fruit rot	Fungus	*Colletotrichum gloeosporoides* Penz

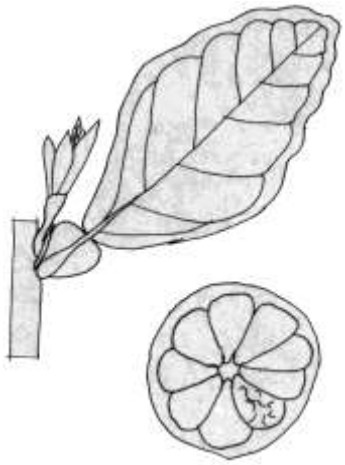
Pests:

Importance: Only of minor use as a flavouring in cooking. Occasional trees occur in Papua New Guinea and the fruit is probably little used.

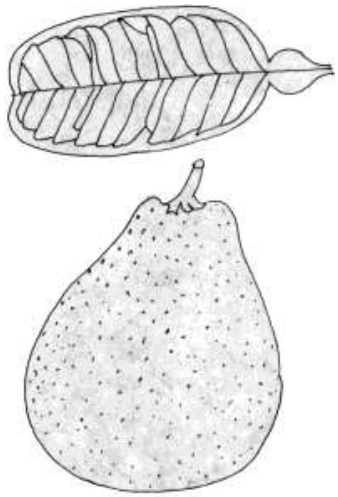
Citrus



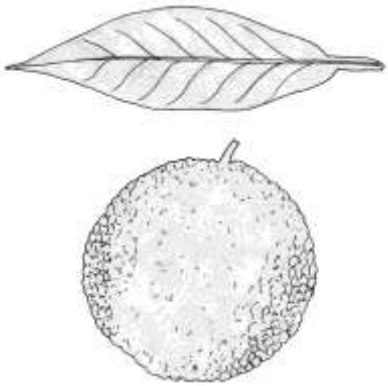
West Indian lime
Citrus aurantifolia



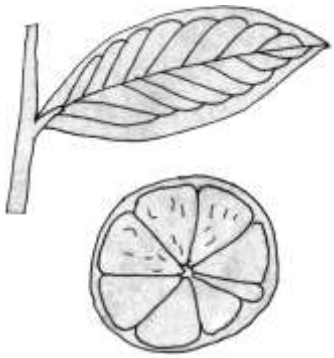
Grapefruit
Citrus paradisi



Pomelo
Citrus grandis



Sweet orange
Citrus sinensis

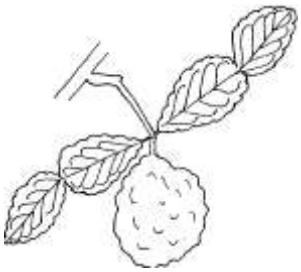


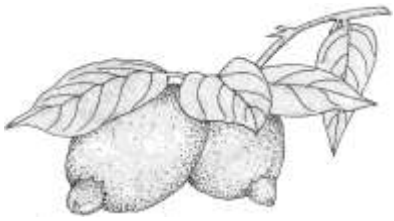
Mandarin
Citrus reticulata



Clymenia
Clymenia polyandra

Wild lime
Citrus hystrix





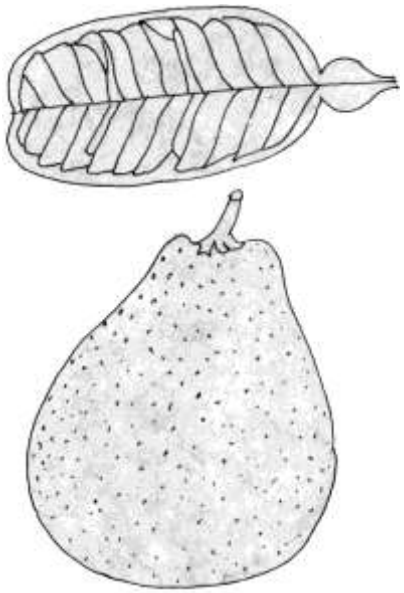
Lemon *Citrus limon*

Pomelo, Pummelo		*Citrus grandis*	**407**
West Indian Lime		*Citrus aurantifolia*	**408**
Grapefruit		*Citrus paradisi*	**409**
Orange	Swit muli	*Citrus sinensis*	**410**
Lemon	Muli	*Citrus limon*	**411**
Citron		*Citrus medica*	**412**
Mandarin		*Citrus reticulata*	**413**
Wild lime		*Citrus hystrix*	**414**
Sour orange		*Citrus aurantium*	**415**
Clymenia		*Clymenia polyandra*	**416**
Lime berry		*Triphasia trifolia*	**417**

Names

English: Pomelo, Pummelo
Tok pisin:
Tok ples:

Scientific name: *Citrus grandis* (L.) Osbeck
Synonyms: *Citrus maxima* (Burm.) Merr
Plant family: Rutaceae



Description: A spreading, spiny tree. It grows up to 15 m high. Leaves are large. The leaf stalks have wings. Young shoots and stems have fine hairs on them. Flowers are large (2 cm) and creamy white. The flowers are produced in bunches from woody shoots. The fruit is very large (20 cm) with a thick skin. The skin is dotted with oil glands. The skin is light green or pale yellow. The flesh can be white, pink or red. Each segment of the fruit is covered by a strong membrane. Some kinds have many seeds, while others are almost seedless.

Distribution: A tropical plant. They thrive in warm lowland areas in the tropics. They can grow from sea level up to 900 m. They are tolerant of brackish and salty conditions. They suit humid climates.

Cultivation: They are mostly grown from seed, but do not breed true. The seed only produce one seedling unlike many citrus. Trees are often produced by aerial layering, but budding or grafting can be used. Air-layered trees give sweeter fruit. Trees start producing after about 9 years. Trees need to be about 9 m apart. Trees grown away from other trees often produce almost seedless fruit.

Production: Fruit is produced almost all the year round. The time from flowering to ripe fruit, is about 6 months. Fruit can be stored quite well.

Use: The fruit can be eaten fresh or made into marmalade.
The peel can be candied.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	89.1	159	0.76		0.11	0	61.0	0.1
Peel								

Insects:

Diseases:

Collar rot	Fungus	*Athelia rolfsii*

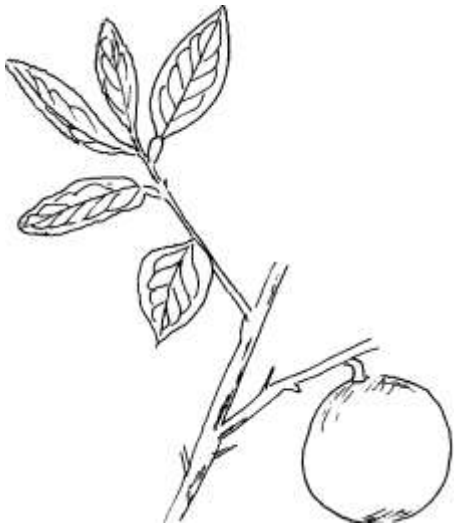
Pests:

Importance: Trees can be seen occasionally in several coastal areas of Papua New Guinea and they are common in New Ireland Province.

Names

English: Lime, West Indian Lime **Scientific name:** *Citrus aurantifolia* (Christm.) Swingle
Tok pisin: **Synonyms:**
Tok ples: **Plant family:** Rutaceae

Description: A small much branched evergreen tree. It grows up to 5-6 m tall with short sharp spines. It spreads to 3 m across. The leaves are small and dark green. There are narrow wings on the leaf stalk. The leaf blade is about 5 cm long by 3 cm wide and oval. They have a sweet smell when crushed. There is a thorn at the base of each leaf. (Thorn free kinds are known). The flowers are yellowish white. They are 2.5 cm across and have 5 petals. The flowers are produced in the leaf axils or at the ends of branches. The fruit is small, round 3-4 cm across and become pale orange to yellow when ripe. They are thin skinned. The flesh of the fruit is green. West Indian limes with larger, better fruit also occur



Distribution: They need a warm climate and are most common in coastal regions in the lowland tropics. They grow from sea level to 2200 m altitude in Papua New Guinea. They suit humid areas and can survive in poor soils. Light to medium well drained soils are best. It is drought and frost tender. It grows in Nepal to about 1800 m altitude. It can grow in alkaline soil. It suits hardiness zones 11-12.

Cultivation: They are often grown from seed but are better if grafted. Plants can be grown by cuttings. A spacing of 4-5 metres is suitable. When grown from seed, several shoots may develop from the one seed, which means the seedlings may be identical to the parent.

Production: Trees can start producing fruit quickly. They fruit in 5-6 years. They normally produce fruit all the year round. Fruit drop when mature. Black limes are sun dried limes. They are 2.5-4 cm across.

Use: They are mainly used for juice and drinks.
They can be used in pickles.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	91.0	133	0.7		0.25	4	40	0.1

Insects:

Agrilus occipitalis Esch.	Buprestidae (COL)	Larvae under the bark
Eudecatoma sp.	Eurytomidae (HYMEN)	Wasp forming galls
Papilio aegeus Don	Papilionidae (LEP)	Larvae of citrus butterfly
Phyllocnistis citrella Staint	Phyllocnistidae (LEP)	Citrus leaf miner
Planococcus citri (Risso)	Pseudococcidae (HEM)	Mealy bug

Diseases:

Sooty mould	Fungus	*Meliola citricola*
Pink disease	Fungus	*Phanerochaete salmonicolor*
Collar & root rot	Fungus	*Phellinus noxius*
Bacterial canker	Bacteria	*Xanthomonas campestris*

Pests:
Importance: Moderately common in coastal areas of Papua New Guinea

Names

English: Grapefruit
Tok pisin:
Tok ples:
Scientific name: *Citrus paradisi* Macf.
Synonyms: Probably now *Citrus x aurantium* Grapefruit gp
Plant family: Rutaceae



Description: A medium sized evergreen tree up to 10-15 m high. They spread 5 m across. The stem is stout and crooked. The branches hang down giving a rounded crown. The thorns are small. The leaves are dark shiny green and sword shaped. They can be 18 cm long. The leaves are leathery and they have rounded teeth along the edge. The leaf stalk usually has a broad wing. The flowers are creamy white and large. The flowers occur either singly or in clusters (2-20) in the axils of leaves. The flowers are 4-5 cm across. The fruit are large, yellow and in clusters. Fruit can be 9-15 cm across. Fruit are very juicy with a sweet-sour pulp. The juice sacs are large but closely packed. There are many cultivars.

Distribution: Plants grow from sea level up to 2000 m altitude in the tropics. They are frost tender. Plants prefer well-drained soils and a protected sunny position. Plants are drought tender. They do best in humid climates. It suits hardiness zones 9-11.

Cultivation: Plants can be grown from seed. The seed should be sown fresh. Trees are best grown by layering or grafting.

Production: Fruiting tends to be seasonal from April to August in the Southern hemisphere.

Use: The fruit is eaten as fresh fruit, or the juice is used in drinks.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	43.5	45	0.3		0.1	Tr	19	0.1

Insects:

Diseases:

Anthracnose	Fungus	*Glomerella cingulata* (Stonem)Spauld & Schr.
Bacterial canker	Bacteria	*Xanthomonas campestris*
Algal leaf spot	Alga	*Cephaleuros virescens*

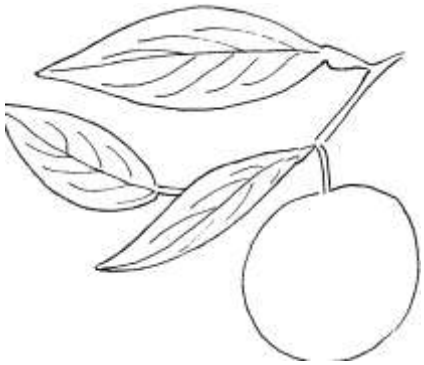
Pests:

Importance: Not widely grown in Papua New Guinea.

Names

English: Orange, Sweet orange
Tok pisin: Swit muli
Tok ples:

Scientific name: *Citrus sinensis* (L.)Osbeck
Synonyms: Probably now *Citrus x aurantium* Sweet Orange group
Plant family: Rutaceae



Description: An evergreen tree up to 8-10 m high. It spreads to 4 m across. The stem is short, stout and spiny. It has a dense, rounded crown. The leaves are dark green, sword shaped and tapering towards the tip. They are 5-15 cm long. The leaves have a sweet smell when crushed. The leaf stalks have narrow wings and the stalk is jointed to the blade. The flowers are white and have a scent. The flowers have 5 petals and occur either singly or in clusters. The fruit often remain green colour and don't turn orange when ripened below 600 m altitude in the tropics. The fruit are about 9 cm across. They have 10-14 segments.

Distribution: Not suited to very wet areas. Not suited to high altitudes. Seeds won't grow below 13 °C. They need a well drained, fertile, sandy soil. They are drought and frost tender. Trees need temperatures above 3-5°C to grow. It suits hardiness zones 9-11.

Cultivation: Trees are often grown from seeds but these do not breed true. Seeds grow most easily between 27°C and 32°C. It is better to use budded plants. Plants can also be grafted. Green fruit can be treated with ethylene to give an orange colour, if people think an "orange" fruit is not supposed to have green colour!

Production:

Use: The fruit is eaten fresh, and the juice used in drinks.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	86.8	197	0.94		0.1	21	53.2	0.1

Insects:

Diseases:

Pink disease	Fungus	*Phanerochaete salmonicolor*
Sooty mould	Fungus	

Pests:

Importance: Trees are seen scattered in many lowland areas in Papua New Guinea. Few good quality fruit are produced.

Names

English: Lemon
Tok pisin: Muli
Tok ples:

Scientific name: *Citrus limon* (L.) Burm.f
Synonyms: Probably now *Citrus x limon*
Plant family: Rutaceae

Description: A small evergreen tree with short spines. It grows to 7 m high and spreads to 3 m across. It branches freely. Young branches are often reddish. Leaves are about 5-12 cm long. They are green and drawn out to a point, with notched edges. The leaf stalk is usually not winged. The leaves do not have much of a scent. The flowers are white, with 5 petals and have a strong sweet smell. They are 4-5 cm across. The fruit is oval shaped and with a knob at the end. Fruit can be 7-15 cm long. The skin is fairly thin, rough and light yellow. The flesh is sour and the seeds are oval.



Distribution: Trees do not do well on the coast in the tropics but they grow well at about 1300 m and will grow up to 2200 m altitude in Papua New Guinea. They prefer a light to medium, well drained soil. They are drought resistant but most varieties are frost tender. They need a temperature above 3-5°C for growth. They suit temperate regions. It suits hardiness zones 9-11.

Cultivation: Many trees are seedlings. Better trees are grafted.

Production:

Use: The fruit is mostly too sour to eat fresh but the juice is used to make drinks.
The peel is candied.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	83.3	65	1.1		0.4	Tr	80	0.1
Juice	91.3	31	0.3		0.1	Tr	50	Tr

Insects:

Aonidiella aurantii Maskell	Diaspididae (HEM)	Red scale
Amblypelta theobromae Brown	Coreidae (HEM)	Amblypelta bug
Oribius cinereus Mshl.	Curculionidae (COL)	Shot hole weevil
Papilio aegeus Don	Papilionidae (LEP)	Orchard butterfly
Phyllocnistis citrella Staint	Phyllocnistidae (LEP)	Citrus leaf miner
Planococcus citri (Risso)	Pseudococcidae (HEM)	Citrus mealy bug
Rhinoscapha thomsoni Waterh.	Curculionidae (COL)	Weevil
Unaspis citri (Comst.)	Diaspididae (HEM)	White louse scale

Diseases:

Leaf spot	Fungus	*Ascochyta citri* Penz.
Sooty mould	Fungus	*Meliola citricola* Sydow
Pink disease	Fungus	*Phanerochaete salmonicolor*
Scab	Fungus	*Sphaceloma fawcettii*
Bacterial canker	Bacteria	*Xanthomonas campestris*

Pests:

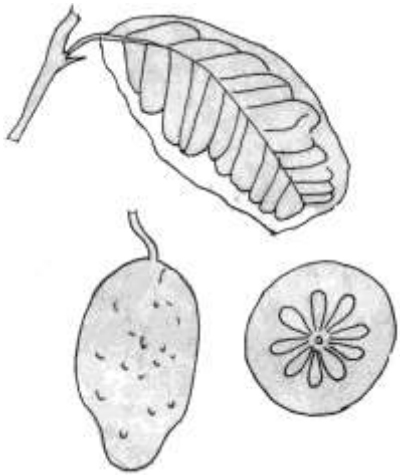
Importance: Less common than West Indian limes on the coast in Papua New Guinea but more common in highland areas.

Names

English: Citron
Tok pisin:
Tok ples:

Scientific name: *Citrus medica* L.
Synonyms:
Plant family: Rutaceae

Description: A small evergreen tree. It grows up to 3-5 m high and spreads to 2 m across. The stem is stout, erect and thorny. The leaves are green and 20 cm x 10 cm. The tree has fat spines. The leaves have teeth along the edge. The leaf stalk does not have wings. The flowers are white, star shaped and with 5 petals. They have a scent. The fruit are large and long, with a rough skin. The fruit grows to 15-25 cm long by 10-15 cm wide. The flesh is white. The fruit does not have a lot of juice.



Distribution: It prefers rich, moist soils. They should be in a protected sunny position. They are drought and frost tender. It suits hardiness zones 9-11.

Cultivation: Trees can be grown by seed, cuttings or grafting.

Production:

Use: The thick layer of inner white skin is used as candied peel.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	90.2	170	0.7		0.5		53	0.1

Insects:

Diseases:

Scab	Fungus	*Sphaceloma fawcettii*
Algal spot	Algae	*Cephaleuros virescens* Kunze

Pests:

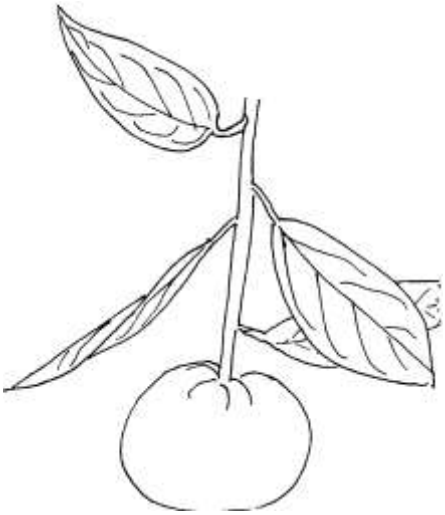
Importance: Fruit are sold in markets. Trees and fruit are only occasionally seen in Papua New Guinea.

Names

English: Mandarin, Tangerine
Tok pisin:
Tok ples:

Scientific name: *Citrus reticulata* Blanco
Synonyms:
Plant family: Rutaceae

Description: A small evergreen tree up to 4-8 m tall. It spreads to 2 m across. The stem is erect, branching and thorny. The leaves are dark green, and long and narrow in shape. They are 3-4 cm long. There is only a narrow wing on the leaf stalk. It has a few or no spines. The flowers are white and star shaped. They are 2.5-4 cm across and have a scent. Fruit are almost round and the skin peels off easily. The fruit are 4-8 cm long. The flesh is red, juicy and sweet.



Distribution: The hardiest of the citrus. It grows from sea level up to 2300 m altitude in the tropics. They do best between 800 m and 1200 m altitude. A well drained soil is needed. They also prefer a drier climate. It is drought and frost resistant. They need a temperature above 3-5 °C. It suits hardiness zones 9-11.

Cultivation: Often trees are grown from seed. Some breed true from seed. Seedling trees take a long time to start producing fruit. Budded trees are best. A spacing of about 8 m between trees is suitable. From one seed, several seedlings can grow. Using seedlings of seeds with 3 or more shoots helps produce trees true to type. Cuttings or layering can also be used.

Production: Fruit tend to be produced seasonally. The season is often from April to August in the Southern Hemisphere.

Use: The fruit are eaten fresh.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	87.6	184	1.5		0.8	42 RE	136	

Insects:

Black leaf-footed bug	Coreidae (HEM)	*Leptoglossus australis* (F).

Also scales, aphids, fruit flies and leaf miners.

Diseases:

Sooty mould	Fungus	*Meliola citricola* Sydow
Pink encrustation on stems	Fungus	*Podonectria sp.*

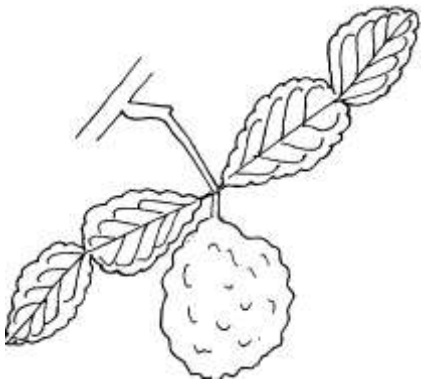
Pests:

Importance: Not widely grown in Papua New Guinea but more are being planted.

Names

English: Wild lime
Tok pisin:
Tok ples:

Scientific name: *Citrus hystrix* (L.) D.C.
Synonyms: Probable syn. *Citrus papuana* Bail.
Plant family: Rutaceae



Description: A low shrubby tree up to 6 or 8 m high. The trunk is thin and crooked. It has slender sharp thorns. The leaf petiole has very large lobes. The leaf is oval. The leaves can be 8-15 cm long by 3-5cm wide including the leafy stalks. The leaves are dark green and shiny above and pale and matt underneath. The flowers are small and white. The fruit are small (8 cm across) with a rough, thick skin and very little edible pulp inside. They are very acid. The peel of the fruit is very fragrant.

Distribution: It mainly occurs in lowland areas in the tropics. It suits hardiness zones 10-12.

Cultivation: It often now grows wild in coastal areas. It grows slowly.

Production: The tree flowers throughout the year but has most ripe fruit about June and July.

Use: The leaves and fruit are used to make drinks or to flavour food.
The fruit are eaten crystallised. The juice of the fruit is used for flavouring.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: A citrus of only minor importance in Papua New Guinea, but grown is some coastal areas.

Names

English: Sour orange
Tok pisin:
Tok ples:

Scientific name: *Citrus aurantium* L.
Synonyms:
Plant family: Rutaceae



Description: An evergreen tree up to 10-15 m high and with slender thorns. It spreads to 5 m across. The stem is stout and erect. It is covered with smooth greyish-brown bark. The leaf stalks have broad wings. The leaves are glossy green, oval and 10 cm long. The leaves taper towards the base and are paler under the leaf. There are spines in the axils of the leaves. The flowers are white and have a sweet smell. They are 2 cm across and there can be 1, 2 or a cluster, in the axils of leaves. The fruit is often green with a reddish tinge and fairly juicy but sour. The fruit are 5-7 cm long. The fruit is often rough skinned. The flesh is divided into segments with sour pulp.

Distribution: Mostly in coastal areas in the tropics. It is drought and frost resistant. It does best in a protected sunny position. It must have a temperature above 3-5°C to grow. It suits hardiness zones 9-11.

Cultivation: It is mostly grown from seeds. It can also be grown by cuttings. The seeds often produce several shoots.

Production:

Use: The fruit is bitter, therefore mostly used for marmalade or flavouring.
The fruit are used for peel and for sherry and wine.
The tree is used as a rootstock for budding or grafting other citrus on to.
The oil from the flowers is used for flavouring.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	86.0	205	0.9		0.5	4	53	
Peel								

Diseases:

Insects:

Aonidiella citrina Coq	Diaspididae (HEM)	Yellow scale

Pests:

Importance: Trees are scattered in a number of coastal areas in Papua New Guinea but fruit are not used and just left lying under the tree.

Names

English: Clymenia
Tok pisin:
Tok ples:
Scientific name: *Clymenia polyandra* (Tanaka) Swingle
Synonyms: *Citrus polyandra* Tanaka; *Citrus flaviflora* Peekel
Plant family: Rutaceae



Description: A citrus relative. The tree is 5-8 m tall. The leaves are large (18 cm x 6 cm) and simple. Young leaves have lobes. The leaves are more thin and papery than other citrus. The leaves taper towards the tip and have notched edges. The leaf stalks are short and without wings. It does not have thorns. The flowers are dark yellow and 2.5-3 cm across. They occur either singly, or as 2-4 together, in the axils of leaves. The fruit is yellow and the size of a large lime. They are 7-10 cm long by 6-8 cm wide. The flesh is edible. The skin of the fruit can irritate human skin. The seeds are flattish with lines on them.

Distribution: It is cultivated on Manus and New Ireland. It only occurs in PNG.

Cultivation: Trees are grown from seed.

Production: Some kinds have sweet pleasant tasting fruit.

Use: The fruit are eaten fresh.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

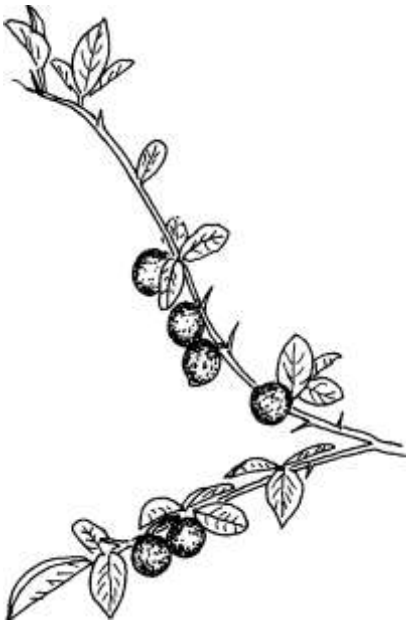
Pests:

Importance: In Papua New Guinea, fruit are of moderate importance in only a few limited areas. It could become important for breeding or rootstocks.

Names

English: Lime berry
Tok pisin:
Tok ples:

Scientific name: *Triphasia trifolia* (Burm.f.)P.Wils.
Synonyms: *Triphasia trifoliata* (L.) DC.
Plant family: Rutaceae



Description: A small spiny shrub up to 7 m high with slender zigzag twigs. There are 2 spines near each leaf. The leaves have 3 leaflets and are small and dark green with slightly toothed edges. Flowers are in axils of leaves and are white and about 1 cm across. The small berry is green when young and turns red when ripe. They are 1-2 cm across. The skin has glands in it and the 3 sections of the fruit have 1-3 slimy seeds inside.

Distribution: It grows in tropical Asia. They are widely distributed in the settled areas of the Philippines and are sometimes cultivated. Mainly in lowland coastal areas.

Cultivation: Plants are grown from seed.

Production:

Use: The fruit are eaten raw or cooked or made into jam or juice. They are preserved in syrup. They are also pickled.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: A minor cultivated fruit in some coastal villages in Papua New Guinea.

Names

English: **Scientific name:** *Corynocarpus cribbianus* (F.M.Bail.) L.Smith
Tok pisin: **Synonyms:** *Cyanocarpus cribbiana* F.M. Bail.
Tok ples: Mundroi **Plant family:** Corynocarpaceae



Description: A medium sized tree, up to 20 m high. The trunk can be straight or crooked. The bark is grey, with many long cracks along it. The twigs vary between angular and round, in cross section. The leaf stalk is 1-5 cm long and with a groove along it. The leaf is 9-26 cm long by 3-13 cm wide. (Leaves tend to be larger in the Solomons than in Papua New Guinea or Australia.) The leaf is pointed at the tip, and rounded near the base. The 8-11 pairs of veins curve, and join near the leaf edge. The veins have a dent inwards on the top of the leaf surface, and are raised, underneath the leaf. The leaf is thin textured but firm. The flower cluster is branched and about 20 cm long.
The individual flower stalks are about 2-4 mm long. The flowers have a scent, and are whitish or occasionally slightly pink or greenish. It produces clusters of fruit on the ends of the branches. The fruit are 10 -12 cm x 8-10 cm, and have one large seed inside. The fruit is green when young, and pink or cream when ripe. The fruit is shaped like a mango. This is an attractive tree, especially when fruiting. It is a good shade tree.

Distribution: Trees occur in well drained rainforest, up to 1800 m altitude, in the tropics near the equator. They have been recorded up to 2750 m above sea level. They occur naturally in Australia, Papua New Guinea, and the Solomon Islands. In the Solomons trees have been recorded up to 600 m above sea level.

Cultivation: Trees are grown from seed.

Production: The tree flowers and fruits throughout the year. The fruit fall when ripe, and are then collected from the ground. (It is important to only use fruit which fall naturally)

Use: The fruit are edible. They are sweet but not juicy. Fruit can be eaten raw or cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance: This is a quite important fruit in Papua New Guinea on Manus and on islands near Madang.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Baccaurea papuana* F.M.Bail.
Synonyms:
Plant family: Euphorbiaceae

Description: A small tree up to 12 m tall but often only 3-4 m high. The leaves are rather rough and clustered at the ends of the small branches. The leaves are 10 to 18 cm long and 6 to 8 cm wide. The edges of the leaves are wavy and the leaf is tapered towards the base. Flowers form long yellow stalks. These female flower stalks are 15-20 cm long. They have a sweet smell. The fruit hang on a chain (raceme) from the branches and main trunk. The fruit are 4-5 cm across and turn yellow when ripe. Male and female trees occur. The flower gives off a strong smell. The fruit have several seeds inside.



Distribution: They occur in several lowland areas from sea level up to 1600 m altitude. They are mainly eaten in Gulf and Milne Bay Provinces of Papua New Guinea.

Cultivation: They are both cultivated and grow wild from seed.

Production:

Use: The fruit is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance: An indigenous tree in Papua New Guinea, valued in some areas and at least worth evaluation. Several other Baccaurea species are grown and used in SE Asia.

Names

English: Tree tomato, Tamarillo

Scientific name: *Cyphomandra betacea* (Cavanilles) Sendtner

Tok pisin:

Synonyms:

Tok ples:

Plant family: Solanaceae



Description: This is a small fruit tree or shrub in the tomato and tobacco family. It grows as a shrub with soft wood and it grows up to 4 m high. The stem is 5-10 cm across. It is brittle and shallow rooted. The leaves are large (25 cm x 12 cm) and soft. They are heart shaped at the base. The flowers are 1-2 cm across with a sweet smell. They are in loose clusters near the ends of branches. Flowers are normally self pollinating but need wind. The fruit is about 6-12 cm long, the shape of a hen's egg and red or orange in colour. They hang off the ends of the branches. The skin of the fruit is somewhat tough but the flesh around the seeds is soft and juicy. The flesh varies between yellow and dark purple. The flesh is edible. The seeds are black, thin and nearly flat. They are edible.

Distribution: Tree tomatoes are subtropical and the normal range is 750 m to 2200 m altitude in the equatorial tropics but can be up to 3000 m in continental tropical regions. In Nepal it grows between 1000-1400 m altitude. It is slightly more hardy to cold temperatures than the tomato. They do best where average temperatures are about 15°-21°C. Plants don't fruit at low altitudes in the tropics. Plants do best where temperatures are above 10°C. Trees cannot stand much frost although mature trees will survive light frosts over short periods. They can't stand waterlogging or drought. Trees can grow under shade but do better in the sun unless it is too hot and dry. Deep, fertile, permeable soil is best. The trees can be grown in shade as well as in full sunlight. They need garden sites that are clean of disease and fertile. Plants don't fruit at low altitudes in the tropics due to constant high temperatures. They are susceptible to frost damage. The brittle branches make them easily damaged by wind and therefore needing sheltered sites. They need shelter from strong wind. It suits hardiness zones 9-11.

Cultivation: They can be grown from seeds or cuttings. Seeds grow better is they are washed and dried then placed in a freezer for 24 hours before planting out. Seeds produce a high branched erect tree. Cuttings produce a lower bushier plant. Cuttings of 60-90 cm long stalks are suitable. Cuttings should be taken from 1 to 2 year old wood which is 1-2 cm thick. Root cuttings can also be used. It has shallow roots therefore needs careful weeding. A spacing of 3 m apart is sufficient. Because the roots are easily damaged by nematodes, plants grafted or budded onto rootstocks that are resistant to nematode will live longer. The root rot fungus can mean it is difficult to get plants established in old gardens. The root knot nematodes also mean trees can die more quickly than they should, and sometimes this occurs in 3 or 4 years. High humidity can also cause stem rots. Young plants can be pruned to produce lower branches and fruiting. As fruit is produced on new branches, branches which have borne fruit can be pruned out. Flowers are self compatible so that pollination can occur within the one plant by wind.

Production: It commences bearing in its second year, when grown from seed. Fruit production is continuous throughout the year. Trees can bear hundreds of fruit year round. The tree is short lived lasting 5 or 6 years. Yields of 20 kg per plant are possible. Fruit are ready to harvest when the red or yellow colour develops. Fruit can be stored in a refrigerator for 10 weeks provided they are not frozen (3°C).

Use: The content of the berries is eaten. It can be eaten raw or cooked. The layer just under the skin can be bitter while the layer around the seeds is sweet. The seeds can be eaten, or strained out. The outside skin is easily removed by immersing fruit in boiling water for one or two minutes.
Sometimes the fruit is boiled to make a drink.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Seed								

Insects:

Bactrocera tryoni Frogg	Tephritidae(DIPT)	Queensland fruit fly

Diseases:

Leaf spot	Fungus	*Ascochyta sp.*
Very susceptible to root rot	Fungus	*Phytophthora palmivora* Butl.
	And	*Pythium sp.*
Leave and ripe fruit get anthracnose	Fungus	*Colletotrichum gloeosporoides* Penz.

Pests:

Importance: In Papua New Guinea it is quite often seen in the highlands and appears to be increasing in importance.



Names

English: Naranjilla
Tok pisin:
Tok ples:
Scientific name: *Solanum quitoense* Lam.
Synonyms:
Plant family: Solanaceae



Description: A small shrub up to 2 m high. It is hairy or thorny. The leaves are large (60 cm) and angular and hairy on both surfaces. They have thorns along the veins. Young leaves are purple. The flowers are pale violet and 2-4 cm across. The fruit are produced in clusters on the trunk. The fruit is bright orange in colour and covered with short hairs which can be removed by rubbing. The fruit is about 6 cm across. The flesh is yellow-orange to green. It has numerous small edible seeds.

Distribution: It suits the highland areas in the tropics. The best altitude is probably 800 to 2000 m. In the Andes it grows between 1,500-2,800 m altitude. The temperatures are 14-22°C. It is frost sensitive. It likes humidity. It grows well with rainfall of 1,500 mm per year. It suits hardiness zones 10-12.

Cultivation: They are grown from seeds. Seeds can be bought in stores or collected from the fruit. Seeds germinate in 25-40 days in warm soil. A spacing of 1-2 m is suitable. Plants can be grown from cuttings. Cuttings need to be about 15 cm long. The cuttings should be stored for a few days to allow the cut surfaces to heal before planting. Grafting onto more resistant root stocks is possible.

Production: Plants commence bearing fruit after 6-12 months. They bear fruit throughout the year.

Use: Fruit is eaten fresh or used for jams and drinks.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Collar rot	Fungus	*Athelia rolfsii*

Pests:

Importance: Plants are not common in Papua New Guinea, but they are increasing in importance in the highlands.

Names

English: Argus pheasant tree
Tok pisin: Mon
Tok ples:
Scientific name: *Dracontomelon dao* (Blanco) Merr. & Rolfe
Synonyms: *Dracontomelon puberulum* Miq.
Plant family: Anacardiaceae



Description: A large tree up to 50 m tall and with an umbrella shaped crown of leaves. It often has buttresses at the base. The leaves are hairy and compound with both the leaflets and leaves carried alternately. The leaves come one after the other on opposite sides and have 5 to 7 pairs of leaflets. The leaves are pointed at the end and bluntly pointed at the base. The leaflets have a smooth edge. Young leaves are reddish colour. The flowers are small white, with no smell and carried as several on a stalk. The fruit are yellow and round. The fruit is 2-3 cm across and has 5 flecks around it. There is little edible flesh around a flattened seed.

Distribution: A tropical plant. It grows in lowland rainforest and in valleys up to about 800 m. It occurs in high rainfall areas. It is common throughout the Philippines at low altitudes. The tree also occurs in other SE Asian countries. They are common from northern Luzon to southern Mindanao in the Philippines.

Cultivation: Trees are grown from seed. Many trees grow wild.

Production: It flowers and fruits throughout most of the year. Leaf fall and a fruit flush follows a dry spell. Trees can produce after 3-4 years. An average fruit weighs 17 g. The season normally coincides with the breadfruit and mango season. The fruit turn slightly yellow when ripe and the seed inside turns brown. If the seed inside is white, then the fruit is not ripe.

Use: The fleshy part of the fruit is eaten raw. It is sour. They are used as a sour relish.
The flowers and leaves can be cooked and eaten as a vegetable.
The kernel inside the seed is edible.
Caution: The sap of the tree may be irritating and /or poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Leaves								
Flower								

Insects:

Diseases:

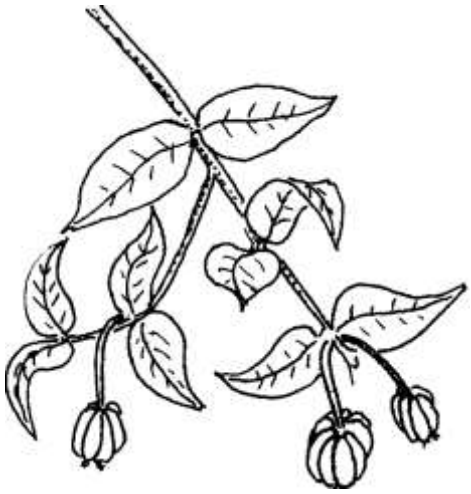
Pests:

Importance: The fruit are sold in markets. The tree is common in coastal areas of Papua New Guinea, but the popularity of the fruit varies. In Madang it is a most popular fruit.

Names

English: Surinam cherry
Tok pisin:
Tok ples:

Scientific name: *Eugenia uniflora* L.
Synonyms: *Eugenia michelii* Lamk.;
Plant family: Myrtaceae



Description: A small tree up to 5-7.5 m high. It is often a much smaller shrub. Branches often develop close to the ground. The branches are thin and wiry. It has attractive oval and pointed leaves. They are dark green and shiny. The leaves are 2.5-6 cm long by 1.5-3 cm wide. New leaves are dark purple or red. The flowers are small and white and the fruit is lobed and red. There is a single large seed inside. The fruit is about 3 cm across. The tree is used as a hedge plant. The flesh of the fruit is edible.

Distribution: It is a tropical plant. It is native to South America. It grows in the tropical lowlands from sea level up to about 800 m or higher in Papua New Guinea. In south India it grows to 1700 m altitude.
It is suited to a warm moist climate. Adequate moisture is needed during fruit development. It can be grown in the subtropics. It can stand some frost. Mature trees can withstand frosts down to -3°C. It suits hardiness zones 10-12.

Cultivation: Trees are mostly grown from seeds but can be grown from cuttings. Seeds should be fresh. Seeds grow in 3-5 weeks. Seed which are extracted from the fruit then washed and dried can be stored for a month. Seed can be sun dried for 7 days then stored in cool open containers for a few months. Seed can be planted 1-2 cm deep in nursery beds than transplanted when 20-30 cm tall. Trees can be trimmed and pruned to form hedges. Ground layering and suckers could probably be used to produce new plants. Tips from trees with better fruit types can be grafted onto seedling root stocks.

Production: It is a slow growing plant. Several crops of fruit are produced each year. Flowers or fruit can be on the tree throughout the year in tropical locations. Trees start to produce fruit after about 3-4 years. Fruit are mature 5-6 weeks after flowering.

Use: The ripe fruit is eaten fresh. It can be cooked or used for jams and other products.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Scab of fruit	Fungi	*Pestalotia eugeniae* Thuem.
	And	*Pyrenochaeta sp.*

Pests:

Importance: Trees have been grown and distributed in some coastal areas in Papua New Guinea.

Names

English: Sweet cherry, Beach cherry
Tok pisin:
Tok ples:

Scientific name: *Eugenia reinwardtiana* (Blume)DC
Synonyms: *Eugenia carissoides* F. Muell.
Plant family: Myrtaceae



Description: A tree up to 3-6 m tall. It spreads 0.5-2 m across. The bark is smooth and flaky. It is pale brown. The young shoots have short hairs pressed against the stem. The leaves are simple and 2-9 cm long by 1-4.5 cm across. They are smooth and have oil dots along them. The leaf stalks are short (0.2-0.4 cm long). The leaves are fairly thick with a blunt tip. The leaves are shiny on the upper surface. Young leaves are bronze red. The flowers are mostly 1-3 together. The flowers are white and about 1.2 cm across. Both male and female parts occur on the one flower.
The fruit occur either singly or in bunches in the angles of leaves. The fruit are 1.5-2.1 cm long by 1.3-2.3 cm wide. When ripe the fruit are red. There is one seed inside. The seed is 0.7-1.2 cm long. The flesh is edible.

Distribution: It is native to NE Australia. It is a tropical rainforest species. Often it occurs in coastal scrub. They can tolerate salt laden winds. They require a well drained soil. Trees will grow in full sunlight or heavy shade. They can tolerate very slight frosts.

Cultivation: They can be grown from seed. They can also be grown from cuttings but the cuttings are slow to form roots.

Production: Trees are very slow growing but commence flowering while still small. Trees flower and fruit throughout the year. Most commonly flowering is June to February with fruit maturing August to March.

Use: The flesh of the fruit is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

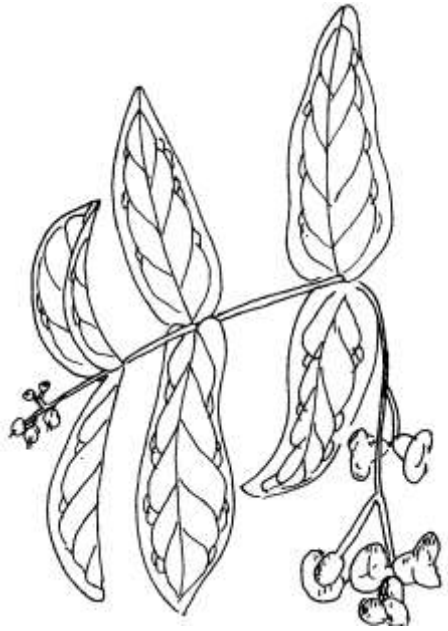
Importance: It is reported to be in some areas in Western Province in Papua New Guinea.

Names

English: Watery rose apple
Tok pisin:
Tok ples:

Scientific name: *Syzygium aqueum* (Burm.f.)Alst.
Synonyms: *Eugenia aquea* Burman f.
Plant family: Myrtaceae

Description: It mostly occurs as just a small shrub with branches near the base. It is 5-8 m tall. But it can occur as a tree up to 10-30 m high with a short crooked trunk. The trunk can be 70 cm across. The twigs are angular and carry simple opposite leaves. The leaves are somewhat narrow and pointed at both ends and they clasp the stem without a stalk. They are stiff. They are from 5 to 23 cm long by 6 cm wide. They have a heart shaped base. The leaves have many oil dots. The flowers are yellowish green. They are about 3 cm across. The flowers occur in many flowered clusters in the angles of leaves. They can also be on the ends of branches and on side shoots from stems. Flowers and fruit are slightly scented. The fruit is a fleshy yellow or red berry which is bell shaped. The fruit is about 3-5 cm across. It has a crater in the end with a long thread in it. The fruit is waxy and crisp and is often seedless. When seeds occur there can be one or more seeds. The fruit is edible.



Distribution: It occurs in many tropical countries. In grows in lower montaine forest. It grows from sea level to 1600 metres near the equator. It grows well in wet places but needs a well drained soil. They can grow in poor alkaline soils. They are found in Samar in the Philippines growing in areas of shrub and forest at low and medium altitudes. Plants are sensitive to frost. It suits hardiness zones 10-12.

Cultivation: Trees can be grown fairly easily from cuttings but can also be grown by air layering or budding. Buds do not always continue to grow successfully. A spacing of 6-8 metres between trees is suitable. Where seeds occur, plants can be grown from fresh seed. Fruit from these plants can be more oily and acidic.

Production: Fruiting is seasonal but there can be 2 or 3 crops a year. In the southern hemisphere flowering is often about October with fruit from October to January. Fruit develop quickly.

Use: The fruit are eaten raw.
They are also used for drinks.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Coccus viridus	Coccidae (HEM)	Green scale

Diseases:

Pests:
Importance: It is moderately common in lowland areas of Papua New Guinea and suits drier areas than Malay apple.

Names

English: Malay-apple
Tok pisin: Laulau
Tok ples:

Scientific name: *Syzygium malaccense* (L.)Merr. et Perry
Synonyms: *Eugenia malaccensis* L.
Plant family: Myrtaceae



Description: An evergreen tree 5 to 25 m tall. It spreads out to 4 m across. Trees tend to branch near the base. Leaves are simple, thick and leathery and shiny on both surfaces. They are large and oval. Leaves can be up to 25-30 cm long and 12 cm wide. The leaves have a vein around the edge of the leaf. Flowers are produced on old wood and on the trunk as well as in the angles where leaves join and at the ends of branches. Flowers are purple, crimson or white and 2.5 cm across. They mostly occur in dense clusters giving a brilliant display. The red stamens are often fallen under the tree. The fruit is rounded or oblong and 5-6 cm across by 6-8 cm long. The fruit has white flesh around a large brown seed. The seed is about 1.3 cm by 1.7 cm. Some kinds are seedless. The skin of the fruit is red or pink with darker stripes. The fruit are edible.

Distribution: They grow in coastal areas in the tropics and up to 1000 m altitude. It is a rainforest species. They need fertile soil, plenty of moisture, and good drainage. They are sensitive to frost. It does best in an open sunny position. It can tolerate drought but does best where there is an absence of drought. They occur in NE Queensland in Australia and across Malesia. They have also been introduced into other regions. It suits hardiness zones 10-12.

Cultivation: Trees are normally grown from seed. Seeds need to be fresh. Where termites are a problem damaging seedlings, growing them in light shade reduces the problem. Plants can be grown by budding, grafting, layering or cuttings. Aerial layering is probably the most common method for vegetative propagation. Budding onto rootstocks of the same species have proven successful, but they are rarely successful if rootstocks of related species are used. A spacing of 10 m between trees is suitable.

Production: Flowering and fruiting is seasonal. In the southern hemisphere flowering is about October to November. Fruit ripen in 2-3 months. The fruit are ripe January to February.

Use: The fruit can be eaten fresh or cooked. They are also used in jam and pickles.
The young leaves are eaten. The flowers have also been recorded as being eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	91.1	105	0.4		0.4		15	
Leaves								

Insects:

Bactrocera sp.	Tephritidae (DIPT)	Fruit fly larvae
Coccus viridus	Coccidae (HEM)	Green scale
Lasiodactylus notabilis Oliff.	Nitidulidae (COL)	
Cryptophasa sp nr *arithmologa* Meyr.	Xyloryctidae (LEP)	

Diseases:

Sooty mould	Fungi	*Chaetothyrium womersleyi* Hansf.
	And	*Brooksia tropicalis* Hansf.

Importance: A common village fruit tree in coastal areas of Papua New Guinea.

Names

English: Java apple
Tok pisin:
Tok ples:

Scientific name: *Syzygium javanicum* Miq.
Synonyms: *Eugenia javanica* Lam.
Plant family: Myrtaceae

Description: A tree which grows 5-15 m tall. It often has branches near the base. The leaves are smooth on both surfaces. It has a short leaf stalk. Fruit are usually green but can be pink or red. White fruited kinds are often seedless while pink fruited kinds can have 1 or 2 seeds. The fruit are pear shaped. The skin of the fruit has a waxy feel. The fruit can be 12.5 cm long.



Distribution: It needs a fertile soil. In south India it grows to 1200 m altitude.

Cultivation: Plants can be grown by seed. Seed need to be sown while fresh. Seedless kinds are grown using air layering. Where branches are low to the ground layering in the soil can be used.

Production: Trees start to produce fruit while still small.

Use: Fresh fruit are eaten raw. They are also made into sauce.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English: Rose apple
Tok pisin:
Tok ples:

Scientific name: *Syzygium jambos* (L.)Alston
Synonyms: *Eugenia jambos* L.
Plant family: Myrtaceae



Description: An evergreen tree. It grows up to 7.5-15 m tall and with a spread of 4 m. It can be a small shrub. The stem is erect and 20-40 cm across. The branches hang downwards. The bark is greyish-green. The young twigs are either flattened of somewhat square in cross section. The leaves are simple, thick and shiny. The leaves are narrow and pointed (10-20 cm long and 3-4 cm wide). They taper towards both ends. Young leaves are brownish red coloured. The leaves have 16-18 pairs of side veins which join near the edge of the leaf. The leaf stalk is 1 cm long. The flowers are large (4-5 cm) and greenish-white and fluffy. They occur in clusters at the ends of branches. The fruit is rose scented and apple like. They are dull yellow and tinged pink. Fruit are 4 cm across. The fruit have a distinct crown at the end. They contain 1 or 2 large seeds. The seeds are pale brown. The fruit is edible.

Distribution: A tropical plant. It needs adequate moisture and suits the warm moist tropics. It can't stand waterlogging. It prefers a rich well composted soil but will do well on poorer soils. It does best in an open sunny position. It is drought and frost tender. It is often along stream banks. It does well near the sea shore. Young plants need shade and moisture but established trees can tolerate harder conditions. It probably grows up to about 1200 metres above sea level in equatorial regions but near the altitudinal and latitudinal limits it produces no fruit. Trees can grow on a variety of soils. A pH between 5.5 and 7 is recommended. In Nepal it grows between 600-1400 m altitude. It suits hardiness zones 10-12.

Cultivation: Plants can be grown from seed. Seeds germinate well and have no dormancy. Seeds often give rise to more than one seedling. These can be carefully separated when young. As fruit quality varies it is best to preserve better kinds of trees using vegetative propagation methods. Plants can be grafted or budded if needed. Cuttings root fairly easily in sand. Tip cuttings are suitable. Trees need to be 6-8 metres apart.

Production: Trees grow slowly. They start bearing when 4-5 years old. Fruiting is normally seasonal but over a long season. In the northern hemisphere it flowers from April to May and fruit ripen July to August.

Use: The fruit are eaten raw. They are poor as a dessert fruit but because of the sweet rose smell are often crystallised and used in sweets. They can be used for jams and jellies. (It is good to mix with other fruits as rose apple helps the jam to set.)

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	80.4	105	0.6		0.1	34	27	0.1

Insects:

Green scale	Coccidae (HEM)	*Coccus viridus*

Diseases:

Sooty mould	Fungi	*Chaetothyrium womersleyi* Hansf.
	And	*Brooksia tropicalis* Hansf.

Importance: Not widely grown or used in Papua New Guinea.

Names

English: Pink satinash
Tok pisin:
Tok ples:

Scientific name: *Syzygium sayeri*
Synonyms: *Eugenia sayeri*
Plant family: Myrtaceae

Description: A tree. It grows up to 35 m tall. The leavess are simple. They are 7-16 cm long and smooth. Usually there are 2 veins near the edge of the leaf. Oil dots are visible on the leaves. The fruit are 3-4 cm acrpss. The hang in bunches on special branches. These are usually within the crown of the tree. There is one seed inside. The seed is 1-2 cm long. The flesh of the fruit is edible

Distribution: It grows in lowland and upland rainforest in north east Queensland in Australia.

Cultivation:

Production: The fruiting season is mostly November to April.

Use: The fruit is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English: Lockerbie Satinash
Tok pisin:
Tok ples:

Scientific name: *Syzygium branderhorstii* Laut.
Synonyms:
Plant family: Myrtaceae

Description: A tree which grows up to 10 m tall. It has a rounded dense crown of leaves. The small branches are round in cross section. The leaves are oblong and thick. They are14-18 cm long by 6-9 cm wide. They are dark green on the upper surface and paler underneath. The flowers are small and cream to red coloured. They occur in large numbers in clusters on the trunk and larger branches. The fruit is oval and about 4 cm across. It may vary between white to dark purple. The fruit are edible.



Distribution: It occurs in northern Queensland and in Papua New Guinea. It occurs in the lowland rainforest.

Cultivation: Plants need protection when young. They need plenty of watering.

Production: Plants grow less quickly in subtropical regions. Flowers are produced September to November and fruit are ripe December to March.

Use: The fruit are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Fruit (Continued)

English name	Tok Pisin	Scientific name	Page
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White apple		*Syzygium forte* subsp. *forte*	**434**
Java apple		*Syzygium samarangensis*	**435**
Red bush apple		*Syzygium suborbiculare*	**436**
Bamaga Satinash		*Syzygium tierneyanum*	**437**
Governor's plum		*Flacourtia indica*	**438**
Thornless rukam	Lovi-lovi	*Flacourtia inermis*	**439**
Coffee plum		*Flacourtia jangomas*	**440**
Rukam		*Flacourtia rukam*	**441**
Red raspberry		*Rubus fraxinifolius*	**442**
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Garden strawberry		*Fragaria x ananassa*	**449**
Purple passionfruit		*Passiflora edulis*	**450**
Banana passionfruit		*Passiflora tripartita* var. *mollisima*	**452**
Yellow granadilla		*Passiflora laurifolia*	**453**
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	Pakal	*Parartocarpus venenosus*	**457**
Tooth-leafed winter cherry		*Physalis angulata*	**458**
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Canistel		*Pouteria campechiana*	**460**
		Pouteria maclayana	**461**
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Wild olive, Yellow plum		*Ximenia americana* var. *america*	**481**
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Nonda plum		*Parinari nonda*	**483**
Santol		*Sandoricum koetjape*	**484**

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Names

English: Fibrous satinash, Apricot Satinash

Scientific name: *Syzygium fibrosum* (Bailey) T. Hartley & Perry

Tok pisin:

Synonyms: *Eugenia fibrosa*

Tok ples:

Plant family: Myrtaceae



Description: A tree which grows about 5-10-15 m tall. It has a rounded canopy of leaves. The new leaf growth is bright purplish red. (This is more so when plants are in sunny positions.) The branches usually hang downwards. The bark is smooth and mottled brown-grey. The leaves are sword shaped and thick and leathery. They are 6-15 cm long by 4-5 cm wide. They are dark green and shiny on the upper surface and paler underneath. The tip is pointed. The flowers occur in clusters on the ends of branches.
The flowers are dull orange to brown. They have many stamens which can be 2.5 cm long giving the flower a fluffy appearance. The fruit are round and bright red when ripe. They are fleshy and 2 cm across. The crown at the end is prominent. The fruit have one seed inside. Fruit can often be seedless. The fruit is edible.

Distribution: Trees occur in northeast Queensland in Australia and in Papua New Guinea. It is a rainforest species and also occurs in monsoon vine forest. It often grows near stream banks and in shady positions. They need well drained soils. They benefit from organic matter in the soil.

Cultivation: Plants are grown from seed. They can be grown from cuttings but the cuttings are slow to strike.

Production: Trees flower from April to December and the fruit are ripe July to January.

Use: The fruit is eaten raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English: White apple
Tok pisin:
Tok ples:

Scientific name: *Syzygium forte* subsp. *forte*
Synonyms: *Eugenia fortis*
Plant family: Myrtaceae

Description: A graceful tree. It grows up to 15 m tall. It has a round crown of leaves. The bark is papery. The young shoots are deep bronze colour. The leaves are thick with a blunt point. They are 14 cm long by 8 cm wide. They are bright green on the upper surface and dull underneath. The flowers are white. They occur in clusters at the ends of small branches. The fruit are oval and white and grow to 6 cm across. The fruit are edible. The fruit have one seed inside and it is 1-2.5 cm long.

Distribution: It occurs in northern Australia and in Papua New Guinea. It grows near the seaside on sandy soils. It can tolerate salt laden winds. They cannot tolerate poorly drained soils.

Cultivation: Plants are grown from seed.

Production: Plants are slow growing.

Use: The fruit are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English: Java apple

Scientific name: *Syzygium samarangensis* (Blume) Merr. & Perry

Tok pisin:

Synonyms: *Eugenia javanica* Lam. in part

Tok ples:

Plant family: Myrtaceae

Description: A tree up to 15 m high which branches near the base giving a spreading open tree. The leaves are smaller (25 cm x 10 cm) and more pointed than Malay apple and on short stalks. Flowers are about 3 cm wide and white. They are on leafy twigs. It produces clusters of attractive glossy pink waxy looking fruit. Fruit are 3 cm long and 3-5 cm wide. At the end of the fruit there is a cavity almost enclosed by four lobes. The fruit has a waxy skin and crispy flesh.

Distribution: Trees grow in coastal areas in the tropics. They need a deep fertile soil. It needs adequate rainfall and some humidity. It suits hardiness zones 11-12.

Cultivation: Plants are mainly raised from seeds. Fresh seeds must be used. Often few seeds are produced. They can be propagated by air layering or budding. Girdling of the shoots and using rooting hormones enables cuttings to be used for propagation. A spacing of 8-10 m apart is suitable.

Production: It is fast growing. Trees start fruiting when quite small. Fruit production is seasonal. Normally large numbers of fruit are produced.

Use: The fruit are eaten fresh.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	90.3	94	0.7		0.8	0	8	

Insects:

Diseases:

Pests:

Importance: This is not a common fruit tree in Papua New Guinea. Where it occurs fruit quality is poor.

Names

English: Lady apple, Red bush apple

Scientific name: *Syzygium suborbiculare* (Benth.) T. Hartley & Perry

Tok pisin:

Synonyms: *Eugenia suborbicularis* Benth.

Tok ples:

Plant family: Myrtaceae

Description: A tree. It grows 8-12 m tall. It has an upright form and a rounded crown. The bark is slightly rough, tightly attached and is grey-brown. The leaves are oval to roundish, opposite and smooth. They are 7-19 cm long by 4-13 cm wide. They are glossy and dark green on the upper surface and paler underneath. They have a short pinted tip. The flowers are large. They have numerous stamens. The flowers are 3-5 cm long by 2.5-3 cm wide and carried in dense clusters at the ends of branches. The fruit can occur either singly or in bunches. The fruit is round but flattened and fleshy. It is 3-7 cm long by 3.5-9 cm wide. It has distinct ribs and is red when ripe. The flesh around the seed is 1 cm thick. It is crunchy and bluish-pink in colour. It is edible. There is one large seed inside. The seed is about 3.5-5 cm across. It looks like a large apricot stone.

Distribution: It is a tropical tree. It occurs as an understorey tree to open forest. It also grows in rainforest. It occurs on well drained soils and sandy soils. It can tolerate fire because it produces a lignotuber under the ground. It can regrow from this tuber. During drought it can lose most of its leaves. It tolerates salty winds.

Cultivation: It can be grown from fresh seed. Branches are low making harvesting easy. Fruit should be harvested when ripe before fruit fall.

Production: Seedling growth can be rapid. Flowering occurs July to October in Australia and fruiting is October to February. It can produce fruit during any month but tends to fruit during the wet season. The quality of the fruit varies between trees.

Use: The fruit are eaten raw.
They can be used in cooking or for sauces and relishes.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	89.3	146	0.6		1.2		8	0.2

Insects:

Diseases:

Pests:

Importance: A popular food in northern Australia.

Names

English: Bamaga satinash, River cherry
Tok pisin:
Tok ples:

Scientific name: *Syzygium tierneyanum*
Synonyms: *Eugenia tierneyana*
Plant family: Myrtaceae



Description: A small tree. It grows to 10-25 m tall. It has a spreading dense crown. The bark is flaky. The young shoots are coppery brown. The leaves are sword shaped and thin. They are smooth and without hairs. They are 9-18 cm long by 6 cm wide. They are dark glossy green on the upper surface and paler underneath. The flowers are fairly large. They are cream and borne in small clusters in the axils of the older leaves. The fruit are round and 2 cm across. They are usually pink or red but may be white. The fruit are edible. There is one seed inside. It is 5-8 mm across. The cut seed is red-purple.

Distribution: A tropical tree. It occurs in north east Queensland in Australia. Plants will grow in a range of soils. They need plenty of moisture. They occur in rainforests.

Cultivation: Plants can be grown from fresh seed.

Production: In Australia the fruit are ripe in January and February.

Use: The fruit are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

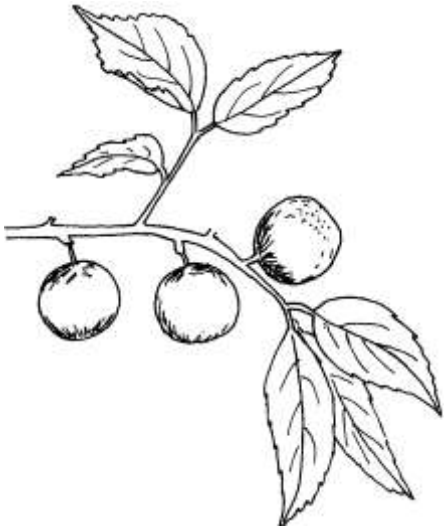
Diseases:

Pests:

Importance:

Names

English: Governor's plum
Tok pisin:
Tok ples:
Scientific name: *Flacourtia indica* (Burm.f.)Merr.
Synonyms: *Flacourtia ramontchii* L'Her.
Plant family: Flacourtiaceae



Description: A shrub or small tree. It grows 5-15 m high. The trunk is crooked and low branched and armed with scattered slender spines. The leaves are alternate, pointed at the base and rounded at the tip. The edges of the leaves toothed with rounded lobes. Leaves are dark green on top and pale green underneath. They are 6-17 cm long and 3-7 cm wide. Male and female trees occur. The flowers are small and white, occur singly or in pairs in the axils of leaves or near the ends of short branches. The fruit are rounded, fleshy, purple or nearly black. They are smooth and about 1 cm across. The flesh is yellowish, juicy and acid. There are 6 to 10 small flattened seeds inside.

Distribution: They are found in the Philippines. They thrive in dry shrubby areas at low altitudes. Trees grow in coastal areas and up to 700 m or higher. They suit drier areas. In Yunnan, China it grows between 700-1500 m altitude. It grows in subtropical broadleaved evergreen forest. It suits hardiness zones 10-12.

Cultivation: Trees are normally grown from seed. Groups of trees containing both male and female trees need to be grown from root suckers or by budding. A spacing of 12-16 m apart is needed.

Production: Fruit matures in 60 days from pollination.

Use: The fleshy pulp of the fruit is eaten raw when ripe.
They are also cooked and eaten.
They can be used to make jelly.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	69.5	452	0.5		1.2	15	14	

Insects:
A caterpillar of an unidentified moth eats the leaves.

Diseases:

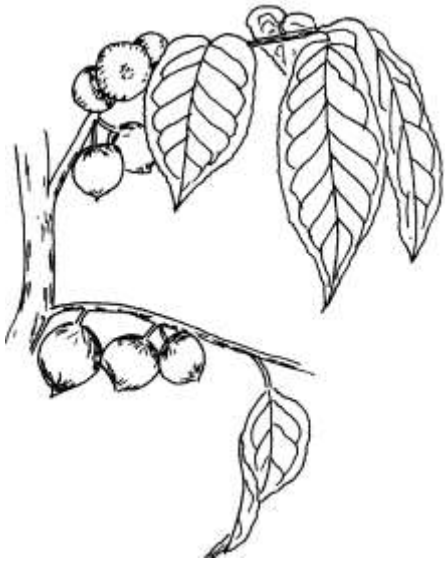
Pests:

Importance: The fruit are eaten especially by children. A fruit tree occasionally seen in lowland areas of Papua New Guinea.

Names

English: Thornless rukam
Tok pisin: Lovi-lovi
Tok ples:

Scientific name: *Flacourtia inermis* Roxb.
Synonyms:
Plant family: Flacourtiaceae



Description: It is a small tree. It grows up to 15 m high. It is without spines on the trunk. The trunk is often crooked. Leaves are 10-20 cm long and 5-9 cm wide. New leaves are deep red. Flowers have both sexes. The fruit is round, green when young and dark red when ripe. It is about 2-3 cm across. It has 5 seeds inside.

Distribution: Trees occur in New Britain in Papua New Guinea and some other coastal areas. They grow from sea level up to about 1300 m. They can grown on a variety of soils.

Cultivation: Trees are mostly grown from seed. It is better to grow them by marcottage or budding. Seedlings take up to 18 months to be ready to plant out. A spacing of 12-16 m apart is needed. Seeds are small.

Production: Fruit is mostly ready about May to July in the Southern hemisphere.

Use: Many kinds have sour fruit so they are often cooked or used for jam, jellies, syrups and preserves.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Closteria rubida Druce.	Notodontidae (LEP)	Caterpillars of moth chewing leaves

Diseases:

Leaf spot	probably Fungus	

Pests:

Importance: Trees occur occasionally in coastal areas of Papua New Guinea.

Names

English: Coffee plum
Tok pisin:
Tok ples:

Scientific name: *Flacourtia jangomas* (Lour.) Raeusch
Synonyms: *Flacourtia cataphracta* Roxb ex Willd
Plant family: Flacourtiaceae

Description: A small deciduous tree up to 10 m tall. It spreads to 3 m across. The stem is erect and branching. Young tree parts can have large branched spines. The leaves are 5-10 cm long and 2-4 cm wide. Young leaves are red and glossy. There are several flushes of new growth during the year. Old trees often do not have thorns on the trunk or branches. Flowers are small and in clusters in the axils of leaves. They have a strong sweet smell. The fruit is a dull brownish red with a greenish yellow pulp. Fruit are about 2 cm across.



Distribution: It is a tropical plant. In regions near the equator they are grown as a fruit tree up to about 600 m. They would probably grow up to about 1500 m. It also occurs wild. It does best in rich, moist soil. It needs a protected site and a partly shaded position. It is damaged by drought and frost. It suits hardiness zones 10-12.

Cultivation: Trees are mostly grown from seed but better kinds should be propagated by grafting. They can be grown by cuttings. It produces root suckers and these can be used for planting. A spacing of 14-16 m apart is needed.

Production: Fruiting is seasonal. Fruit probably occur from May to October. Rubbing the fruit to bruise them improves eating quality.

Use: The ripe fruit are eaten fresh. Because they are sour, they are often used for jams or preserves.
The young red leaves are edible. They contain tannin. They are also used for tea.
Young roots are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Leaves								
Roots								

Insects:

Diseases:

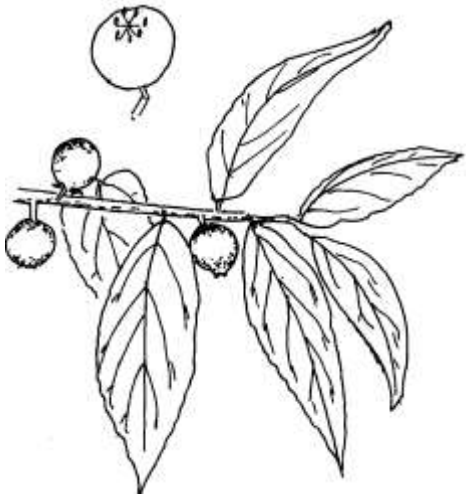
Pests:

Importance: Trees have been planted in a few coastal areas in Papua New Guinea.

Names

English: Rukam
Tok pisin:
Tok ples:

Scientific name: *Flacourtia rukam* Zoll. and Mor.
Synonyms:
Plant family: Flacourtiaceae



Description: A tree reaching a height of 5-20 m and about 30 cm across the trunk. It can be 40 m tall with a trunk 1 m across. The old branches are usually crooked with furrows along them. The leaves are 5 to 15 cm long and 4-7 cm wide and pointed at the tip. Young leaves are reddish brown and leaves are shiny on top. The young stems are very rough. The flowers are very small and occur in greenish yellow clusters in axils of leaves. They occur with separate sexes in separate flowers. The fruit is a flattened berry with soft juicy flesh and a red colour. The trunk in young trees has many simple spines. The leaf size and shape varies a lot.

Distribution: It grows in humid tropical conditions. It can grow in shade as well as full sun. They occur in Benguet to the southern parts of the islands of the Philippines. Trees occur in tall lowland rainforest. They probably grow from sea level up to about 1600 m in Papua New Guinea. In Samoa it grows from 50 to 550 m altitude. It suits hardiness zones 10-12.

Cultivation: Trees are mostly self sown. They grow from seed. Seed germinate quickly and easily. Trees can be grown from seed or root suckers. Root suckers are commonly produced. Fruit are made sweeter by rubbing them after harvest. Trees can also be budded or grafted. Trees are spaced 8-12 m apart.

Production: Fruiting is seasonal. There can be several flowering and fruiting flushes during the year. Fruit are often produced about Sept to Nov in the southern hemisphere. Fruit take 14 weeks to ripen.

Use: The fruit are eaten raw when ripe. It can be sour and is used for jam, sauce or pickles.
The young leaves and shoots are edible.
The young roots are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	77	345	1.7					
Leaves								
Roots								

Insects:

Diseases:

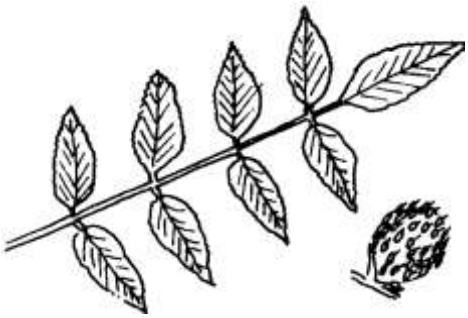
Pests:

Importance: In Papua New Guinea, trees occur but are not very common in coastal areas.

Names

English: Red raspberry
Tok pisin:
Tok ples:

Scientific name: *Rubus fraxinifolius* Poir.
Synonyms:
Plant family: Rosaceae



Description: A scrambling shrub reaching 2 to 4 m high. It is armed with fair sized sharp spines. The leaves have leaflets on opposite sides of the stalk with 3 to 11 leaflets. The edges are toothed and they are pointed at the tip and slanting at the base. The flowers are white and the berries borne in clusters. The berries are bright red and fairly juicy but tasteless. The fruit are 0.8-1.4 cm across.

Distribution: They grow in damp forests at low and medium altitudes up to 1800 m. They occur in the Philippines. It grows in thickets near sea level in Taiwan.

Cultivation:

Production:

Use: The berries are eaten raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Gymnopholus marquardti Hllr.	Curculionidae (COL)	Weevils
Gymnopholus interpres Hllr.	Curculionidae (COL)	

Diseases:

Rust	Fungus	*Hamaspora acutissima* Sydow

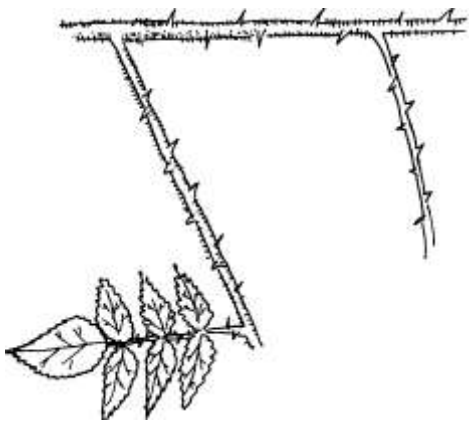
Pests:
Importance: The plants are common in Papua New Guinea. The fruit is mainly eaten by children.

Names

English: Black raspberry
Tok pisin:
Tok ples:

Scientific name: *Rubus lasiocarpus* Smith
Synonyms:
Plant family: Rosaceae

Description: A long white cane with large thorns along it. It produces black fruit.



Distribution: It has been introduced from India. It grows between 800 m and 2600 m altitude.

Cultivation: It grows wild and is cultivated. New plants do not grow easily from canes.

Production:

Use: The fruit is eaten or used for drinks.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

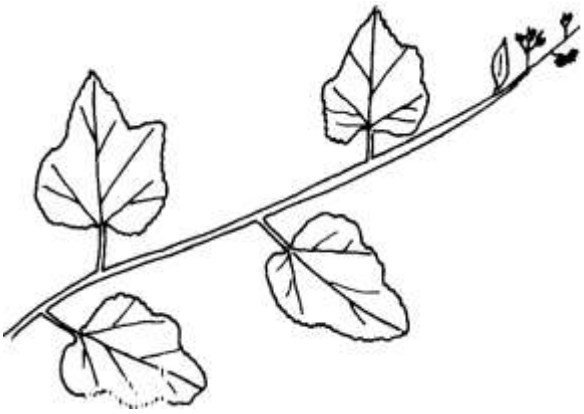
Importance: It is gaining importance as a fruit around compounds and houses in the highlands of Papua New Guinea.

Names

English: Molucca bramble
Tok pisin:
Tok ples:

Scientific name: *Rubus moluccanus* L.
Synonyms:
Plant family: Rosaceae

Description: A scrambling shrub reaching 2 to 3 m high. They can be 10-15 m long. The stems and leaves are armed with medium sized spines. The leaves are large and lobed and the upper surface hairy. The leaves can be 25 cm long and 25 cm wide. They are broadly heart shaped with 5 indistinct lobes. The flowers are white and borne in clusters. The berries are about 1-3 cm across. They are red and with little flavour.



Distribution: They occur in mountains in the Philippines. They are common in the highlands of Papua New Guinea from sea level to 2700 m.

Cultivation: They both grow wild. They could be grown by division of the root.

Production:

Use: The berries are eaten raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: The plants are common in Papua New Guinea. The fruit is mainly eaten by children.

Names

English: Rose-leaved raspberry
Tok pisin:
Tok ples:

Scientific name: *Rubus parvifolius* L.
Synonyms:
Plant family: Rosaceae

Description: An evergreen shrub. It is weakly climbing or trailing. It grows to 60 cm high and spreads to 1-3 m across. The stem is trailing and prickly The leaves have 3 leaflets. The leaflets are 2-6 cm long. The leaves have teeth around the edge. These have a silvery undersurface. The flowers are small and pink. The fruit are red. They have a few, large, pointed grains.

Distribution: It will grow on most soils. it is drought and frost resistant.

Cultivation: Plants can be grown by cuttings.

Production:

Use: The fruit are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

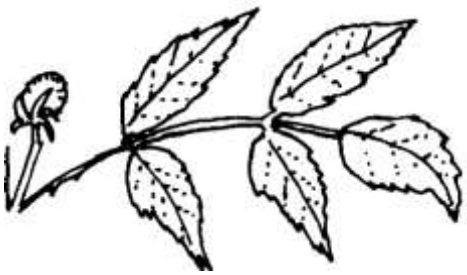
Importance:

Names

English: Rose-leaf bramble
Tok pisin:
Tok ples:

Scientific name: *Rubus rosifolius* Smith
Synonyms:
Plant family: Rosaceae

Description: A spiny evergreen shrub. It grows to 3 m high and spreads to 3 m across. The stem is trailing and forms suckers. The leaves have 3 to 7 leaflets on opposite sides of the stalk. These are either smooth or hairy with lobed edges. The leaflets are 1-9 cm long. The flowers are white and 3 cm across. The fruit are red and about 1.5 to 2 cm across. They occur on their own or in clusters. They are juicy and tasteless. They have several seeds inside which are very tiny.



Distribution: Plants are resistant to drought and frost. They are common in forests in the Philippines at low and medium altitudes. They are common in the highlands. In Papua New Guinea, *Rubus rosifolius* grows from 750-2850 m altitude. It suits hardiness zones 9-11.

Cultivation: They grow wild. They could be grown by division of the root or from cuttings.

Production:

Use: The fruit are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	82.9		1.3				1	0.3

Insects:

Diseases:

Pests:

Importance: The plants are common in Papua New Guinea. The fruit is eaten especially by children.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Rubus archboldianus* Merr. & Perry
Synonyms:
Plant family: Rosaceae

Description: A climbing or scrambling shrub. The stems are up to 5 m long. The prickles are 2 mm long and curved. Often they are purplish. The leaves have 3 leaflets. The leaf stalks are 1-4 cm long. The leaflets are oval and the side ones are 5.5 cm long by 4 cm wide. The edges of the leaves have saw like teeth. The leaves are leathery. The flowerings stalks have 1 or 2 flower stalks below the end flower. These have 1 or 2 flowers each. The petals are red. The fruit or berry is 3 cm across made up of many small fruit. The fruit is dark red. The fruit are edible.

Distribution: In mountain forests from 1,800 to 3,600 m altitude.

Cultivation:

Production:

Use: The fruit are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English: Alpine strawberry
Tok pisin:
Tok ples:

Scientific name: *Fragaria vesca* L.
Synonyms:
Plant family: Rosaceae

Description: A small plant which keeps growing from year to year. It grows to 20 cm high and spreads to 30 cm wide. The stems are long runners which form roots at the nodes. The leaves have 3 leaflets and are bright green. The leaflets are oval and with coarse teeth around the edge. They are 6 cm long and arranged in rings on long leaf stalks. The flowers are small white and open. They have 5 petals. The fruit are oval and fleshy. They are white and turn red (or white) as they ripen. They are sweet. A strawberry with small leaves and fruit and the seeds are on the outside of the fruit.

Distribution: It grows from 1600 m up to 3550 m in the tropics. They do poorly in hot humid climates. It becomes naturalised in high mountain regions in Papua New Guinea. It needs well drained soils and a protected sunny position. They are drought and frost tender. They enjoy acid soil. It suits hardiness zones 5-9.

Cultivation: They can be grown from seed. Seed are best put in a refrigerator for 2 weeks before planting. Mostly they are grown from runners. It grows wild in some areas.

Production:

Use: The fruit is eaten.
The leaves are used to make tea. It has a good flavour and is high in Vit C.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Leaves								

Insects:

Diseases:

Pests:

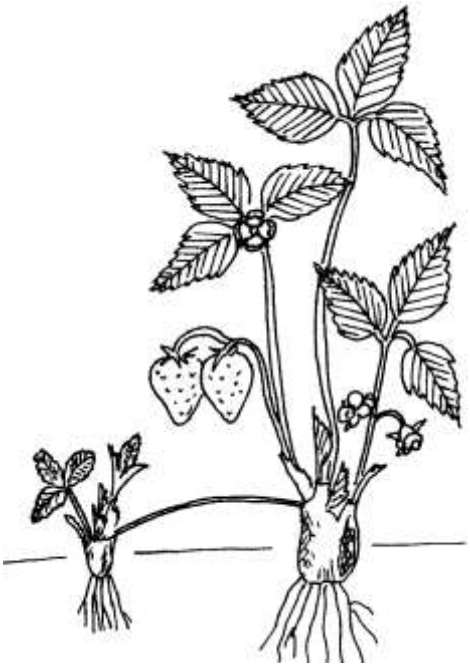
Importance:

Names

English: Garden strawberry
Tok pisin:
Tok ples:

Scientific name: *Fragaria x ananassa* Duchesne
Synonyms:
Plant family: Rosaceae

Description: A herb which keeps growing from year to year. The stems are short. The leaves occur in a ring and the plant has runners with new rings of leaves. The leaves have 3 leaflets. The leaf stalk is 1.5 cm long. They have soft hairs. The leaflets can be 1.8-7 cm long by 1.3-6 cm wide. There are teeth along the edge. The flowering shoots are up to 26 cm long. There can be 16 flowers on branches that divided into 2 at each joint. The false fruits are round or oval and 4.5 cm long by 5.5 cm wide.



Distribution: It suits temperate and subtropical locations. It can be grown in the highlands in tropical regions. It suits hardiness zones 3-10.

Cultivation: Plants are grown from runners. These runners form roots and then new plants. Flowers require short days and warm weather, otherwise only runners form. Plants form few runners when there is no winter cold.

Production:

Use: The ripe fruit are eaten raw. They are also used in desserts.
They are also used in jams, preserves and for flavouring.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	91.2	126	0.6		0.4	3	57	0.1

Insects:

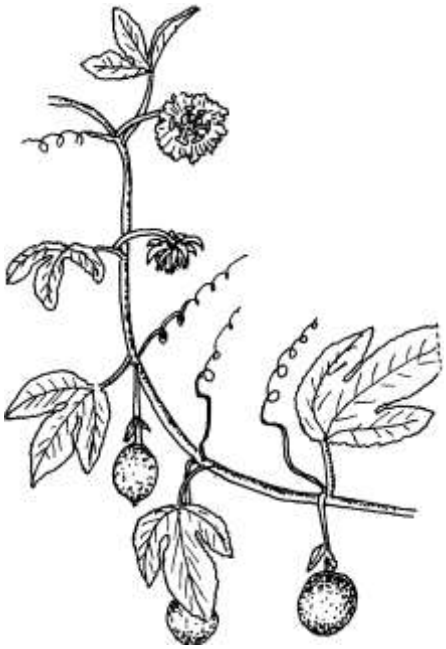
Diseases:

Pests:

Importance:

Names

English: Purple passionfruit
Tok pisin:
Tok ples:
Scientific name: *Passiflora edulis* Sims
Synonyms:
Plant family: Passifloraceae



Description: A vine which continues to grow for several years. The main vine becomes woody. Vines can be 6-7 m long. It climbs by tendrils. The leaves are shaped like the fingers on a hand with three lobes. They are 5-10 cm long. The vine can set flowers at each leaf. The flowers are white and often tinted purple. They are 5 cm across. The fruit are oblong and thickly dotted with purple when ripe. The skin is hard and they have a sweet smell. The flesh is orange. The seed occupy most of the inside with a small amount of flesh. The flesh is edible.

Distribution: A subtropical plant. They are cultivated up to 2000 m altitude in the tropics. The purple variety grows in the highlands up to 3000 m. It can stand very light frosts. The yellow one grows in the lowlands. Its normal range is 700 to 2300 m. Often fruit set is poor in wet conditions. Wind breaks are important. Vines can tolerate very light frosts. If frosts are likely wrapping the stems near ground level with insulation paper can help protect the plant. Heavy rain at flowering can reduce fruit set through poor pollination. Soils should be fertile, moist and well drained. Plants cannot tolerate waterlogging. A pH in the range 5.5-6.5 is best. In Nepal they grow between 1200-1700 m altitude. It suits hardiness zones 8-11.

Cultivation: Plants are grown by seeds or cuttings. Seeds germinate in 15-45 days. Seedlings can be grafted. When the end shoots of the mother plant are the same thickness as the seedling stem, shoot tips 8 cm long can be used. The leaves should be removed from the cutting being used in the graft. An even light and high humidity allows these grafted plants to be ready in a few weeks. Plants are put in a hole 30 cm deep and which has had organic matter added. A spacing of 3-4 m apart is suitable. Plants need a trellis to climb over. Often a trellis 2 m high is used. Normally the side shoots are picked off until the vine reaches the trellis height. Then the tip is picked out to promote branching. Normally later pruning is not done. Putting mulch around the plant helps retain moisture and adds nutrients as well as controlling weeds. Hand pollination can improve fruit set. The fruit turns purple, wrinkles then drops off when ripe. Balanced fertiliser to promote healthy growth is important. Deficiencies of magnesium, iron, zinc, copper and boron can occur in some places. Pruning is important to keep vines vigorous.

Production: Plants produce after about 12-18 months and keep producing well for 4 or 5 years. Good production is related to keeping the vine growing well by avoiding low temperatures and lack of water. Plants are pollinated by insects, so it is important to not kill these with insecticides. They can also self pollinate. Fruit mature between 60 and 100 days from pollination.

Use: The fleshy portion of the fruit is eaten raw.
Passionfruit are also used for flavouring in juices, and with other foods.
The seeds are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	73.3	280	2.8		1.3	10	20	0.1
Seeds								

Insects:

Helopeltis clavifer (Walker)	Coreidae (HEM)	Cacao mirid
Hemiberlesia lataniae (Signoret)	Diaspididae (HEM)	
Hemiberlesia palmae (Cockerell)	Diaspididae (HEM)	
Idiopsis grisea Faust.	Curculionidae (COL)	Weevil
Leptoglossus australis (Fab.)	Coreidae (HEM)	Black leaf footed bug
Oribius cinereus Mshl.	Curculionidae (COL)	Shot hole weevils
Oribius destructor Mshl.	Curculionidae (COL)	Shothole weevils
Oribius inimicus Mshl.	Curculionidae (COL)	Shothole weevils
Planococcus citri (Risso)	Pseudococcidae (HEM)	Citrus mealy bug
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Pseudaulacaspis pentagona (Targioni)	Diaspididae (HEM)	White scale
Tiracola plagiata (Walker)	Noctuidae (LEP)	Cacao armyworm

Diseases:

Brown spot	Fungus	*Alternaria passiflorae* J.H.Simm.

Pests:

Importance: Plants are common in the highlands of Papua New Guinea. The fruit are eaten but are not popular.

Names

English: Banana passionfruit

Scientific name: *Passiflora tripartita* var. *mollisima* (Kunth.) Hlm-Niels. & P.M. Jorg.

Tok pisin:

Synonyms: *Passiflora mollissima* (Kunth) L. H. Bailey

Tok ples:

Plant family: Passifloraceae



Description: A vigorous vine. It has a leaf with 3 lobes. The vine has tendrils by which it attaches to other plants. The flowers are pink and about 7.5 cm across. The fruit is long and yellow, 5-12 cm long x 3-4 cm diameter. It contains several hard black seeds.

Distribution: In continuously wet areas in temperate or high altitude tropical regions the plant can spread rapidly climbing trees for support. It is suited to colder highland conditions. It grows wild over 2500 m altitude in Papua New Guinea. Plants will fruit between 1600 and 2800 m altitude in the tropics.

Cultivation: Seeds can be sown in a nursery and then transplanted. Plants are mostly grown from seeds, but it can be propagated by cuttings. Bottom heating the seeds at 20-26°C can result in germination at 1-2 weeks, at lower temperatures seeds can take up to 10 weeks to germinate. Plants need a framework to climb over.

Production: Up to 300 fruit can be produced from a well established vine.

Use: The fruit is eaten when ripe.
It is also used for drinks.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

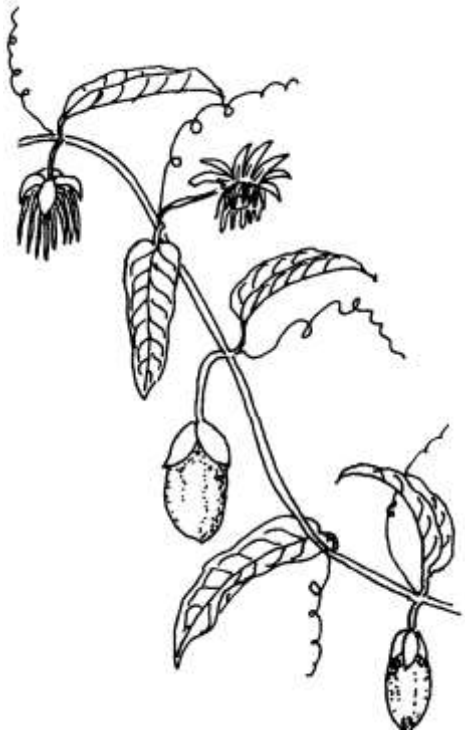
Pests:

Importance: In Papua New Guinea is common and fairly popular fruit in very high altitude areas.

Names

English: Yellow granadilla
Tok pisin:
Tok ples:

Scientific name: *Passiflora laurifolia* L.
Synonyms:
Plant family: Passifloraceae



Description: A perennial climbing vine. It can be up to 10 m long. Leaves do not have lobes and stems are round. Leaves are rounded (10 cm x 5 cm), hairless and rough. Flowers are large (6 cm across) and have a pleasant smell. Fruit are oblong and taper at both ends. They are about 8 cm x 5 cm smooth and yellow or orange when ripe. They have tough yellow skins and paler orange pulp. The fruit are edible.

Distribution: It grows in lowland areas in the tropics. It does best in slightly drier, humid climates. It is damaged by frost. It can grow on a variety of soils.

Cultivation: Plants are mostly grown from seed. They can be grown from cuttings. Bottom heating the seeds at 20-26°C can result in germination at 1-2 weeks, at lower temperatures seeds can take up to 10 weeks to germinate.

Production:

Use: Fruit are eaten raw. They are also used in drinks.
Caution: The leaves are poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: Not commonly seen in Papua New Guinea. Fruit are sold in markets in many countries.

Names

English: Sweet granadilla, Yellow passionfruit
Tok pisin:
Tok ples:

Scientific name: *Passiflora ligularis* Juss.
Synonyms:
Plant family: Passifloraceae

Description: A vigorous climbing vine. It grows 26 m long. The fruit is larger, yellow skinned and sweeter with larger seeds than the more common purple passionfruit. Leaves are entire, heart shaped and up to 20 cm long. Flowers are pale green. They are large.

Distribution: They grow between 1300 and 2400 m altitude in the tropics. It needs rich soil with good drainage.

Cultivation: They can be grown from cuttings. Plants need a fence or trellis to grow on. They can also be grown from fresh seed.

Production: Fruit production is seasonal. Vines bear in 1-2 years.

Use: The fruit are eaten. They can be eaten fresh or used in drinks.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	78.5	393	2.8		0.9	20	20	

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea, it is not very often seen in the highlands but it is being more widely planted.

Names

English: Passionflower
Tok pisin:
Tok ples:

Scientific name: *Passiflora foetida* L.
Synonyms:
Plant family: Passifloraceae



Description: A vine with tendrils. It creeps over the ground. The vine can be 2-10 m long. It has a strong smell. The stems are yellowish and have soft erect hairs. The leaves are 3 lobed and with fine hairs. They are pale green. The leaves are 3-10 cm long and 3-8 cm wide. The base of the leaf is often heart shaped. The flowers occur singly on flower stalks. The flowers are flattish with several rings of structures. They are 5 cm wide. They are white with a purple centre. The fruit is small (2-3 cm across) yellow and with a soft skin. The fruit is enclosed in a green net which dries brown then falls off. The fruit is edible. Seeds are flat.

Distribution: A tropical plant. It is common in the lowlands and occurs up to 1000 m altitude in the tropics. It is drought resistant and can grow on poor soils. In prefers sunny situations. It does best in humid places. It suits hardiness zones 10-12.

Cultivation: Plants are grown from seed. It grows wild in the lowlands. Seeds germinate rapidly.

Production: Fruit occur throughout most of the year.

Use: The ripe fruit are eaten. The seeds are also eaten.
The young stalks and leaves are boiled and eaten in soup in times of food shortage.
Caution: The unripe fruit and leaves are claimed to be poisonous. They contain cyanide so can be poisonous raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	64.2	421	4.9		8.4		5	1.1
Leaves	86.0	176	6.9				220	

Insects:

Brachyplatis translineatus Walk.	Pentatomidae (HEM)	

Diseases:

Sooty mould	Fungus	*Schiffnerula mirabilis* Hohnel
Chlorotic spot	Virus	
Leaf spot		

Pests:

Importance: A common plant in lowland areas. The fruit is widely eaten especially by children.

Names

English: Granadilla
Tok pisin:
Tok ples:

Scientific name: *Passiflora quandrangularis* L.
Synonyms: *Passiflora macrocarpa* Mast.
Plant family: Passifloraceae

Description: A long creeping vine with square stems. It has fleshy tuberous roots. The vine can be from 5-15 m long. The vine has four wings. The tendrils are pale green and coiled in a spiral. The tendrils are not branched and can be 30 cm long. The leaf stalk is 3 sided and 5-8 cm long. The leafy structures (stipules) at the base of the leaf are sword shaped and 2-5 cmlong by 1-2.5 cm wide. The leaves are also large (10-25 cm long and 8-17 cm wide) and green or purple. The flowers occur singly in the axils of the leaves and can be 10-12 cm across. Flowers are white and purple and have red dots on them. The fruit is greenish yellow 12-30 cm long by 10-18 cm wide and with black seeds amongst purple flesh. The aril or layer around the seed is white and edible. The seeds are 1 cm long.

Distribution: It mainly occurs in the tropical lowlands but grows up to about 1000 m. It suits hot humid lowland areas in the tropics. Fruiting is often best between 200-500 m altitude. They can stand cool temperatures when mature. At 21-26°C seed germinate in 1-2 weeks but at lower temperatures seed can take 10 weeks. It suits hardiness zones 10-12.

Cultivation: Plants are normally grown from cuttings but they can be grown from seed. Cuttings 25- 30 cm long from well matured stems should be used. A spacing of 2-3 m between plants is suitable. It needs a trellis to grow over. It often pays to hand pollinate. Seed germinate in 2-4 weeks. Seedlings can be planted in the field within 4 months.

Production: A vine lasts for 5-6 years. Flowers are produced 9 months from planting. Fruit are ready to harvest 60-80 days from flowering. A vine can produce 16-50 fruit in a season.

Use: Sometimes unripe fruit is boiled as a vegetable.
Otherwise the fruit is eaten ripe. It can be used for juice.
Sometimes the swollen root is cooked and eaten like a yam.
Caution: The leaves are poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	94.4	170	0.7		0.8		15	
Seed	78.4	339	1.9		2.9		15	
Root								

Insects:

Pternistra sp.	Coreidae (HEM)	

Diseases:

Chlorotic spot	Virus	

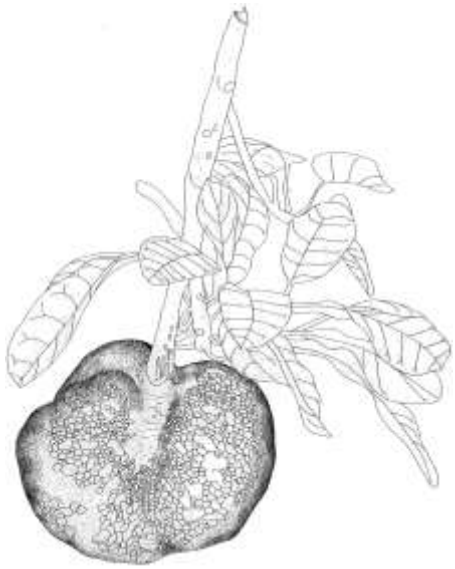
Pests:

Importance: Reasonably common in lowland areas.

Names

English: **Scientific name:** *Parartocarpus venenosus* (Zoll. & Mor.) Becc.
Tok pisin: **Synonyms:**
Tok ples: Purut, Pakal **Plant family:** Moraceae





Description: A medium sized tree up to 35-45 m tall with milky sap. The trunk is 45 cm across. The bark is yellow or grey-brown. It is papery and scaly. The twigs are 3-8 mm thick. The leaves are alternate and oblong and pointed at the tip. They are leathery. They can be rounded or pointed at the base. They are 8 to 15 cm long and 5 to 7 cm wide. They are smooth on the upper surface and can have hairs on the veins underneath. The flowers are borne in the axils of the leaves. Flowers are separately male and female but both on the one tree. Male heads are round and 15-30 mm across. They are covered by close, hard spines. The flower stalk is 12-35 mm long. The fruit is a cluster of "seeds" forming a rough checkered head about 18 cm across. The "seeds" are about 3 cm long. The fruit is brown on the outside and yellow inside and irregular in shape.

Distribution: They occur in the Philippines. The subspecies that occurs in PNG occurs from 5 to 1000 m altitude. It occurs in humid forest.

Cultivation: It grows wild. It can be grown from seed. Seeds are distributed naturally by flying foxes

Production: The fruit turns very brown on the outside and has a sweet smell when ripe. Fruit production is seasonal.

Use: The seeds are eaten either raw or cooked.
The ripe fruit is edible. They are very dry so a drink is needed with them.
Caution: The sap of the tree is often used as an arrow poison.
The unripe seeds are poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Seed								

Insects:

Diseases:

Pests:

Importance: A minor edible fruit moderately common particularly on islands and peninsulas along the north coast of Papua New Guinea.

Names

English: Toothed-leaved winter cherry
Tok pisin:
Tok ples:

Scientific name: *Physalis angulata* L.
Synonyms:
Plant family: Solanaceae

Description: A perennial herb up to about 1 m high. The leaves are smooth. The stems are angular. The leaves are oval and have teeth along the edge. They are 5-10 cm long by 3-6 cm wide. The flowers occur singly. The flowers are small and cream coloured. They do not have a dark spot. It has a yellow berry with many seeds inside. The berry is enclosed in a veiny inflated case about 3 cm across. The berries are sticky.

Distribution: It is a tropical plant. It mostly occurs above 1000 m and up to 2800 m altitude.

Cultivation: It is easily grown by sprinkling a few seeds into moist ground. It grows easily under most conditions. If the plants are in a very sheltered place, fertilization is improved by spraying the plants with water.

Production:

Use: The fruit can be eaten raw or cooked.
The young leaves are used in soup.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Leaves	83.9	113	4.0				58	

Insects:

Heliothis assulta (Guenee)	Noctuidae (LEP)	Cape gooseberry budworm
Tiracola plagiata (Walker)	Noctuidae (LEP)	Cacao armyworm
		Leaf miner

Diseases:

Leaf spot	Fungus	*Cercospora physalis* Ellis

Pests:

Importance: In Papua New Guinea a common plant and the fruit is being used more commonly.

Names

English: Native gooseberry
Tok pisin:
Tok ples:

Scientific name: *Physalis minima* L.
Synonyms:
Plant family: Solanaceae

Description: An erect or spreading branched herb. It is an annual plant. The roots are fibrous. The leaves are alternate and entire and covered with soft downy hairs. They have irregular teeth along the edge. They are 2-3 cm long and 1-1.5 cm wide. They are pale green. The stems are round or nearly so. The flowers are yellow with the inner ring of petals bell shaped. These are sometimes purple at the base inside. The fruit is a round berry about 6 mm across. It is completely surrounded by an inflated calyx. This is 5 angled.

Distribution: It grows in the tropics. They are common in waste places at low altitudes up to 1600 m in the Philippines. It grows in southern China on slopes between 1000-1800 m. altitude.

Cultivation:

Production:

Use: The fruit are eaten. They are also preserved.
The leaves are eaten, cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	84.2	264	3.2		4.2		1	0.5
Leaves								

Insects:

Diseases:

Pests:

Importance: They are mostly eaten by children.

Names

English: Canistel, Yellow sapote
Tok pisin:
Tok ples:
Scientific name: *Pouteria campechiana* (HBK) Baehni
Synonyms: *Lucuma nervosa* A. DC.
Plant family: Sapotaceae



Description: A tree up to 8 m high. It can be 30 m high. It is evergreen and has an open crown. The branches are mostly horizontal. The leaves are oval but taper towards both ends. They can be 6-25 cm long by 2.5-8 cm wide. They are shiny and bright green. The leaves are clustered near the ends of the twigs. The leaf stalks can be 5-25 cm long. The small flowers grow in clusters of 2 to 5 on young wood. The flowers have a scent. The fruit is round, slightly pointed at the end, orange yellow and up to 10 cm long. The skin is thin, tough and waxy. The flesh is orange and has a musky smell. The seeds are about 2-3 cm long, dark brown and shiny. There are often 1-3 seeds per fruit.

Distribution: It is native to C and S America. It is a tropical and subtropical plant. It suits the coast in the tropics and is damaged by frost. It can grow up to 1400 m in the tropics. It will grow on fairly poor soils. It does better on fertile well drained soils. It can tolerate reasonably dry periods. It suits hardiness zones 10-11.

Cultivation: Trees are normally grown from seed. Seed need to be planted fresh. Seeds germinate in 2-3 weeks. Seedlings can be planted out after one year. A spacing of 4 m is suitable. It benefits from mulching due to the shallow root system. Plants can also be grafted and grown by air-layering.

Production: Seedlings and grafted trees grow quickly. It begins bearing at about 3-5 years old. Grafted trees produce a year or so earlier. Fruit are harvested when they develop their full yellow colour. Fruit should be clipped when mature and ripened at room temperature for 3 to 10 days. Putting a little salt on the end of the fruit stalk hastens ripening. Fruit ripen 5-6 months after flowering.

Use: The fruit is eaten fresh or made into icecream. The skin and seeds are removed. It is not good cooked but is used instead of pumpkin in pie.
It is often eaten with lemon juice. It can also be eaten with pepper and salt.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	60.6	580	1.68		0.92	320	58	

Insects:

Diseases:

Pests:

Importance: It is only being tried out in Papua New Guinea.

Names

English:
Tok pisin:
Tok ples: Warap

Scientific name: *Pouteria maclayana* (Muell.) Baehni
Synonyms:
Plant family: Sapotaceae



Description: A small to medium sized tree. It commonly has buttresses. It can grow up to 27 m tall and with a 2 m girth. The branches are green with brown areas. The leaves are at the ends of the small branches. They are long and rounded. They are 23 cm long by 9 cm wide. They have a wavy and scalloped edge. The base of the leaf tapers to the leaf stalk. The leaves are dark green and shiny on top and dull underneath. The veins are whitish and prominent on both sides of the leaf. There are 7-8 pairs of side veins. The leaf stalk is about 2.5 cm long. The flowers occur in clusters of 6 in the axils of leaves. The flowers are small and creamy white. The fruit are like flattened spheres about 7.5-10 cm across. They are light olive-green. The flesh is orange and fibrous with 2-3 large seeds. The pulp has a sickly sweet smell. The seed are 6 cm long by 2.5 cm wide. The seed is partly covered by a hard shell.

Distribution: It mainly grows on the coast. It grows up to 500 m altitude.

Cultivation:

Production:

Use: The fruit have an edible yellow flesh. It is probably cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

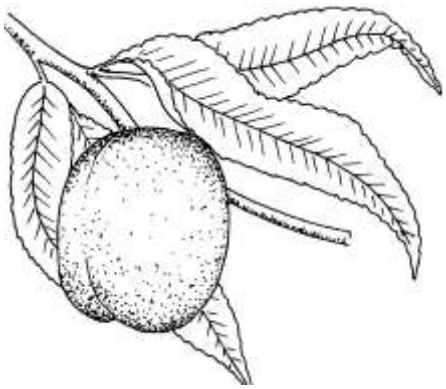
Importance: It is not known how common it is in Papua New Guinea.

Names

English: Peach
Tok pisin:
Tok ples:

Scientific name: *Prunus persica* (L.)Batsch
Synonyms:
Plant family: Rosaceae

Description: A small tree. It loses its leaves during the year. It grows 3-8 m tall. It has an open growth habit. The leaves have stalks. These are 5-10 mm long. The leaves are oblong to sword shaped. They have fine teeth along the edge. The leaf blades are 7-15 cm long and 2-3 cm wide. They are acute at the base and taper to the tip. The flowers occur singly. They appear before the leaves. The flowers are small and pink or white. The fruit varies in shape and size. It is round with a groove down the side. It is 5-8 cm across. It is yellow when ripe. It has one hard stone inside with holes in it.



Distribution: It is native to China. They need a specific cold requirement below 7°C to start flowers and leaves forming but a warm period for fruit ripening. It likes a warm sheltered position. It will tolerate mild frosts. Mild hot summers and cool cold winters are best. Temperate. In Nepal it grows between 1100-2000 m altitude. Some varieties can be grown in some highland regions in the tropics if the leaves are picked off. It suits hardiness zones 5-10.

Cultivation: It is easily grown from seed. It can be budded. Trees can be grown from seed but do not breed true. It is better to graft. Branches which have borne fruit should be removed to allow new fruit bearing wood to grow.

Production: Budded trees commence fruiting in 2 or 3 years. Useful bearing takes 8-10 years. Trees often need zinc and borax sprays. Trees tend to be fairly short lived (20 years).

Use: Ripe fruit are eaten fresh, preserved or made into wine.
The seed oil is used for cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	86.2	156	0.6		0.4	500	8	0.1
Seed oil								

Insects:

Diseases:

Pests:

Importance: Only occasional trees occur in Papua New Guinea.

Names

English: Plum
Tok pisin:
Tok ples:

Scientific name: *Prunus sp.*
Synonyms:
Plant family: Rosaceae

Description: Slender trees which lose their leaves. The leaves are toothed around the edge and hairy underneath. Leaves in the bud are rolled. Flowers are white. The fruit is a one seeded round fleshy fruit.

Distribution: Suitable only for high altitude areas in the tropics. (Japanese plums need less cold weather than European plums to start off flower formation). The soil needs to be well drained. Trees need plenty of sunlight. Trees can stand frost except at flowering.

Cultivation: Plums are often grown from seed. They can be budded or grafted. Many kinds of plums have to be pollinated from other trees.

Production:

Use: The fruit are eaten raw or cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

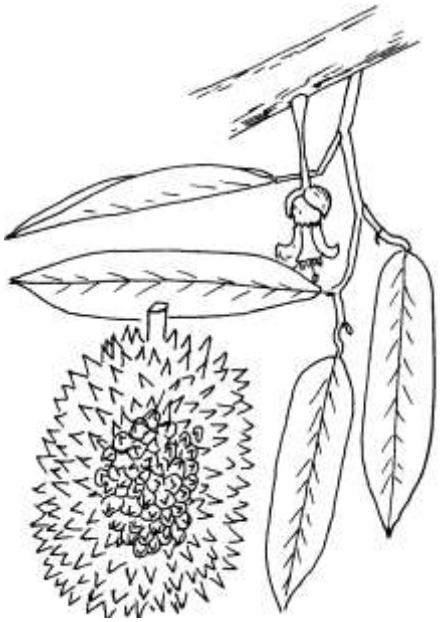
Importance: A few trees are established and fruit in the highland areas of Papua New Guinea.

Names

English: Durian
Tok pisin:
Tok ples:

Scientific name: *Durio zibethinus* Murray
Synonyms:
Plant family: Bombacaceae/ Malvaceae

Description: A large evergreen tree up to 30-50 m high and with buttresses. The bark is dark red-brown and rough and peels off irregularly. The leaves are alternate and oval. They are about 10 to 15 cm long and 3 to 5 cm wide. The upper surface is smooth and shiny and the midrib is sunken. The lower surface is covered with silver scales. The flowers are on the older branches and form bunches of flowers where the lower flower stalks are longer. They have 3 to 30 flowers on a main stalk up to 5 cm long. The fruit are green to yellow, fat and up to 25 cm long by 20 cm wide. They have sharp spines over the surface. The seeds are completely covered with a yellowish soft very sweet seed covering. The fruit drop unopened. As the fruit ripens it splits open naturally into 3-5 sections which have large seeds embedded in a yellow coloured pulp. The seeds are oval and 4-5 cm long by 2.5-3.5 cm wide.



Distribution: A tree of the humid tropics preferably below 300 m altitude but they may grow up to about 800 m above sea level in the equatorial tropics. Trees are mainly within 15° latitude of the equator. They need plenty of soil moisture and a rich soil. For a tropical tree it can tolerate cooler temperatures eg 23°C and can tolerate temperatures up to 46°C. A rainfall of over 2000 mm evenly distributed throughout the year is best. A drier period during flowering is beneficial. Poorly drained or sandy soil are not suitable. In the Philippines they occur from Davao to Butuan and central Mindanao. It suits hardiness zone 12.

Cultivation: Trees grow readily from seed. Seeds need to be fresh. Seeds germinate in about 3 days and can be transplanted in about 4 weeks. Seeds do not breed true. Trees fruit about 7 years after planting. Trees can be grown by budding or grafting. A spacing of at least 14 m between plants is needed. Grafted trees seldom reach 20 m height. Heavy mulching near the trunk can help patch canker (*Phytophthora palmivora*) to develop. Trees should be pruned and shaped for uniform branching and by topping to reduce excessive growth and give optimum production.

Production: Flowers are cross pollinated by bats. Normally flowers cannot self pollinate. Flowers open in the afternoon and fall by next morning. Up to 50 fruit can be produced per tree per year. Between 0 and 400 fruit can grow on one tree and this varies with season. Fruit can be up to 3 kg weight. Fruiting is seasonal. Fruit take between 90 to 130 days from flowering to maturity depending on variety.

Use: The flesh around the seeds is eaten. Fruit need to be eaten within 2 days of falling from the tree. Fruit should only be opened at time of eating as the flesh goes sour. The unripe fruit can be cooked as a vegetable. Fruit are also processed for ice-creams and desserts.
The seeds are edible, usually cooked.
The young leaves and shoots can be eaten.
The raw fruit is used as a vegetable or in soups.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	61.1	602	2.5	5	0.7	5	24	0.3
Leaves								
Seeds								

Insects:

Diseases:

Can be damaged by Pink disease	Fungus	*Corticium salmonicolor*

Pests:

Importance: Very common in Indonesia and Malaysia. Introduced into several coastal areas of Papua New Guinea and plantings are increasing. At present fruit are mainly used by Asians.

Names

English: Mangosteen
Tok pisin:
Tok ples:
Scientific name: *Garcinia mangostana* L.
Synonyms:
Plant family: Clusiaceae



Description: A medium sized tree 10-20 m high with bright glossy leaves. Trees keep their leaves all year. Leaves are 15-25 cm long and leathery. Male and female flowers are on separate trees. Commercial trees only have female flowers. Male trees occur but are rare. Flowers are produced on shoots near the end of branches. Female flowers have 4 cream petals and 4 sepals and a round ovary with a thick stigma composed of 4 to 8 lobes. No pollination is required because fruit develop without fertilisation. The fruit is dark blue with 4-8 white juicy segments inside the thick skin. Each segment is enclosed in fine pinkish veins. It is 8 cm across and has flower sepals attached to the stalk end. It leaks yellow sap from wounds. Fruit is produced on side branches near to the tips of the main branches. Fruit often have no seeds or up to 2. These are not true seeds but they will grow.

Distribution: It is a tropical plant. It needs a hot humid climate (25°C to 35°C). Temperatures below 5°C will kill the plant and temperatures below 20°C slow growth. It grows from sea level up to 1000 m altitude in the equatorial tropics although they grow very slowly at this altitude. It can stand light shade. It often does not do well with sea breezes, and needs protection from wind. It cannot tolerate drought. It needs fertile soil. Good fertility enables earlier bearing. It suits high rainfall areas over 2500 mm per year. It cannot tolerate alkaline soils. It suits hardiness zones 11-12.

Cultivation: Trees breed true from seed because they are produced asexually. This means trees are very uniform. As well some seeds can produce more than one seedling. They germinate between 10 and 54 days. Seeds need to be fresh (less than 5 days after extraction) and undamaged, and cleaned of pulp. They quickly lose their viability. Transplanting is done with care after 2 years. Long tap roots make this difficult. Young trees require shade during hot weather. The slow early growth is because the original roots of the seedling are replaced by new roots from the base of the stem. A spacing of 7 - 10 m suits. Grafting onto vigorous root stocks is difficult. It has been performed on *Garcinia tinctoria*. Budding, cuttings and layering have been unsuccessful.

Production: Trees are slow growing and begin to bear after 8-20 years. Fruit are produced on shoots which are more than two years old so pruning is unecessary. Fruiting is seasonal once or twice a year. Often more fruit are produced every second year. The main fruiting season is Nov to March. Fruit need to be harvested when mature and ripe. Fruit can only be transported with difficulty. They can be stored under refrigeration. (10°C for up to eight weeks). Between 500 to 1500 fruit are produced per tree. Fruit are best opened by cutting the skin around the middle to prevent tannins from the skin spoiling the flavour. Fruit can be stored for 3 weeks if undamaged.

Use: Fruit is best eaten fresh. It is the arillus or layer around the seeds which is eaten.
The seeds are edible raw.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	81.3	299	0.6		0.4		2.7	
Seeds								

Insects:

Diseases:

Pests:

Importance: A few trees have been planted in lowland areas of Papua New Guinea. It is a very popular fruit.

Names

English: Warren's mangosteen
Tok pisin:
Tok ples:
Scientific name: *Garcinia warrenii* F. Muell.
Synonyms:
Plant family: Clusiaceae

Description: A tall shrub or small bushy tree. It grows to 6-13 m high and spreads 1-3 m wide. When the tree is damaged it produces a yellow exudate. The small branches are angular. The leaves are 10-16 cm long by 4-5 cm wide and leathery. They are dark green and have short thick leaf stalks. Flushes of new growth are often red. The flower cluster is produced in the axils of leaves. It is branched and stiff. The flowers are about 1 cm across and white. They have a strong scent. There are 4 thick petals. The fruit is a berry 3-3.5 cm across. It is oval, purple and fleshy. Two seed occur in a fruit. The seed are 3 cm by 2 cm. The flesh of the fruit is edible.

Distribution: It is a tropical plant. It occurs in rainforest. Often it is near streams or on flood plains. They need good drainage. They can grow in full sunlight or partial shade. It will grow in subtropical regions but young plants are sensitive to frost.

Cultivation: Plants can be grown from seed. The seed needs to be sown fresh.

Production: Plants are slow growing. In Australia, fruit are mature in November to January.

Use: The fruit is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: It apparently occurs in Papua New Guinea, presumably on the South Coast.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Garcinia riparia* A.C.Smith
Synonyms:
Plant family: Clusiaceae

Description: A tall shrub or small tree. It grows 4-8 m high and spreads 1-3 m wide. When trees are damaged they produce a clear exudate. The leaves are 7-9 cm long and 2-3 cm wide. They are narrowly oval and dark green. They are thick textured and the veins are prominent underneath the leaf. The tips of the leaves are drawn out to a fine point. The flower cluster is produced in the axils of leaves and these occur as dense clusters. The flowers are about 0.6 cm across and white. The fruit are 2.5 cm across and yellowish. There are 1-5 seeds inside.

Distribution: A tropical plant. It occurs in rainforests. It grows near rivers.

Cultivation: Plants are grown from seed which should be sown fresh.

Production: In Australia, the fruit are mature in December to January. Flowering occurs in July.

Use: The fruit are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: It apparently occurs in Papua New Guinea and its distribution is unknown.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Garcinia eugeniaefolia* T.Anders
Synonyms:
Plant family: Clusiaceae

Description: A tree. The small branches are slender and stiff. The leaves are crowded at the ends of branches. The leaves are opposite and sword shaped tapering gradually to the tip. The leaves are 9 cm long by 2.5 cm wide. The leaf stalk is 0.4 cm long. The flower clusters are in the axils of leaves. The flowers occur singly on the cluster. The fruit is oval and curved. It is 1.5 cm long. The fruit do not have a stalk.

Distribution:

Cultivation:

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: A minor fruit and its importance in Papua New Guinea is unknown.

Names

English: Egg tree
Tok pisin:
Tok ples:

Scientific name: *Garcinia dulcis* (Roxb.) Kurz
Synonyms: *Xanthochymus dulcis* Roxb.
Plant family: Clusiaceae

Description: A bushy tree up to 10-20 m high. It spreads 2-4 m wide. It has a short trunk. It has 4 angled yellow drooping branches. It has large leathery leaves 10-30 cm long and 4-14 cm wide. The leaves are opposite, smooth and somewhat oval in shape. Young leaves are pale green and older leaves are dark green. The leaves are shiny above and often hairy underneath. The leaf stalk is 2 cm long. Male and female flowers are separate. The flowers are white or greenish yellow and borne in small rounded clusters. Male flowers are very small. The flowers have a sour smell. The fruit is smooth, yellow and the size of a small orange but with a point at the end. It is 5-8 cm wide. It has a thin skin and 1 to 5 seeds inside. These are brown and 2.5 cm long. The pulp is yellow.



Distribution: They are common and widely distributed in the Philippines from northern Luzon to the southern part growing in primary forest at low and medium altitudes. It grows in coastal areas up to 500 m altitude. It is not particular as regards soil.

Cultivation: Trees are grown from seed. Seed need to be sown while fresh. Trees can be budded or grafted. Shield budding on fairly mature wood using large buds is best.

Production: Fruit production is seasonal about Dec to May in the Southern Hemisphere.

Use: The fleshy portion of the fruit is eaten raw. They are a bit acid. They can be cooked. They can be used to make jam.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	86.7	205	0.4		0.4	25	5	

Insects:

Diseases:

Pests:

Importance: At present not commonly planted in Papua New Guinea.

Names

English: Loquat
Tok pisin:
Tok ples:
Scientific name: *Eriobotrya japonica* (Thunb.) Lindley
Synonyms:
Plant family: Rosaceae



Description: A small evergreen tree up to 6-10 m high. It has a round crown. Leaves are large and strongly ribbed. They are 12-30 cm long and 8-10 cm wide. They are dark green and glossy on the upper surface and woolly white underneath. They are leathery with slight teeth. The new growth is tinged with red. Flowers have a strong scent. Flowers are small and white and in clusters at the ends of branches. Fruit are in loose clusters of about 10. They are pear shaped. They are 3-5 cm long and yellow when ripe. There are 3-5 large brown seeds in each fruit.

Distribution: It is native to China and Japan. They suit subtropical and warm temperate areas. Trees grow best between 750 and 1750 m altitude in the tropics, and are best about 1000 m. It is not suited to the coastal tropics and can't stand heavy frosts on the flowers or fruit. It does better in drier areas and needs good drainage. Well established trees can tolerate a low temperature of -11°C.
The killing temperature for the flower bud is about -7°C, and for the mature flower about -2°C. At -4°C the seed is killed, causing the fruit to fall. Trees need good drainage and do best in full sunlight. Trees can stand drought but yield best with water at flowering and fruit development. In Nepal they grow between 1300-2000 m altitude. It suits hardiness zones 8-11.

Cultivation: It can be grown from cuttings or layering. It can also be grown from seeds or by grafting. Seeds grow easily. Trees should be planted in groups to cross pollinate. A spacing of 6 m is suitable. Trees grow quickly. Trees need light pruning of the tips of branches to maintain tree shape and avoid excessively thin fruit bearing branches.

Production: Seedling trees begin to bear in 6-8 years compared with 2-3 years for grafted trees. Biennial bearing occurs. Thinning in heavy bearing years can give larger fruit. The fruiting is seasonal. The season is August to October in the Southern Hemisphere. Fruit should be allowed to ripen fully before harvesting. Fruit reach maturity after about 90 days from full flowering. Ripe fruit can be stored in a refrigerator for 1 to 2 weeks.

Use: The ripe fruit is eaten fresh. If the fruit are cooked, the seeds should be removed as they give a bitter taste. The fruit are used for alcohol production. Fruit are also used for jam, jellies and sauces.
Caution: The leaves are poisonous. The seeds are also poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	86.7	197	0.4		0.3	153	1	0.1

Insects:

Bactrocera sp.	Tephritidae (DIPT)	Fruit are prone to fruit fly damage

Diseases:

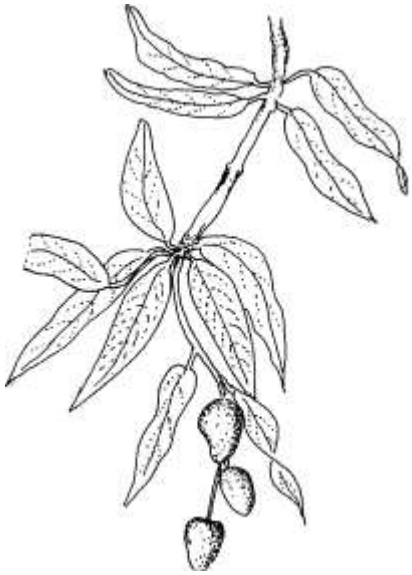
Pink disease	Fungus	*Corticium salmonicolor* Berk. & Br.

Importance: In Papua New Guinea, at present only occasional trees are seen.

Names

English: Mango
Tok pisin:
Tok ples:

Scientific name: *Mangifera indica* L.
Synonyms:
Plant family: Anacardiaceae



Description: An erect, branched evergreen tree. It can grow to 10-40 m high and is long lived. (Trees grown vegetatively are smaller and more compact.) Trees spread to 15 m across. It has strong deep roots. The trunk is thick. The bark is greyish-brown. The leaves are simple and shaped like a spear. Some kinds of mangoes have leaves with a wavy edge. They can be 10-30 cm long and 2-10 cm wide. They are arranged in spirals. The leaf stalk is 1-10 cm long and flattened. Leaves are often brightly coloured and brownish-red when young. These tender leaves which are produced in flushes become stiff and dark-green when mature. The flower stalks are at the ends of branches. They are 10-50 cm long and branching. Up to 6,000 flowers can occur on a stalk. Most of these are male and between 1 and 35 % have both male and female flower parts.

Fruit are green, yellow or red and 2.5 to 30 cm long. The fruit hang down on long stalks. The outside layer of the seed is hard and fibrous and there is one seed inside. Several embryos can develop from one seed by asexual reproduction. The fruit shape and colour vary as well as the amount of fibre and the flavour.

Distribution: Mango grows in the tropics and subtropics. It grows from sea level up to 1300 m altitude in the tropics. It does best in areas below 700 m and with a dry season. Rain and high humidity at flowering reduces fruit set. It thrives best where temperatures are about 25°C but will grow with temperatures between 10 and 42°C. Temperatures of 0°C will damage young trees and flowers. Low temperatures (10-20°C) at flowering time will reduce fruiting. As temperatures get lower due to latitude or altitude, fruit maturity is later and trees become more likely to only have good crops every second year. Mangoes can grow on a range of soils. In wetter areas soils with less clay are better. They can withstand occasional flooding. A soil pH of 5.5 to 6.5 is best. Soils with pH above 7.5 cause plants to develop iron deficiency. It suits hardiness zones 11-12.

Cultivation: Trees are grown by planting fresh seed and they can be transplanted. Mangoes vary in their ability to breed true from seed. When more than one seedling emerges from the seed some of these are asexual and breed true. Clean seed germinate best if they are treated at 50°C for 20 minutes, then planted on their edge with the round bulge upwards and near the soil surface. The husk around the seed should be removed. Seeds germinate in 3-6 weeks. The strongest growing seedlings from this seed are used and the others thrown away. The seedlings from the folds of the seed are vegetative while the seedling from the centre of the seedling near the stalk end may be sexual and show variation from type. Other seeds only produce one seedling and these normally vary and can be different from the parent tree. Plants can be propagated by budding, or by grafting using inarching. This is not easy. Cuttings grow with care. In wetter places flowers need to be protected with fungicides to enable fruit to form. If organic manure is used this should not be directly in the planting hole nor immediately against the new plant. Young transplanted seedlings need regular watering. A spacing of 6-12 m between plants is used. Wind protection is advisable to prevent fruit rubbing and getting damaged. Trees should only ever be lightly pruned as fruit develop on new growth and heavy pruning can reduce flowering. Flowering can be brought about by foliar sprays of potassium nitrate

Production: Seeds germinate after about 20 days. Seedling trees produce after 4-6 years and increase in production up to 20 years. Trees often bear better each second year. Rain at flowering reduces fruit setting. Fruiting is at the end of the year. Fruit take 4-5 months to mature. Fruit vary in weight from 200 to 1,000 g. Trees can produce one million flowers but only 500 fruit. Trees last for many years.

Use: Ripe fruit are eaten raw.
Seeds can be eaten cooked. They are boiled or roasted and soaked to remove the bitterness. They are made into meal by powdering.
Young leaves can be eaten cooked.
Unripe fruit is pickled. Amchur is made from the dried unripe fruit. This is used in curries, and pickles and chutneys.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	83.0	253	0.5		0.5	1200	30	0.04
Seeds								
Leaves		122	0.5				60	

Insects:

Aleurodicus dispersus Russel	Aleyrodidae (HEM)	Spiralling whitefly
Amblypelta spp.	Coreidae (HEM)	Tip wilt bugs
Aspidiotus destructor Sign.	Diaspididae (HEM)	Coconut scale
Bactrocera bryoniae (Tryon.)	Tephritidae (DIPT)	Fruit fly
Bactrocera frauenfeldi Schiner	Tephritidae (DIPT)	Fruit fly
Bombotelia jocosatrix (Guen.)	Noctuidae (LEP)	Large mango tip borer
Ceroplastes rubens Mask.	Coccidae (HEM)	Pink wax scale
Chlumetia transversa Walker	Noctuidae (LEP)	Mango shoot caterpillar
Idioscopus niveosparsus (Leth.)	Cicadellidae (HEM)	Leafhopper on flowers
Coccus viridis (Green)	Coccidae (HEM)	Green scale
Dysmicoccus brevipes (Cockerell)	Pseudococcidae (HEM)	Pineapple mealy bug
Helopeltis clavifer (Walker)	Miridae (HEM)	Cacao mirid
Idioscopus clypealis (Leth.)	Cicadellidae (HEM)	Mango hopper
Idioscopus niveosparsus (Leth.)	Cicadellidae (HEM)	Mango hopper
Ischnaspis longirostris (Sign.)	Diaspididae (HEM)	Armoured scale
Noorda albizonalis Hamps	Pyralidae (LEP)	Red banded mango borer
Protaetia fusca Herbst.	Scarabaeidae (COL)	Mango flower beetle
Rhyparida clypeata Jacoby	Chrysomelidae (COL)	
Saisettia coffeae Walker	Coccidae (HEM)	Brown coffee scale
Scopelodes dinawa B.Bak	Limacocidae (LEP)	Cup moth
Scopelodes nitens B.Bak	Limacocidae (LEP)	Cup moth
Selenothrips rubrocinctus (Giard)	Thripidae (THYS)	Cacao thrips

Diseases:

Sooty mould	Fungi	*Asterina sp.*
	And	*Meliola mangiferae* Earle
Leaf spot, wither tip, fruit rot	Fungus	*Glomerella cingulata* (Stonem) Spauld & Schrenk
	Fungus	*Stigmina mangiferae*
Pink disease	Fungus	*Phanerochaete salmonic*

Pests:

Importance: Very popular and important in seasonally dry lowlands.

Names

English: Wild mango
Tok pisin:
Tok ples:

Scientific name: *Mangifera minor* Bl.
Synonyms:
Plant family: Anacardiaceae

Description: A large tree often 10-15 m tall but can be up to 30 m tall. The trunk can be 30-120 cm across. It can have buttresses. It has a thick round crown of leaves. Leaves are more narrow than the cultivated mango. They are 10-22 cm long by 3-6 cm wide. The leaves are dark green and shiny on top but paler and smooth underneath. They are papery. The leaf stalk is 1-3 cm long. The flowers occur on the ends of branches in a much branched flower arrangement. These stalks are 30 cm long. The individual flowers are small. The flowers have a scent. Fruit are yellow green and flattened at the sides and with one large seed inside. They are smaller than mango. They can be 6-10 cm long by 4-7 cm wide. The fruit have stringy flesh. It is edible. The stone is very fibrous.

Distribution: It occurs mainly in the lowlands and foothills below 750 m altitude but grows up to 1900 m altitude. It occurs as scattered individuals. It prefers damp, even wet ground. It is common near the foreshore. They grow in the humid tropics.

Cultivation: Trees grow from seed both as wild and cultivated plants.

Production:

Use: The fruit is peeled and eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Helopeltis clavifer (Walker)	Coreidae (HEM)	Cacao mirid

Diseases:

Pests:

Importance: It is sometimes cultivated around villages. A minor edible fruit in several areas of Papua New Guinea.

Names

English: Horse mango
Tok pisin:
Tok ples:

Scientific name: *Mangifera foetida* Lour.
Synonyms: *Mangifera horsfieldii* Miq.
Plant family: Anacardiaceae



Description: A tree. It grows 10-27 m high. It has rough brown bark. The trunk is straight and can be 1 m across. It does not have buttresses. The bark is brown and has broad flat cracks. The sap causes irritation and it turns black on exposure. The branches are large and the crown is dense. The leaves are dark green. They are oblong and 15-40 cm long by 9-15 cm wide. They are stiff and rough. They are dark green above and clear green underneath. The leaf stalks are 15.8 cm longand are stout with a fattened base. The flowering clusters are upright and form a pyramid shape. These can be 10-40 cm long. The flowers are pinkish red and do not have a scent. The flowers and dead leaves are found on the ground. Pink flowers are on red stems. The fruit is oval and 9-14 cm long by 5-10 cm wide. It is like a mango fruit. The fruit is dull green with a smooth skin. They have small dark spots. The flesh is fibrous and yellow. The juice has a strong smell of turpentine. The stone is plump and 6 cm long by 5 cm wide and 3 cm thick.

Distribution: It is a tropical plant. They grow in the humid tropics.

Cultivation: Plants are grown from seed.

Production: Flowers can be produced throughout the year but often in two main flushes.

Use: The fruit are eaten once they are fully ripe. They are also used in chutney and pickles. The fruit has a turpentine smell which makes it less popular.
Caution: The unripe fruit can irritate the skin. The ripe fruit is peeled thickly to avoid this. The unripe fruit are washed in salted water and sliced and used as a vegetable and in pickles.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	72.5		1.4				56	

Insects:

Diseases:

Pests:

Importance: They are sold in markets in Malaysia and in Brunei. It is only a minor fruit in Papua New Guinea.

Names

English: Wild mango
Tok pisin: Wel mango
Tok ples:

Scientific name: *Mangifera altissima* Blanco
Synonyms:
Plant family: Anacardiaceae

Description: A large tree. It grows 12-35 m tall or taller. The trunk is 35-80 cm across or wider. The small branches are angular with prominent leaf scars. The leaves are long and narrow and pointed at both ends or wedge shaped at the base. They are 15-43 cm long by 2-11 cm wide. They are rough. They are dark green above. The flowers are small and white. They have a smell. They are produced in large numbers on branched compound flowers. The veins are net like. The leaf stalk is 1.5-5 cm long. The flowers stalks are crowded near the ends of the twings. They are 10-25 cm long. The flowers are creamy-white. They occur in groups of 4-5 on side branches. The fruit are 5 to 8 cm long and 4 to 6 cm wide. They are shaped like a mango and are smooth, green and sticky. They turn yellow as they ripen. The flesh is white and fibrous. The stone is 4.5 cm long by 2.5 cm wide annd 1 cm thick.

Distribution: They grow in the humid tropics. It can grow up to 400 m altitude. It does best in places with a wet and dry season. They are common in the forests in the Philippines.

Cultivation: Plants are usually grown from seed. They can be grown by cleft grafting.

Production: A fruit can weigh about 40 g. Fruit can be harvested about 70 days from flowering. They ripen in 6 days.

Use: The fruit are used to make pickles or mixed with vegetables.
The immature fruit are also eaten fresh.
Ripe fruit are used to prepare marmalade.
The seeds are salted and pounded to prepare an edible meal.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	82.0	277	0.7			131 IU	33	

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea it is a minor edible fruit. In some countries it is grown in backyards and fruit are sold in markets.

Names

English:
Tok pisin:
Tok ples: Pendarahan

Scientific name: *Horsfieldia sylvestris* (Hout.)Warb
Synonyms: *Myristica sylvestris* Hout.
Myristica edulis F.v.Muller
Plant family: Myristicaceae

Description: A medium sized tree 15-20 m tall with fairly straight trunk and long narrow leaves. The leaves droop. The yellow pointed fruit hang singly on short stalks along the branches. The fruit is orange on the outside with yellow flesh around a red coated seed. Male and female flowers are separate.



Distribution: Tropical. The tree occurs in the Moluccas and Papua New Guinea, but not in the New Guinea Islands or the Solomon Islands. They occur in primary forest on sandy or clayey soils. They are mainly in the coastal plain. They probably need some shade in the seedling stage.

Cultivation: Trees are planted from seeds.

Production:

Use: The flesh around the seed is eaten raw.
The leaves are used as a spice or flavouring.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea, a fruit tree cultivated at least at Kawito near Balimo in the Western Province.

Names

English: Mangrove nutmeg
Tok pisin:
Tok ples:

Scientific name: *Myristica hollrungii* Warb.
Synonyms:
Plant family: Myristicaceae

Description: A large tree up to 40 m tall with a straight trunk and buttress roots. Twigs have 2 raised lines along them between the leaves. The leaf stalk is 3 cm long and 0.3 mm wide. The leaf is 20-35 cm long x 5-13 cm wide. The base of the leaf is rounded and the tip tapers. The midrib and veins are sunken on the top of the leaf and raised underneath. The veins are almost parallel with fine networks between them. The male flower cluster is a woody scar covered knob. The male flowers have stalks 6 mm long. The female flowers are similar to the male flowers but with thicker shorter stalks. The fruit are oval and 3-6 cm long by 2-4 cm wide. Fruits are yellow with a red covered seed inside. The seed is 3 cm long by 1.5 cm wide.

Distribution: Tropical. Trees are often just behind the mangrove swamps. They can grow up to 920 m altitude. They grow in the lowland rainforests, by rivers and streams.

Cultivation: Trees grow wild from seed.

Production: Fruiting is seasonal.

Use: The fruit is eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

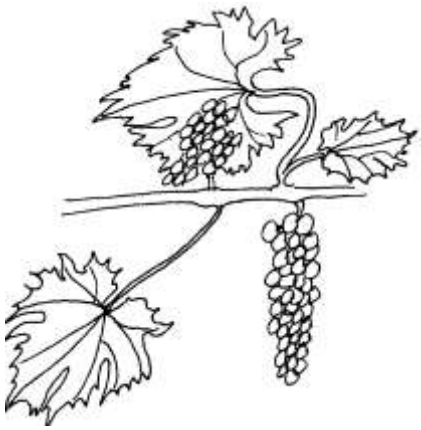
Diseases:

Pests:

Importance: In Papua New Guinea, a common tree in lowland areas of the mainland and islands but only a minor edible fruit.

Names

English: European grape
Tok pisin:
Tok ples:
Scientific name: *Vitis vinifera* L.
Synonyms:
Plant family: Vitaceae



Description: A woody vine which keeps growing from year to year. It is often pruned to reduce its size. It climbs by coiled tendrils which attach to objects. It has large leaves which are roughly heart shaped. They can be entire or be deeply divided into 3-5 lobes. Leaves can be 20 cm across. The edges of the leaf are sharply and irregularly toothed. The tip of the leaf is pointed and the base is rounded. Sometimes the leaves are hairy. The flowers are small and yellow-green. They occur in clusters which are 5-20 cm long and beside the leaves. The 5 green petals drop off together to show 5 central stamens and the ovary. These bear clusters of fleshy fruit.
The fruit is a berry which is generally oval and juicy. The skin can be yellow or violet-black. They are 1-4 cm long. The flesh is edible. They contain a few hard seeds.

Distribution: It mainly grows in Mediterranean-type climates with hot dry summers and cool rainy winters. It needs shelter from the wind. In Nepal it grows up to 1400 m altitude. It suits hardiness zones 6-9.

Cultivation: They are mostly grown from hardwood cuttings. It needs a trellis for support. It is normally pruned to control the growth. A spacing of 2.4 m by 3 m is suitable. Vines are pruned when they have lost their leaves. Pruning in the first year is designed to form the permanent shape of the plant. Nomally it is pruned to allow a single stem with two branches just below the trellis.

Production:

Use: The fruit are eaten ripe and also used for juice and wines, champagnes and brandies.
Sometimes young slightly acid leaves are eaten.
The dried fruit are eaten as raisins.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit raw	80.6	297	0.7		0.3	7	10.8	0.1
Fruit dry	19.2	1184	4.1		3.3	7	4.7	0.7
Leaves	73.3	389	5.6		2.6	2699	11.1	0.7

Insects:

Hippotion celerio (L.)	Sphingidae (LEP)	Grapevine hawkmoth
Oribius spp.	Curculionidae (COL)	Shot hole weevil

Diseases:

Powdery mildew	Fungus	*Plasmopara viticola* (Berk & Curt ex de Bary) Berl & de Toni
Leaf spot		

Pests:

Importance: Only very occasional plants occur in hot humid tropical places like Papua New Guinea and produce very poorly. They are suited to drier Mediterranean places.

Names

English: Wild olive, Yellow plum
Tok pisin:
Tok ples:

Scientific name: *Ximenia americana* var. *america* L.
Synonyms:
Plant family: Olacaceae



Description: A small tree or spiny shrub about 3-4 m high. It has spines about 1 cm long which are thin and straight. The leaves and branches are without hairs. The leaves are alternate, oval and about 2-4 cm long. The leaves are bluish green. The leaves fold upwards along the midrib. The tip of the leaf can be round or with a notch. The flowers are greenish white, have a smell and are less than 1 cm long. They occur in small branched clusters with a common stalk. The fruit are yellow, egg shaped and 2 cm across. They are thin skinned. They are sour. There is one large seed.

Distribution: They occur along the back of coasts and seashores in the Philippines. It occurs in the vegetation near the coastline. The plant occurs in all tropical countries. It is found in savannah in Africa. It is drought resistant. In China it grows in sandy areas behind beaches along the sea shore and mostly below 100 m in S China. In Bolivia it grows up to 900 m altitude.

Cultivation: Plants normally grow wild. The plant often has roots which feed off other plants. Plants can be grown from seed. These can be grown in pots then transplanted or can be sown where they are to grow. As seed do not store well, they should be sown fresh.

Production: Plants are slow growing. They can be pruned as a hedge or cut back and allowed to regrow.

Use: The fruit are eaten fresh or pickled. They are used for jam and jellies. They are also used to make beer.
The nuts are powdered and mixed with sago to make bread.
The kernels of the nuts are recorded as both edible and purgative. They should only be eaten in small numbers.
Caution: The leaves have been reported as poisonous. They contain a cyanogenic glycoside. Young leaves are eaten after cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	78.6	210	2.7		0.7			0.3
Nuts								
Leaves								

Insects:

Diseases:

Pests:

Importance: A minor wild edible fruit (and nut) in several coastal areas of Papua New Guinea.

Names

English: Salak, Snake fruit
Tok pisin:
Tok ples:

Scientific name: *Salacca zalacca* (Gaertn.)Voss
Synonyms: *Salacca edulis* Reinw.
Plant family: Arecaceae



Description: A clumping palm. The trunk is underground. It branches. The plant is covered with long, black, sharp spines. The fronds are erect and 4-6 m long. The leaf stalk is about 2 m long and has large flattened spines. The fronds have leaflets along the stalk. These are in rings. The leaflets are 60 cm long by 5 cm wide. They taper to the tip. They are shiny green above and greyish underneath. Male and female flowers occur on different plants. One cultivar from Bali has male and female flowers on the one plant. The flowering stalks are branched and without spines. The male flower stalks are drooping and 50-100 cm long. The female flowers are in crowded spikes and are 20-30 cm long. The fruit are carried in small clusters between the bases of the leaves. The fruit are 4-8 cm long and pear shaped. They are covered with overlapping brown scales which give it an appearance like a snake skin. The pulp is firm and tart. There is one seed inside.

Distribution: A tropical plant. It does best in lowland tropical areas. It usually grows in marshy ground. Plants can tolerate full sun from an early age.

Cultivation: Male and female plants are normally needed to get fertile seed and fruit. Sometimes single plants can fruit. Plants respond to regular applications of fertiliser. Flower production is improved if old fronds and debris is removed.

Production:

Use: The ripe fruit are eaten fresh or used in preserves.
The unripe fruit can be made into pickles.
The palm cabbage is edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Cabbage								

Insects:

Diseases:

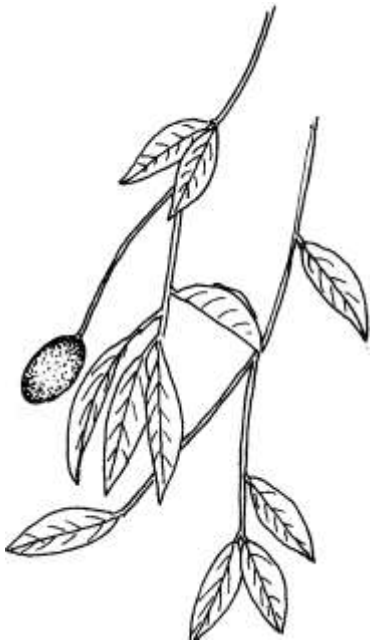
Pests:

Importance: Some plants have been introduced from Indonesia into Sepik coastal villages.

Names

English: Nonda plum
Tok pisin:
Tok ples:
Scientific name: *Parinari nonda* F.v.Muell. ex Benth.
Synonyms: *Parinari papuanum* CT White
Plant family: Chrysobalanaceae

Description: A small tree up to 10-15 m tall. It is often only 3 m tall but can be 34 m tall. It has an open growth habit. The bark is greyish-brown and cracked along its length. The small branches are angular, drooping and hairy. The leaves are narrow, oval and leathery. They are 3.5-8 cm long by 2-4.5 cm wide. They are dark green and smooth on the upper surface and paler with dense white hairs underneath. Under the leaf the midrib is prominent and the veins are like a net. The tip of the leaf has a blunt point. The leaf stalk is short. Flowers are brownish yellow and very small. They occur at the ends of branches and in the axils of upper leaves. The fruit is smallish (2 cm x 3 cm) and brownish. It hangs on the ends of the branches. The fruit has a slightly rough skin due to a brown scaly like layer. The fruit is edible. Inside the fruit is a rough kernel.



Distribution: A tropical plant. The tree grows in lowland areas from 6 to 1300 m altitude in Papua New Guinea. It occurs in moist rainforest and open woodland. It is often in dunes behind sandy beaches. It occurs in northern Australia. It suits seaside dry tropical regions. It can tolerate drought. It needs full sun.

Cultivation: The tree grows wild. They can be grown from fresh seed. It can probably be grown from cuttings of semi ripe wood.

Production: It is slow growing. Fruit occur in August and November (May). Fruit are bitter when fresh from the tree so are best ripened off the tree to make them more sweet. Burying them for a week has been used to improve ripening. They can be harvested after they fall. To make nut-milk the fruit was dried and the kernels crushed and the mash was washed, squeezed and strained to extract the white "nut-milk".

Use: The fruit is eaten raw.
The floury pulp of the fruit can be ground into flour and baked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	78.3	222	1.0		1.5		1	0.4

Insects:

Diseases:

Pests:

Importance: A minor edible wild fruit. The "nut-milk" has been especially used for babies.

Names

English: Santol
Tok pisin:
Tok ples:

Scientific name: *Sandoricum koetjape* (Burm.f.)Merr
Synonyms: *Melia koetjape* Burm. f.
Plant family: Meliaceae



Description: A medium sized tree. It loses its leaves. It grows up to about 25-50 m high. It is 80 cm across the trunk. It can have buttresses 3 m tall. Branches normally develop after 7-10 m. The crown is dense and dark green. The leaves are alternate and have 3 leaflets. The leaves are 18-40 cm long. The leaflets are hairy. They are pointed at the tip and more rounded at the base. They are 10 to 25 cm long. The end leaflet is the largest. The flowering cluster is 2.5-24 cm long. The flowers are greenish yellow and about 1 cm long. They occur in considerable numbers in compound flower clusters. The fruit are rounded and 4 to 6 cm across. They cluster like grapes. The fruit have one stone. They are yellowish or red with a thick outer covering. The flesh of the fruit is white, juicy and allows light through. The seeds are large. The pulp of the fruit is edible.

Distribution: It is native to SE Asia. It is a tropical plant. It can withstand light frosts. It needs light. They occurs throughout the Philippines and is very common both wild and cultivated.

Cultivation: Plants can be grown from seed, air-layering or budding.

Production: It is fast growing.

Use: The fruit are eaten raw or made into preserves. The skin can be eaten.
Fruit are made into alcoholic beverages. This is done by fermenting them with rice.
The leaves are eaten.
The fruit are eaten. The seeds are removed and the skin taken off. They are then boiled and later candied with sugar.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	85.0	192	0.9		0.4	3	86	
Leaves								

Insects:

Diseases:

Pests:

Importance: They are not common in Papua New Guinea.

Fruit (Continued)

English name	Tok Pisin	Scientific name	Page
Rambutan		*Nephelium lappaceum*	**486**
Rhubarb		*Rheum rhaponticum*	**487**
Panama berry		*Muntingia calabura*	**488**
Pomegranate		*Punica granatum*	**489**
Mulberry		*Morus alba*	**490**
Persian mulberry		*Morus nigra*	**491**
Indian mulberry		*Morinda citrifolia*	**492**
Ceriman, Monstera		*Monstera deliciosa*	**493**
Garraway lime		*Microcitrus garrawayae*	**494**
Olive		*Olea europaea*	**495**
Fei banana		*Musa maclayi*	**496**
		Musa ingens	**497**
Sapodilla		*Manilkara zapota*	**498**
Litchi		*Litchi chinensis*	**500**
		Maesa edulis	**501**
Langsat		*Lansium domesticum*	**502**
Rosella		*Hibiscus sabdariffa*	**503**
Garuga		*Garuga floribunda*	**504**
Kumquat		*Fortunella margarita*	**505**
Fig		*Ficus carica*	**506**
Persimmon		*Diospyros kaki*	**507**
Velvet apple		*Diospyros blancoi*	**508**
Tulican		*Diospyros hebecarpa*	**509**
Longan		*Dimocarpus longan*	**510**
Elephant apple		*Dillenia indica*	**511**
Golden beach		*Dillenia alata*	**512**
Akee		*Blighia sapida*	**513**
Black currant tree		*Antidesma ghaesembilla*	**514**
Wild currant		*Antidesma erostre*	**515**
Chinese laurel		*Antidesma bunius*	**516**
Chinese gooseberry		*Actinidia chinensis*	**517**
Broad leafed lillypilly		*Acmena hemilampra* var. *hemilampra*	**518**
		Aceratium oppositifolium	**519**
Feijoa, Pineapple guava		*Acca sellowiana*	**520**

Names

English: Rambutan
Tok pisin:
Tok ples:
Scientific name: *Nephelium lappaceum* L.
Synonyms:
Plant family: Sapindaceae

Description: A medium sized tree up to 12-25 m high. It keeps its leaves throughout the year. Trees spread to 6 m wide. The leaves are alternate with leaflets opposite along the stalk. There are 5-7 pairs of leaflets. Each leaflet can be 20 cm long by 8 cm wide. The leaflet stalks are short and the leaflets are pointed at the tip and rounded at the base. The flowers are very numerous on compound flower arrangements. Seedling trees can produce only female or only male trees. Some kinds have both male and female flowers or both flower parts in the one flower. The fruit are dark red with many prominent projections united at the base. The colour can vary between yellow, green, orange and bright red. Sometimes trees are separately male and female and sometimes seedless fruit is set. Often male and female flowers are separate but on the same tree. The fruit hang in loose clusters of 10-12 and are up to 5 cm long. Normally each fruit contains one large seed.



Distribution: It is native to Malaysia. It requires a moist hot climate mostly within 12° of the equator. They extend from sea level up to altitudes of about 500 m in equatorial zones and will grow about 17° from the equator. They do best where the temperature is constant around 28°C or range from 22-30°C and rainfall of 2000 to 5000 mm per year. Low humidity can cause scorching of leaves. Excessive rainfall before flower formation reduces flowering. A dry period of about one month assists flower initiation and areas with two seasonal dry periods can get double crops. A well drained soil is needed. It suits hardiness zones 11-12.

Cultivation: Trees can be grown from fresh seeds. The seeds are short lived so need to be planted fresh, after washing. Germination takes place in 7-10 days. Seedlings are not easy to transplant. Roots are very sensitive to drying out. Selected trees can be propagated by budding or airlayering. Seedling trees vary considerably in quality due to cross pollination. Planting densities of 80-120 trees per hectare occur. About 1% male flowers are sufficient if enough pollinating insects are present. Some kinds need to have varieties mixed in the garden to get good fruit set. Twice yearly applications of organic manure are often used.

Production: Seedling trees can start to bear after 6 years. Fruiting is seasonal. Flowering occurs during the dry season. The main fruit season is November to March. Fruit mature about 110 days after flowering. Where trees with only female flowers occur male pollinator trees are needed. Fruit can weigh 20 to 40 g each. Fruit need to be harvested when ripe.

Use: The fruit are eaten fresh. Fruit that are more sour are eaten stewed.
The seeds are sometimes roasted and eaten. The seed can be used for oil.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	82.0	271	1.0		1.9	0	53	0.1

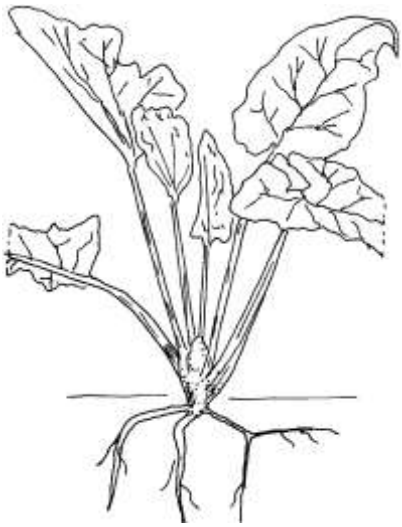
Insects: **Diseases**: **Pests**:

Importance: It is an important fruit tree in SE Asia. Trees have been planted in several coastal areas of Papua New Guinea and produce well.

Names

English: Rhubarb
Tok pisin:
Tok ples:

Scientific name: *Rheum rhaponticum* Linn.
Synonyms:
Plant family: Polygonaceae



Description: A clumpy plant with broad leaves. They grow to 1.2 m high. It has long leaf stalks which are mostly red in colour. The leaf stalks have a channel on the upper surface. The leaves are large and heart shaped at the base. They have a wavy edge. The roots are thick and clustered. They are woody and underground forming a crown. The stems arise individually from this. The flowers grow in tall dense leafy panicles which branch close to the stem. They can he cream, white or yellow. They can be 3 m high.

Distribution: It grows between 750 and 2600 m altitude in the tropics. It needs a fertile soil. It needs a sunny location. It suits hardiness zones 6-10.

Cultivation: Plants are grown by division of the rootstock. Plants can be grown from seed. Seedlings are not easy to transplant. So seed should be sown shallowly and plants thinned to 15-100 cm apart. Flowers should be removed to encourage leaf stalk growth. Leaf stalks can be forced by covering the plant with a container and keeping it warm and dark. Stalks grow more rapidly but the plant is weakened quickly.

Production: Once crowns are well established, leaf stalks are produced very regularly. The leaf stalks are removed regularly. They should be pulled off the crown, not broken or cut off.

Use: The sour leaf stalks are eaten after cooking with sugar. They are also used in sauces and pies.
Caution: The leaves are poisonous due to oxalates.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Stalk	94.6	25	0.6		0.4	55	8	

Insects:

Oribius inimicus Mshl.	Curculionidae (COL)	Shot hole weevils

Diseases:

Leaf spot	Fungus	*Aschochyta rhei* (Ell. & Ev.)Ell & Ev.

Pests:

Importance: Stalks are sold in a few highland markets in Papua New Guinea.

Names

English: Panama berry
Tok pisin:
Tok ples:

Scientific name: *Muntingia calabura* L.
Synonyms:
Plant family: Muntingiaceae

Description: A small tree up to 5-12 m high. The trunk is 15-20 cm across. Branches are wide spreading and almost horizontal. The young shoots are covered with hairs. The leaves are alternate and elliptical. They are 4-5 cm long and 3-4 cm wide. The leaves are unequal at the base. The leaves have teeth along the edge. The leaf is dark green on top and dull below. The flowers are small and white or cream. They occur as one or two in the axils of leaves. The fruit stalk is 1.5 cm long. The fruit are small red berries 1-2 cm across. They have many tiny seeds. The fruit are edible.



Distribution: It is native to the West Indies and South America. A tropical plant. They suit sandy coral soils of low islands. They grow from sea level up to about 1000 m altitude in the tropics. They need a warm, sunny, sheltered position. It suits hardiness zones 10-12.

Cultivation: Trees can be grown from seed. They can also be grown from cuttings of half ripe wood. Seed germinate more readily if they have passed through bats. This means the plant often spreads naturally. Seedlings do not tolerate shade.

Production: Trees grow fairly quickly. Fruit is produced in the second year. Trees flower and produce fruit all year round. Fruit ripen in 6-8 weeks.

Use: The berries are eaten raw. They can be used for jam.
The leaves can be used for tea.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Root rot	Fungus	*Phellinus noxius* (Corner)G H Cunn.
Shoots affected by Pink disease	Fungus	*Corticium salmonicolor* Berk & Br.

Pests:

Importance: It is one of the most common roadside trees in SE Asia. The fruit are eaten especially by children. Trees have been planted as small ornamentals in some coastal areas of Papua New Guinea.

Names

English: Pomegranate
Tok pisin:
Tok ples:

Scientific name: *Punica granatum* L
Synonyms:
Plant family: Punicaceae



Description: A shrub. It grows up to 2-6 m tall. It has short thorns. It can grow up to 10 m tall. Usually trees lose their leaves at one season during the year. The trunk is covered by reddish-brown bark. Trees often sucker near the base. The leaves are opposite, entire and 8 cm x 1.5 cm. Leaves narrow towards the base. It has large scarlet flowers. These are at the ends of branches. 1-3 flowers occur together. The fruit is round, leathery skinned and up to 10 cm across. It is yellow brown in colour. Inside there are angular hard seeds in a juicy yellow pulp. The seeds are 10 mm long.

Distribution: It is native from SE Europe to the Himalayas. It suits drier subtropical climates. It suits areas with a long hot dry summer and cool winter. A humid climate affects fruit formation. They have borne fruit in Papua New Guinea at 1620 m altitude. They are mostly coastal up to 500 m in the tropics. Trees are severely damaged by temperatures below -11°C. In Nepal they grow to about 2700 m altitude. It suits hardiness zone 8-11.

Cultivation: They are easily raised by seed. They are best propagated by layering or grafting but cuttings or root suckers can be used. Cuttings root easily. Cuttings 30 to 50 cm long of one year old wood can be used. Pruning of sucker growth and surplus branches is needed. A spacing of 4-5 m is suitable.

Production: Trees bear after about 2-3 years. Fruiting is seasonal. The season tends to be Dec to May. The tree loses its vigour after about 15 years but trees can live for many years. The pomegranate is self-pollinated as well as cross-pollinated by insects. Cross-pollination increases the fruit set. Fruit matures 5 to 7 months after flowering. Fruit need to be picked when mature to prevent splitting. Fruit develop a distinctive colour and have a metallic sound when tapped, when they are ripe.

Use: The juicy pulp around the seeds is eaten.
The juice can be used for a drink.
The seeds are dried with their aril and used in the Indian condiment Anardana.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	81.0	285	1.0		0.3	0	6	0.1
Seeds								

Insects:

Nipaecoccus vastator (Mask.)	Pseudococcidae (HEM)	

Diseases:

Sooty mould	Fungi	*Chaetothyrium sp.*
	and	*Microxyphium sp.*

Pests:

Importance: Occurs in some areas of Papua New Guinea.

Names

English: Mulberry
Tok pisin:
Tok ples:

Scientific name: *Morus alba* L.
Synonyms:
Plant family: Moraceae



Description: A small tree up to 9 m high but it can grow to 20 m tall. Often it is low and spreading. It has dark green toothed leaves. The leaves vary considerably in shape even on the one tree. They can be oval, heart shaped or 3 lobed and 5-15 cm long. The tip is pointed and the leaf is on a stalk 5 cm long. The upper surface is smooth but there can be some hairs on the veins underneath. Male and female flowers occur separately either on the same or separate plants. The flowers are greenish and in spikes which droop down. The fruit is a dark red or black berry but pale kinds also occur. The fruit is about 2 cm long.

Distribution: It is native to N. China. A warm temperate plant. The white mulberry (*M.alba*) is normally used for silk worms and the black mulberry suits more highland regions. The normal range is 700 to 2200 m altitude in the tropics. Once established it can tolerate heat and drought. It suits hardiness zones 4-10.

Cultivation: Plants can be grown from seed but seed are slow to germinate. If seed are used they should be soaked in cold water for 48 hours. Trees from seeds take a long time to bear. It is better to grow trees from cuttings. Trees can also be grown by grafting. Because trees "bleed" it is best not to do too much pruning but trees can be topped or trained.

Production: Cuttings produce fruit in 3 years while it takes 5-8 years for seedling trees. Fruit is produced seasonally. The fruit season is normally September to December in the southern hemisphere.

Use: The fruit is eaten raw or used in juice, stews and tarts.
The leaves are edible. (Leaves are also used for silk worms.)
The bark can be roasted and ground into a flour.
NOTE The stain from the fruit can be removed by rubbing with an unripe fruit.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	80.2	152	1.3		0.5	Tr	10	0.1
Leaves								
Bark								

Insects:

Bothrichara palliata Macleay	Cerambycidae (COL)	
Cassena intermedia Jacoby	Chrysomelidae (COL)	
Howardia biclavis (Comstock)	Diaspididae (HEM)	
Icerya seychellarum (Westwood)	Margarodidae (HEM)	
Lagria sp.	Chrysomelidae(COL)	
Maconellicoccus hirsutus (Green)	Pseudococcidae (HEM)	Hibiscus mealy bug
Oribius destructor Mshl	Curculionidae (COL)	
Oribius inimicus Mshl.	Curculionidae (COL)	Shot hole weevils
Parasaissetia nigra (Nietner)	Coccidae (HEM)	Nigra scale
Planococcus pacificus Cox	Pseudococcidae (HEM)	
Rhyparida coriacea Jac.	Chrysomelidae (COL)	Beetle feeding on leaves
Tiracola plagiata Walk	Noctuidae (LEP)	Cacao armyworm

Diseases:

Pests:
Importance: Trees moderately common in most highland areas of Papua New Guinea for fruit and leaves. (Also cultivated for silkworms.)

Names

English: Persian mulberry, Black mulberry
Tok pisin:
Tok ples:

Scientific name: *Morus nigra* L.
Synonyms:
Plant family: Moraceae

Description: A deciduous tree. It is a medium sized tree which grows 10-12 m high. The trunk is short and then branches widely. It has an extensive root system. The bark is dark brown. The young branches are hairy. The leaf stalk is 1.5-2.5 cm long. The leaf blade is oval and 6-12 cm long by 7-11 cm wide. The flowers are small and greenish. The fruit is blackish purple when mature. It is 2-2.5 cm long by 1.5-2.5 cm wide.

Distribution: It grows in temperate Asia. It will grow on most types of soils. The soils need to be well-drained. The black mulberry will grow in colder places than the white mulberry. It suits hardiness zones 5-10.

Cultivation: It is grown by cuttings of 1-2 year old wood. Larger cuttings make faster growth. Cuttings are taken while trees are dormant in winter. Cuttings should be 1.5-2.5 cm across and 25-35 cm long. They need to be planted in sandy soil to half their depth. Grafted plants can also be used.

Production:

Use: The fruit are eaten. They can be eaten raw or preserved. They can be used for jams, jellies, and drinks.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	87.7	180	1.4		1.9	3	36	0.1

Insects:

Diseases:

Pests:

Importance:

Names

English: Indian mulberry
Tok pisin:
Tok ples: Noni

Scientific name: *Morinda citrifolia* L.
Synonyms: *Morinda tinctoria* Ridley
Plant family: Rubiaceae

Description: A small evergreen tree. It grows 4-10 m tall and spreads 2-6 m wide. The branches are thick and somewhat 4 angled. It has large oval leaves which grow opposite each other along a four sided shiny branch. The leaves have a small leaf like appendage at the base of the leaf stem which is fused into a type of sheath. The leaves are 12.5-31 cm long by 6.2-15 cm wide. The stalks are 0.6-2.5 cm long. The flowers are numerous. They are 1.5 cm across. They grow in clusters in the axils of leaves. The fruit are rounded and small each with two 1-seeded nutlet. The fruit are yellowish white when mature, with warty looking lumps. They are about 6 cm across. The fruit is a little like soursop and has an unpleasant smell when ripe.



Distribution: They are common along the seashores throughout the Philippines. The trees grow wild in coastal areas and are also planted. They suit dry areas because of high drought tolerance. It is part of the coastal vegetation behind the beach. They can grow on sand and have salt tolerance. Seeds can float easily in salt water. Trees can grow up to about 1500 m altitude. Trees cannot stand frost.

Cultivation: Trees are grown from seeds. Seeds remain viable for at least 6 months. Seeds are planted in a nursery. They germinate in 3-9 weeks after sowing. Within 6 months trees grow to 1.5 m. Flowering and fruiting start in the third year. Trees last for up to 25 years.

Production:

Use: The young leaves are cooked as a vegetable or pot herb.
The fruit can be eaten raw or cooked. It is often eaten with salt. Green fruit are curried.
(Red, yellow and brown non edible dyes are obtained from the root.)

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	86.1	160	0.8		1.1		56	
Leaves	77.6	449	4.5		2.3		50	

Insects:

Diseases:

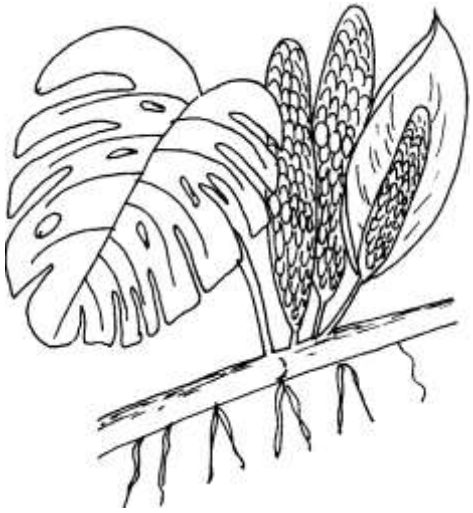
A light brown target leaf spot	Probably fungus	

Pests:

Importance: Trees are moderately common in some lowland areas of Papua New Guinea. Fruit are used more than the leaves. It is a minor food.

Names

English: Ceriman, Monsteria, Fruit Salad Plant **Scientific name:** *Monstera deliciosa* Liebm.
Tok pisin: **Synonyms:**
Tok ples: **Plant family:** Araceae



Description: A woody climber with large leaves with natural holes. It attaches itself to trees by roots at the nodes and climbs up to 15-20 m high. The stem is stout and crooked. The have a few branches. The leaves are glossy green. The leaves are divided around the edge. The leaves are 30-90 cm across. Young leaves are usually on shorter stalks, smaller and entire. The flowers are lily like and green. It has long (20-40 cm) cone like fruit.

Distribution: It does best in rich, moist, well-drained soils. It suits a protected, shady position. It bears fruit between 700 m and 2300 m altitude in the equatorial tropics but the plant grows down to the coast. It is damaged by drought and frost. Seed need to be sown at a temperature between 18-24°C. The plant needs a temperature above 15°C. It suits hardiness zones 11-12.

Cultivation: It is easily propagated by cuttings. Stem cuttings with one or two nodes or eyes are used. These are placed horizontally in potting mix. Putting these in a warm place with bright light but not direct sunlight quickens rooting. It should have a trellis, tree or wall to climb against. Plants can be grown from seed. Fruit can be ripened evenly by cutting them as soon as the base starts to ripen then wrapping them in paper for few days.

Production: The fruit take about a year to mature after flowering.

Use: The fruit is edible.
The fruit pulp can be strained and used as a drink.
Caution: The unripe fruit have irritant crystals which sting the mouth.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:
Leaf spot

Pests:

Importance:

Names

English: Garraway lime
Scientific name: *Microcitrus garrawayae* (Bailey) Swingle
Tok pisin:
Synonyms:
Tok ples:
Plant family: Rutaceae

Description: A shrub. It has a dense bushy habit. It can grow up to 15 m tall but is often 2-6 m tall and 2-4 m wide. Leaves are 1-6 cm long and 1-2.5 cm across. The leaves are broader than finger lime. The leaves are dull green, thick and leathery. Sometimes leaves have broad notches at the tip. Twigs have thorns. The flowers occur singly in the axils of leaves. They are 1 cm across and white. They have a scent. The fruit are finger shaped and 5-10 cm long by 1-3.5 cm wide. They have both a green skin and a green pulp. The skin is up to 2 mm thick and rough. The skin contains large oil glands. Cut fruit smell of citrus. There are few seeds which are 7 mm long.

Distribution: A tropical and subtropical plant. It grows naturally in the Gulf District in Australia and on Goodenough island in Papua New Guinea. It grows as an understorey shrub in the deciduous vine forests. Plants need some protection when small. They need good drainage.

Cultivation: Plants can be grown from seed. They can be grown from cuttings on a heat bed but rooting is slow and can take 6 months. They can be budded onto citrus rootstocks. Because the buds are small this takes some skill to be successful.

Production: Plants are slow growing. In Australia, plants develop flowers from August to December and fruit from April to November. An average fruit weighs 25 g.

Use: The fruit can be used for processing into drinks or marmalade.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance:

Names

English: Olive
Tok pisin:
Tok ples:

Scientific name: *Olea europaea* L.
Synonyms:
Plant family: Oleaceae

Description: A medium sized evergreen tree. It grows to 16 m high and can spread to 10 m wide. The trunk is often gnarled and twisted. The leaves are greyish-green. They are feather shaped and grow opposite each other. Leaves are replaced every two or three years. The flowers are small and cream coloured. They are on long stems in the axils of leaves but are hidden by the leaves. Some flowers contain both male and female parts while others are male only. Pollination is by wind but most olives are self pollinated. Fruit set is better with cross pollination and some varieties can only be cross pollinated. The fruit is small and green or black and oily. The shape, size and colour of fruit vary with variety.

Distribution: Olive require a long hot growing season to properly ripen the fruit. They also need sufficient winter chill to insure fruit set. Plants can survive frosts but green fruit can be damaged as -2°C. Trees are wind tolerant. Olives can grow on any well drained soil up to pH 8.5. They can tolerate mild saline conditions. It suits hardiness zones 8-10.

Cultivation: Growing trees from seed mean they revert to wild small fruited kinds. Seed are poorly viable and may take 2 years to germinate. Normally trees are grown by budding or grafting. Suckers can be used but these may be wild seedling kinds. Trees can be grown from cuttings. Cuttings 30-35 cm long and 3-8 cm thick from 2 year old wood are used with rooting hormone. Thinning the crop can increase fruit size. Thinning to 2-3 fruit per twig is best. Pruning both regulates growth and shapes the tree. Careful pruning can avoid bearing in alternate years. Olives never bear fruit in the same place twice and normally produce on the previous year's growth.

Production: Trees can reach bearing age in about 4 years. Trees can live for 500 years. Green olives are picked unripe, black olives when ripe.

Use: The fruit is used after being preserved. It is also used for oil. Raw fruit contain an alkaloid making them bitter and unpalatable. This is removed by lye curing then washing with water and then transferring to a saline solution.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	80.0	481	0.84		1.6	40	0.9	0.2

Insects:

Diseases:

Pests:

Importance: A minor introduced fruit in Papua New Guinea.

Names

English: Fei banana

Scientific name: *Musa maclayi* F.Muell ex Miklouho-Maclay

Tok pisin:

Synonyms:

Tok ples:

Plant family: Musaceae

Description: A dark green stemmed banana with an upright bunch of fruit. The plant has red sap. The fruit is largely seedless.

Distribution: They occur in small numbers in many areas of PNG.

Cultivation:

Production:

Use: The fruit is eaten.
Caution: After eating the fruit, the faeces and urine become red.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: A minor edible fruit in some coastal areas of Papua New Guinea.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Musa ingens* Simmonds
Synonyms:
Plant family: Musaceae

Description: A wild banana with angular seeds in the fruit. The seeds are up to 8 mm across and the fruit are green but turn yellow/brown when ripe. The fruit are close together on the bunch.



Distribution: It grows wild in some areas between 1000 and 2100 m altitude.

Cultivation: It grows from seeds and also has some suckers.

Production:

Use: The central pith of the false stem of some kinds is used as a food by hunting parties.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Stem								

Insects:

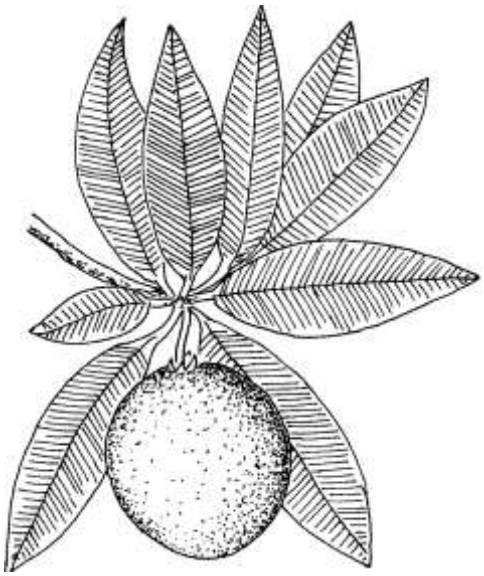
Diseases:

Pests:

Importance: A very minor food.

Names

English: Sapodilla
Tok pisin:
Tok ples:
Scientific name: *Manilkara zapota* (L.)Van Royen
Synonyms: *Achras sapota* L.
Plant family: Sapotaceae



Description: A medium sized evergreen tree up to 18 m tall. It can grow to 30 m in tropical regions. The leaves are 8-12 cm long by 2-4 cm wide. The leaves are green and shiny. The leaves tend to be clustered in spirals near the ends of twigs. The flowers are single and white in the axils of leaves. They are bell like and 1 cm across and produced on long stalks. The fruit has several smooth black shiny seeds. The fruit are normally in pairs and 5-8 cm across. It is rusty brown in colour. The fruit can be seedless or can have up to 3 to 12 hard shiny seeds inside. The seeds are flattened and about 2 cm long. The tree has a milky juice.

Distribution: It is a tropical plant. It will grow in subtropical climates.
It needs a warm climate above 18°C to 24°C. Tree can stand temperatures down to freezing for short periods of time. Frost will kill young trees but mature trees can tolerate reasonable frosts. Good year round rainfall is needed especially for young trees. It will probably grow up to 1000 m in the tropics but is better at lower altitudes. It can tolerate some salt in the soil. They need good fertile soil. It can grow in heavy clay soils. It can grow in acid soils. Young trees need extra fertiliser for good growth. It does best in sunny positions. It cannot tolerate waterlogged soils but can withstand drought. It can stand strong winds. It suits hardiness zones 10-12.

Cultivation: Trees can be grown from fresh seeds but they are not true to type. This has resulted in many varieties which vary in fruit shape and size. It is best to use grafted plants. Seed remain viable for several years. Better varieties should be grown by grafting or airlayering. Trees can be grown from cuttings of mature branches. Seedling trees tend to be taller. Growing from cuttings is not easy. A spacing of 8-9 metres is suitable. Thinning of fruit is rarely undertaken as sap discolours other fruit. Topping of the tree can be done if the tree becomes too tall. Trees need little pruning.

Production: Trees are slow growing. Seedling trees take about 8-10 years to commence bearing. Grafted trees bear when about 4-5 years old. Fruit takes about 4-6 months after flowering to mature. There can be several bunches of fruit throughout the year. The fruit should be harvested when fully ripe to avoid the sticky latex. Often there are two crops each year. A well established 10 year old tree can produce 200-250 kgs of fruit per year. Fruit need to be fully ripe. It is not easy to determine ripeness except for a slight colour change. Allowing fruit to fall ensures full maturity. The fully ripe fruit are eaten. Fruit weigh about 110 g. Fruit can be stored at 2°C for 6 weeks.

Use: The fully ripe fruit are eaten. The fruit are eaten fresh. They can be used for drinks, jams or jellies. The unripe fruit can be pickled.
The juice can be boiled into syrup or made into syrup or wine.
The bark contains a gummy substance (chicle) used for chewing gum.
The very young shoots and leaves may be eaten, but older leaves contain an alkaloid poison.
Caution: The seeds are hooked and can catch in the throat so should be removed.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	74.0	361	0.5		0.7	10	12	0.1
Leaves								

Insects:

Diseases:

Pests:

Importance: Fruit are sold in markets. It is a popular fruit in SE Asia. It has been introduced to Papua New Guinea and is not yet common.

Names

English: Litchi, Lychee
Tok pisin:
Tok ples:

Scientific name: *Litchi chinensis* Sonnerat
Synonyms:
Plant family: Sapindaceae



Description: A medium sized evergreen tree. It grows up to 15 m tall but can be 35 m tall. It has a dense round crown. The trunk is smooth and grey with brittle trunk and branches. The trunk can be 1 m across. Leaves are shiny and light green. The leaves are reddish when young. They are leathery and divided into 4-8 leaflets. The leaflets are oval and taper to the tip. The flowers are pale green and in loosely branched groups at the ends of branches. It bears bunches of rough skinned pinkish fruit 3-4 cm across. These droop in clusters. There are 3 subspecies ssp. *chinensis*, ssp. *philippinensis*, ssp. *javensis*. There are many cultivated varieties.

Distribution: It is native to Asia from China to Malaysia. It grows satisfactorily in the humid equatorial lowland areas but does not fruit. For fruiting it needs to be at a higher altitude or latitude because it has a cold temperature chilling requirement. Most varieties need between 100 and 200 hours of standard chilling (0° and 7°C). It needs a deep moist soil and freedom from frost. Trees can stand temperatures down to -2°C when mature. Temperatures below 5°C at flowering upset normal flower opening. Cool dry climates are important. Although litchi will grow on a range of soils, well drained soils are best. A pH between 5.5 and 7.5 is suitable. It suits hardiness zones 10-11.

Cultivation: Trees are mostly grown from seed but they do not breed true and are slow to produce. Trees can be propagated by aerial layering, grafting or cuttings. Air layering is best. Seeds do not store well (4-5 days), so fresh seed must be sown. Air layers on mature branches in the warmer season are best. Branches of 2 to 2.5 cm across with 45 cm of shoot are suitable for air layers. A spacing of 10-12 m is suitable. Good soil preparation prior to planting enables good early growth. Organic matter dug in over 1 metre square and 30 cm deep 3 months before planting is good. A stick for support of the young plant and shelter are needed at planting. A pH of 5.5 to 6.0 is required. Because it is shallow rooting, cultivation should be avoided and mulching practised. Small amounts of fertiliser added often is the appropriate method. Lychee trees have a high water consumption. Only limited tree training is required. Often no general pruning is required. Plants need adequate water but not waterlogged soil.

Production: Vegetatively propagated trees bear in 4-6 years. Fruiting is normally seasonal. It takes 140 days from flowering to fruit maturity. Fruit need to be harvested ripe from the tree. The normal harvesting method is to remove the fruit with a few cm of the stem still attached. Early fruit set is affected by vegetative growth at flowering. Insects (bees) are important for fruit set. Wind breaks are essential because wind at flowering can reduce fruit set.

Use: The fleshy pulp around the seeds is eaten. They are eaten fresh, preserved or dried.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	80.6	286	1.1		0.5	0	49	0.1

Insects: **Diseases**: **Pests**:

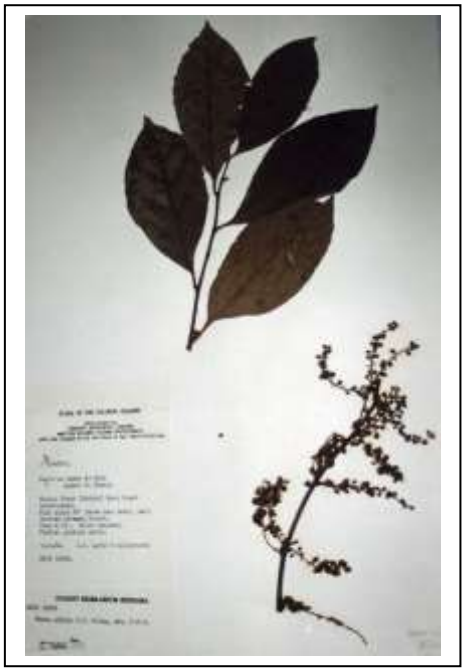
Importance: It is an important fruit in Asia and is exported. It has been introduced into Papua New Guinea and trees grow well but fruiting is rare probably because trees should be at mid altitude zones.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Maesa edulis* White
Synonyms:
Plant family: Maesaceae

Description: A small spreading tree or large shrub up to 8 m high with dark green leaves. The leaves are papery and long. Flowers occur with 2-4 together in a cluster. The flowers are bell shaped with an orange centre. The fruit is cream coloured and transparent with black seeds visible from the outside. It has a sweetish pulp.



Distribution: It grows in coastal areas in lowland rainforest on both the mainland and islands.

Cultivation: Trees are fruiting at least February to August.

Production:

Use: The fruit is edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea, a minor wild edible fruit with a pleasant taste.

Names

English: Langsat
Tok pisin:
Tok ples:
Scientific name: *Lansium domesticum* Correa
Synonyms:
Plant family: Meliaceae



Description: An upright slender tree to 12-20 m high. It has sticky sap. The leaves are alternate and simple. Leaves are up to 40 cm long and made up of 5-7 large leaflets. The flowers are yellow in spikes from old wood mostly on the branches. The flowers have 5 petals which join to form a tube. The flowers have a sweet smell. The fruit is 3-5 cm across and divided into 5 segments with 1-2 large seeds. The fruit is borne in long drooping clusters. There can be 25 fruit in a cluster. The fruit is pale yellow when ripe. It develops a brown scurf on the surface as it ripens. The seeds are green and bitter and are not eaten. Langsats have thin skin, milky juice and are oval and 3.7 cm across. Dukus have thick skin, are round, do not have milky juice and are 5 cm across. They are also sweeter than Langsat.

Distribution: It is native to Malaysia. It is a tropical plant. It occurs in coastal areas and probably up to 700 m altitude in the tropics. A rich deep well drained soil is needed. It suits humid places and is not suited to places with a distinct dry season. It does well in part shade. It can tolerate lower temperature, rainfall and humidity than rambutan.

Cultivation: Trees are mostly grown by seed. Seeds remain viable for about 5 weeks if kept moist. Seeds should be washed and cleaned before planting. Seeds are planted 1 cm deep in a nursery. Germination takes 1- 3 weeks. When seedlings are 15 cm tall they are put into nursery beds for 1-2 years before being planted out in the field. Seedlings do not come into bearing for 12-20 years. They can be grown by budding. Buds should be put onto 4 year old rootstocks of the same species. Buds dry out quickly so should be inserted immediately. Propagation by grafting, marcottage and cuttings is difficult. A spacing of 8-10 m is suitable. Seedlings dry out quickly, so need to be transplanted carefully. Shade is normally provided for the first few years.

Production: Trees are slow growing. Fruit production is seasonal. The season tends to be from December to March. Often trees have large crops every second year. Trees start to produce after 5-8 years but can take 15 years to bear fruit. Fruit will only last about 4 days at normal temperatures. They can be stored at low temperatures for several weeks.

Use: Fruit is eaten fresh after they fall. Seedless fruit can be bottled in syrup.
NOTE The stickiness of the juice of the fruit can be removed by dipping it in boiling water.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	86.5	238	0.8			5		

Insects:

Diseases:

Pests:
Importance: It is an important fruit in SE Asia. In Papua New Guinea, introduced to research farms and now being grown in a few places.

Names

English: Roselle, Rosella
Tok pisin:
Tok ples:

Scientific name: *Hibiscus sabdariffa* L.
Synonyms: *Abelmoschus sabdariffa*
Plant family: Malvaceae



Description: A branched shrub up to 2 m high. It has reddish stems, leaves and fruit. Different types vary in their height, shape and leafiness. The leaves are 7-10 cm across and lobed. The upper leaves often have more lobes than the lower leaves. The flowers are large and yellow and in the axils of the leaves. They are carried singly. The bracts at the base of the flower are enlarged and form a fleshy red fruit. This capsule is 3 cm long and contains 22-34 seeds. The seeds are dark brown and 4-6 mm long. 1000 seeds weigh about 25 g.

Distribution: It grows from sea level up to about 1000 m altitude. It will tolerate a range of soils. It requires short days for flowering. They will grow in semi arid locations. It grows best where average temperatures are in the range 25-30°. Plants will tolerate high temperatures. They grow up to 800 m altitude in Africa. A rainfall of 450-550 mm distributed over a 90-120 day growing period is required. It cannot tolerate waterlogged soils. It suits hardiness zones 10-12.

Cultivation: Seeds are sown and the seedlings can be transplanted. They are transplanted when 15-20 cm high. Seed should be planted 1-2.5 cm deep. A spacing of 50 cm x 50 cm is suitable although a wider spacing is used for fruit and a closer one for leaves. Plants can be propagated by cuttings.

Production: Fruit are ready 12-15 weeks after sowing. The bracts are picked 15-20 days after flowering. They can produce about 1 kg per plant. The yield of leaves can be 10 tons per hectare.

Use: The swollen bases of the flowers are used for jams or drinks.
The young leaves can be cooked and eaten. They can also be dried and used.
The flowers can be used to flavour drinks.
The seeds can be eaten. They can be pressed for oil.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Flower base	86.0	185	1.6		3.8	29	14	
Leaves	86.4	185	10.9		1.5		35	4.1
Seeds								

Insects:

Diseases:

Pests:

Importance: The leaves are flowers are sold in markets in India. In Papua New Guinea, not common except in areas where people have been encouraged to grow it. eg Sepik.

Names

English: Garuga
Tok pisin:
Tok ples:

Scientific name: *Garuga floribunda* Decne
Synonyms: *Garuga pacifica* Burkill
Plant family: Burseraceae

Description: A small tree. It grows 8-12 m tall and spreads 5-10 m wide. The branches are thick and have scars left where the leaves have fallen. The leaves are crowded at the ends of branches. The leaves are 10-30 cm long and divided into leaflets along the central stalk. There are 14-16 leaflets and these are 4-8 cm long by 2-4 cm across. They are oval or sword shaped. They are leathery and dark green on the upper surface and paler underneath. They taper towards the tip and have unequal slanting sides at the base. Young leaves often have a reddish tinge. The flower branch is 20-30 cm across and occurs at the ends of small branches. They flowers are greenish white and hairy and 1 cm across. The fruit is fleshy with a woody shell around the seed inside. The fruit is about 2.5 cm across. It is oval and rough. The fruit is edible.

Distribution: A tropical plant. It suits coastal regions in tropical places. It is very sensitive to cold. They need an open sunny position and well drained soil. It grows from sea level to 450 m altitude in Samoa.

Cultivation: They are grown from seed which should be sown while fresh. The seed germinate irregularly. to break the seed coat it may pay to scratch the seed then soak in water before sowing.

Production:

Use: The fruit are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

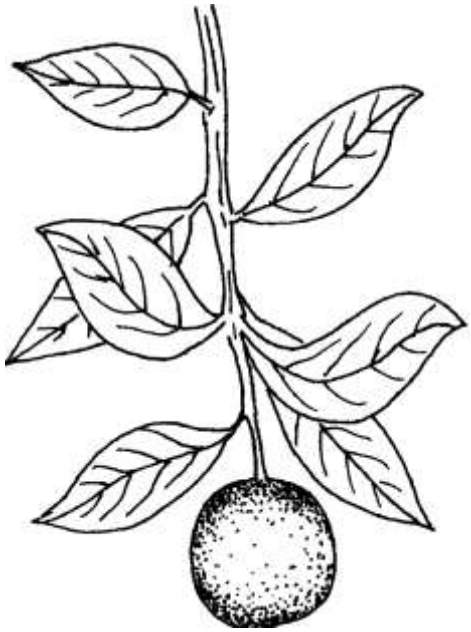
Pests:

Importance:

Names

English: Kumquat, Oval kumquat
Tok pisin:
Tok ples:

Scientific name: *Fortunella margarita* (Lour.) Swingle
Synonyms: *Citrus margarita* Lour.
Plant family: Rutaceae



Description: An evergreen shrub up to 4 m high. It spreads to 2 m across. The stem is slender and branching. It has a rounded crown. It has spiny branches and shiny oval leaves with pointed tips. The leaves are leathery. Flowers are white with 5 petals. They occur singly and have a perfume. Fruit are very small and about 2.5 cm across. They are divided into only 3-6 sections.

Distribution: It suits subtropical locations. It grows from sea level to at least 1150 m altitude in the tropics. It is cold tolerant. When dormant it can stand frosts, but not when in leaf. It cannot tolerate drought. It prefers well drained soils in an open sunny position. They cannot stand waterlogging. They do best with a pH of 5 to 6. They cease growth when temperatures fall below 13°C. It suits hardiness zones 9-10.

Cultivation: Plants are grown from seeds or by grafting. They can also be grown from cuttings. Seed need to be sown fresh.

Production: Fruiting is seasonal. The season tends to be December to May in the southern hemisphere. The fruit improve in flavour if allowed to stay on the tree after ripening.

Use: The ripe fruit can be eaten fresh, skin and all.
The fruit are often pickled or used in jam.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	81.7	264	0.9		0.4	30	37	0.1

Insects:

Diseases:

Pests:

Importance: Occasionally grown in Papua New Guinea. These plants have been hybridised to give limequats and orangequats.

Names

English: Fig
Tok pisin:
Tok ples:

Scientific name: *Ficus carica* L.
Synonyms:
Plant family: Moraceae



Description: A low spreading deciduous tree with large leaves. It can grow to 10 m high. Trees are widely spreading with many branches. It has milky sap. The small branches are straight and strong. The leaves spread out like fingers on a hand with 3 or 5 lobes. The leaves are rough textured on the upper surface and downy underneath. The flowers are of one sex only. There are two sex forms - the caprifig and the fig. The caprifigs are dry and hard and develop 3 times a year. They harbour the fig wasp which itself goes through 3 different stages of its life cycle in these 3 fruit seasons. The "fruit" is a hollow receptacle with an opening at the tip. Inside this the flowers grow and mature. The true fruit develop inside this large receptacle. They are produced either singly or in pairs in the axils of leaves. Fruit colour can vary from black, brown, green and yellow.

Distribution: It is native to S.W. Asia. It suits tropical, subtropical and warm temperate regions. It can stand light frosts once hardened. Of the very large number of figs in PNG, this one is introduced. It suits highland areas in the tropics with a lower rainfall. It produces better if rain is less at flowering. Good summer heat is necessary for sugar-rich fruit. Plants do best in heavy soil in well prepared sites. It needs a neutral pH. It has some salt tolerance. In Nepal it grows to about 1200 m altitude. It suits hardiness zones 10-12.

Cultivation: It can be grown by cuttings. It can also be grown by budding and grafting. Smyrna figs need fig wasps for pollination. Adriatic figs develop fruit without pollination. Trees should be pruned for good production and easy harvesting.

Production: Figs start to bear after about 7 years and can continue for decades but they become unprofitable after 50 years. Fruit ripen in their second year.

Use: Fruit are eaten raw or cooked.
They can be dried, preserved or used in jam.
The fruit are made into brandy and wine.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit raw	84.6	174	1.3		0.4	500	2	0.3
Fruit dry	16.8	908	3.6		4.2	50	0	0.9

Insects:

Diseases:

Rust	Fungus	*Cerotelium fici* (Cast.)Arth.

Pests:

Importance: They have been introduced to Papua New Guinea, and tried but are not common.

Names

English: Persimmon, Japanese persimmon
Tok pisin:
Tok ples:

Scientific name: *Diospyros kaki* L. f.
Synonyms:
Plant family: Ebenaceae



Description: A tree up to 12 m high which loses its leaves each year. The branches tend to hang over and they have a dense covering of leaves. Leaves are long and pointed (10 x 6 cm). The leaves are dark green and shiny on top and lighter under. Young leaves are pale green and old leaves turn yellow or red before they fall. Male and female flowers are normally on separate tree. Therefore pollinator trees often help. Sometimes male and female flowers occur on the same tree. Fruit are 7 cm across, with flattened ends and orange with a thin skin. It can have a few large seeds inside or be seedless. Pollination and seeding influence flavour and fruit ripeness. There are many varieties.

Distribution: It suits cooler Mediterranean type climates. It does best in well drained soils. They can stand some waterlogging. In the tropics it needs to grow in highland areas with a distinctly seasonal climate.
Dormant trees can tolerate freezing temperatures. They have only a short (100 hours) chilling requirement. They will not tolerate acid soils. A pH of 6.5 to 7.5 is preferred. Branches tend to be brittle and damaged by strong winds. In Nepal it grows to about 1200 m altitude. It suits hardiness zones 8-10.

Cultivation: They are grown from seeds. Seeds often germinate poorly. Trees grow slowly. Budded or grafted trees can be used. Trees can be pruned and shaped either along a wall or as a hedge. Pruning when trees are young to develop a strong framework of branches is important. Adequate moisture is needed during the year. Trees can grow and produce with minimal fertiliser.

Production: Fruiting is seasonal. Often trees bear large crops one year and small ones the next year. This can be evened out by thinning out some of the fruit is the high yielding years. Fruit should be cut from the branches cutting the stalk near the fruit. Fruit are often ripened by putting near other ripening fruit like banana. Fruit must be handled carefully to avoid bruising. Fruit can be stored in a refrigerator for one month.

Use: The fruit is eaten raw or can be cooked. It needs to be fully ripe and soft. Freezing fruit overnight can improve sweetness. Fruit can be stored frozen.
Fruit are used for wine and vinegar.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit raw	80.3	293	0.58		0.2	217x	7.5	0.1
Fruit dry	23.0	1146	1.38		0.7	56	0	0.4

Diseases:

Insects:

Ichnaspis longirostris (Sign.)	Diaspididae (HEM)	Black thread scale
Pinnaspis strachani (Cooley)	Diaspididae (HEM)	

Importance: This tree has been introduced and tried in a few highland areas of Papua New Guinea but so far has not grown or fruited well.

Names

English: Velvet apple
Tok pisin:
Tok ples:

Scientific name: *Diospyros blancoi* A.DC
Synonyms: *Diospyros discolor* Willd. nom. illeg.
Diospyros philippensis (Desr.) Burke
Plant family: Ebenaceae



Description: A large tree. It can grow to 20 m or more high. Often it is only a small tree. It is a spreading tree with drooping branches. The leaves are smooth but covered with fine soft hairs. They are 7.5-22.5 cm long by 2.5-7.5 cm wide. The leaves are dark green on the top surface and copper coloured underneath. Flowers are in small clusters of 2-3 together in the axils of leaves. Both male and female flowers occur. These are on separate trees. The flowers are cream and have a slight scent. The fruit are round and 5-8 cm across.
The fruit colour is pink to brown. It can be dark red or purple. The fruit have short silky hairs and have the sepals still attached. The flesh is white and sweet but has a cheesy unpleasant smell. The fruit are like a flat persimmon but have a velvety appearance. Often fruit contain many large seeds. Seedless fruit also occur.

Distribution: A tropical and subtropical plant. Mature trees can withstand light frost for short times. Young trees do not tolerate low temperatures. It is better to have trees in sheltered places protected from cold winds. Slightly acid, moist and free draining soils are best. It can grow in sun or light shade. It cannot tolerate salt. Plants grow naturally in the Philippines. It suits hardiness zones 9-12. It has become established wild in the bush in the Gazelle Peninsula of Papua New Guinea. It grows from sea level to 200m altitude in Taiwan.

Cultivation: They are cultivated for the fruit popularly known as mabalo. Plants are normally grown from seed. A spacing of 5 m is needed. Trees should be left unattended prior to flowering.

Production: A slow growing tree. It may take three years for seedling trees to be large enough to transplant. Fruiting is not normally seasonal. Fruit ripening takes 2-4 months from flowering.

Use: The fleshy portion of the fruit is eaten raw when ripe. The fruit is eaten fresh or made into jellies or juice. The hairs and skin are removed.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:
Importance: At present only of minor importance in some coastal areas of Papua New Guinea. It is better suited to Papua New Guinea than the Japanese persimmon (*Diospyros kaki*).

Names

English: Tulican, Scrub Ebony
Tok pisin:
Tok ples:

Scientific name: *Diospyros hebecarpa* Cunn. ex Benth.
Synonyms:
Plant family: Ebenaceae

Description: A small tree. It grows 7-10 m high and spreads 3-6 m wide. The wood is soft and yellow. The tree has a dark compact crown. The branches are slender and greyish-green. The young shoots have short hairs. The leaves hang in a lax fashion on the tree. The leaves are simple, entire and alternate. They are oval and the tip comes to a point while the base is tapered. The leaves are dark green and dull above but lighter and more shiny underneath. The leaves are 5-9 cm long by 2-3 cm wide. The male and female flowers are separate. The fruit are 1.5-2.5 cm across and round. They are covered with short hairs. The seeds are flattened and there are about 8 seeds in a fruit.

Distribution: A tropical plant. It grows naturally in mixed secondary forest.

Cultivation: Plants are grown from seed which must be sown fresh.

Production: It is slow growing especially when young. It needs well drained acid soil. It probably does best with light shade. In Australia flowering is in October.

Use: The fruit are eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	82.8	264	0.2		1.2	105	98	

Insects:

Diseases:

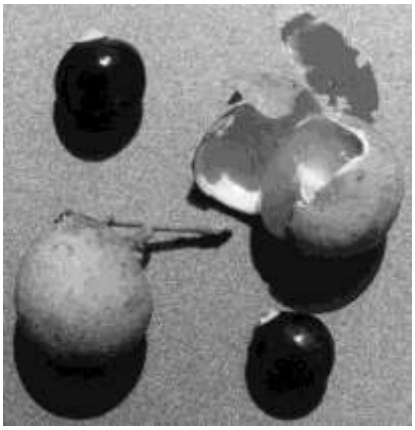
Pests:

Importance:

Names

English: Longan
Tok pisin:
Tok ples:

Scientific name: *Dimocarpus longan* Lour.
Synonyms: *Euphoria longana* Lam.
Plant family: Sapindaceae



Description: A tree up to 12-40 m high with a low trunk and spreading branches. The tree has a rounded crown. It keeps its leaves throughout the year. The trunk can be 80 cm across. There can be buttresses 2 m tall. The bark is corky. The twigs have 5 faint grooves. The leaves are 3-45 cm long by 1.8-20 cm wide. The leaves have petioles and six to nine leaflets. Leaflets are up to 12 cm long. Young leaflets are often red before turning green. The flowers occur in upright clusters. These are 8-40 cm long. They are produced on new growth. The flowers are small and reddish-brown. A progression of male, female and hermaphrodite flowers occur.
Flowers are pollinated by insects. The fruit is similar to a litchi and about 2.5 cm across. They are yellow-brown when mature and with a pebbly surface. They occur in clusters of 10 to 80. The flesh or aril is white and sweet. The seed is small, round and brownish-black.

Distribution: It will grow in poorer soils and colder conditions than a litchi. It can stand frost and needs a period of cool temperature to fruit well. So they suit a subtropical to warm temperate climate, but will also grow in the lowland tropics. The chilling requirement is less than litchi which means it will fruit in more tropical areas. They can tolerate wind but drying winds at flowering affect fruit set. Excessive rainfall during flowering reduces fruit set. It suits monsoonal regions with a distinct wet and dry season. They can tolerate flooding for a few days. It suits hardiness zones 11-12.

Cultivation: Seedlings do not produce true to type and take up to 20 years to fruit. So air layered or grafted plants are used and these fruit in 3-4 years. For air layering, mature shoots about 2-3 cm across are chosen which do not have active vegetative growth. A ring is cut around the twig 50 cm from the tip removing the bark and soft wood. A plastic sleeve is put over the twig and tied below the cut ring. Then peat moss or rooting mix is filled into the sleeve and this is tied off above the ring. When roots have formed the twig is cut off and planted. Cuttings and budding can also be used. Spacing needs to be 5-8 m apart. Deep rooting needs to be encouraged by good site preparation. This stops trees being blown over. Wind protection is essential. Although flowers need to be cross pollinated, this can be done between flowers on the same tree as flowers develop at different times. Very little pruning should be done. Fruit need to ripen on the tree. They do not ripen further after harvest.

Production: Seedlings grow slowly at first, but then grow more rapidly. Up to 40 to 55 kg of fruit per tree are possible. Fruit can be stored for 6 weeks at 5°C when covered. Trees can live for 400 years.

Use: The fruit is eaten raw or cooked.
They can be dried and stored or preserved canned in syrup.

Food Value: Per 100 g edible portion

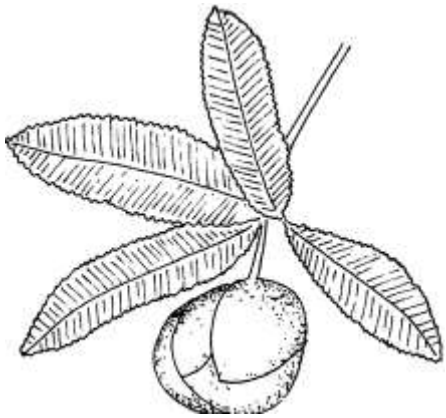
Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	82.0	255	1.3		1.2		84	0.1

Insects: **Diseases**: **Pests**:

Importance: Rare in Papua New Guinea but common in Indonesia.

Names

English: Elephant apple
Tok pisin:
Tok ples:
Scientific name: *Dillenia indica* (R. Br. ex DC.) Martelli
Synonyms:
Plant family: Dilleniaceae



Description: An evergreen tree with a short trunk. It grows to 10-15-30 m high and spreads to 4-10 m across. The bark is rough. It has a dense round crown. The branches are straggling and droop at the end. The leaves are at the ends of branches. The leaves are deeply ribbed. They have teeth around the edge. The leaves are bright dark green. They are 15-25 cm long and 5-10 cm wide, but can be twice that size. The leaves have a bold pattern of sunken veins. The leaf stalk is 2-5 cm long. The flower buds are large and round and look like fruit. The flowers are large and white and 20 cm across. They are cup shaped. The flowers are produced in the upper leaf axils.
The flower sepals thicken and cover the fruit to make a round green fruit up to 12 cm across. The seeds are kidney shaped with hairy edges. They are embedded in a glutinous pulp.

Distribution: It is a tropical plant. It prefers rich moist soils. It needs a protected partly shaded position. It is drought and frost tender. They need a temperature above 15°C to grow. It grows in moist evergreen forest. In Papua New Guinea it is an introduced species and grows in coastal areas below about 600 m altitude. In Yunnan in China it grows between 600-1100 m altitude. It suits hardiness zones 10-12.

Cultivation: Plants are normally grown from seed. They can be grown from cuttings.

Production:

Use: The fruit can be used for jellies, curries and drinks. It is the fleshy sepals around the fruit that are eaten. The fruit can be eaten raw. They can be made into jam.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	84.5						2.2	

Insects:

Diseases:

Leaf spot		

Pests:

Importance: Trees are only occasionally seen in coastal areas of Papua New Guinea and they are rarely used for food.

Names

English: Red beach, Golden Guinea Tree

Scientific name: *Dillenia alata* (R.Br.ex DC.) Martelli

Tok pisin:

Synonyms:

Tok ples:

Plant family: Dilleniaceae



Description: A small to medium sized tree. It grows to 10-18 m high and spreads to 4-10 m across. The trunk is smoothly round. It has a dense rounded evergreen crown. The bark is loose and flaky. It is reddish brown and bright in colour. The leaves are smooth and produced one after another along the stem. They are often grouped into rings around the stem. They are a rich glossy green. They are broadly oval with a lobe at the base. The leaf blade is 13-25 cm long by 8-12 cm wide.
The veins show up clearly and they are raised underneath the leaf. The tip of the leaf is rounded. The leaf stalk has prominent wings and is 5.5 cm long. The flowers are bright yellow. They have 5 petals and 5 spreading lobes. The flowers are 5-8 cm across. There are usually 2-4 flowers together in a cluster at the end of a branch. The fruit is smooth, open, flat and fleshy. They are 4-4.5 cm across. There are 6-8 segments. These open out in a spreading fashion. The fruit are pinkish red when ripe. The fruit contain small brown seeds in a white seed layer. The seed are 5 mm across.

Distribution: It occurs in dense coastal monsoon forest near freshwater streams. It needs adequate moisture and a well drained soil. It suits a humid place. A tropical plant. It is drought and frost tender. It suits hardiness zones 10-12.

Cultivation: It can be grown from fresh seeds. It can also be grown from cuttings.

Production: It is a fast growing tree. In Australia flowering is in October to January and fruit occur in October to November. (September to February).

Use: The seeds are eaten raw especially by children.
The white fleshy part of the fruit (aril) can be eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Seeds								

Insects:

Diseases:

Pests:

Importance: A very occasional plant in Papua New Guinea.

Names

English: Akee
Tok pisin:
Tok ples:

Scientific name: *Blighia sapida* Koenig
Synonyms:
Plant family: Sapindaceae



Description: A small evergreen tree up to 9-13-20 m tall. It spreads to 3 m across. The stem is erect and branching. It has a spreading, open-textured crown. The leaves are dark green with 6, 8 or 10 curved leaflets. The flowers are greenish white in branched flowers stalks, in the axils of leaves. They extend upwards. The fruit is about 9 cm long and red when ripe. The fruit has five segments. It is roughly pear shaped. The fruit opens naturally when ripe and usually has 3 black seeds inside. These are covered with yellowish flesh called an aril. The aril is edible. The pink tissue is toxic. Unripe fruit are toxic.

Distribution: It is native to tropical West Africa. It suits the humid tropics. It needs 2,000 mm of rain per year. It does best in moist, well composted soils in a sheltered, sunny position. It is drought and frost tender. It can grow in the subtropics and survive with temperatures near freezing. It suits hardiness zones 10-12.

Cultivation: Trees can be grown by seeds or cuttings.

Production: It often bears two crops per year. It starts to produce after 4 years. Trees can keep producing for 50 years.

Use: The fleshy white aril around the seeds is edible after the fruit opens naturally. It is often cooked by boiling in salt water. It looks like scrambled eggs after cooking.
Caution: The seeds are poisonous. The unripe aril is inedible. The pink tissue between the aril and seed is poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	57.6	753	8.75		5.5	0	78	

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea it is an introduced crop not widely grown and rarely used. The fruit is popular in Jamaica. It is part of their national dish.

Names

English: Black currant tree
Tok pisin:
Tok ples:
Scientific name: *Antidesma ghaesembilla* Gaertn.
Synonyms:
Plant family: Euphorbiaceae

Description: A stout and erect tree. It grows 3-8 m tall and spreads 2-4 m across. The trunk is covered with chalky yellowish brown bark. It is rough and mottled. The timber is light coloured and hard. The young branches and new leaves have woolly hairs. The tree loses its leaves during the dry season. The leaves are 3-7.5 cm long by 2-3 cm wide. They are broadly oval with a blunt tip. The leaves are thinly textured and shiny on the upper surface but paler underneath. The leaves are numerous. The flowers are numerous and densely clustered. Male and female flowers occur on separate trees. The male flower spikes are 2.5-5 cm long and the female flowers are on short thick stalks at the ends of branches. The individual flowers are very small and about 1-2 mm long. The fruit are small, oval and fleshy. They are 0.4-0.6 cm long and purple when ripe. The fruit are edible.

Distribution: They are common at low and medium altitudes throughout the islands of the Philippines. It grows to 120 m altitude in Malaysia. In Australia they grow in the north in open vine forest.

Cultivation: Plants can be grown from seed or cuttings.

Production: Fruit are available September to December in Australia.

Use: The fruit are eaten raw when ripe. They are sour. They can be used for jam. The fruit are also used with meat and fish dishes.
The leaves are used as acid flavouring in food.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	71.9	450	1.4		2.5			0.4
Leaves								

Insects:

Diseases:

Rust	Fungus	*Crossopsora antidesma-dioicae* (Racib) Arth. & Cumm.

Pests:

Importance: It is not known if it is used for food in Papua New Guinea.

Names

English: Wild Currant
Tok pisin:
Tok ples:
Scientific name: *Antidesma erostre* F. Muell. ex Benth.
Synonyms:
Plant family: Euphorbiaceae

Description: A small tree which grows 3-6 m tall. The tree has a stiff habit. Trees can grow to 20 m tall. It spreads to 2-4 m across. The bark is pale brown. The leaves are oblong or sword shaped and 5-10 cm long by 2-3 cm wide. Leaves are simple and shiny on both surfaces. They are smooth and without hairs and are drawn out into a long point. They have a slender leaf stalk. The female flower bunch has stalks of flowers around a common axis. The bunches are 2-4 cm long. They are slender and produced in the axils of leaves or at the ends of branches. The fruit is about 5 mm across and 7 mm long. The fruit are oval, flattened and red. The fruit are acid and edible. There is one seed about 7 mm long by 5 mm across.

Distribution: It is a plant for the tropics and subtropics. It grows in coastal and highland areas in north east Queensland in Australia. It needs a sunny position and well drained soils.

Cultivation: Plants can be grown from seed or cuttings. Fresh seeds should be used.

Production: Plants may be slow growing. Fruit are available March to November. (September to December).

Use: The fruit can be used for desserts or jam.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

Importance: It is not known if it is used for food in Papua New Guinea.

Names

English: Chinese laurel
Tok pisin:
Tok ples:
Scientific name: *Antidesma bunius* (L.)Spreng.
Synonyms:
Plant family: Euphorbiaceae



Description: A small bushy tree. It can be up to 15 metres high. The leaves tend to be long and narrow and shiny. They are dark green. They are pointed at the tip and more rounded at the base. The leaves are 10-15 cm long by 5-7 cm wide. The male and female flowers are separate, on separate trees. Female flowers producing fruit are on the ends of branches. A spike of dark reddish black berries is produced. The berries are about 1 cm across and have one seed inside. They hang in a large cluster.

Distribution: It can probably grow up to 1000 m altitude in the tropics. It can stand light frost. They can grow on a variety of soils. They are common and widely distributed in open places and secondary forest throughout the Philippines.
It can tolerate salt. It suits the humid tropical lowlands. It suits hardiness zones 10-12.

Cultivation: It grows from seeds. These can be planted, but trees also grow naturally from seed. Trees can be produced by budding, grafting or from cuttings. Aerial layering can also be used. Spacing should be about 12 to 14 metres between trees. Some male trees need to be present for cross pollination. When female trees produce fruit without male trees, the seed from these fruit normally will not germinate.

Production: Seedling trees fruit 4-5 years after planting. The fruiting season lasts a couple of months.

Use: The fruit are eaten raw when ripe or cooked.
They are acid so are often better as jam, jellies and wine.
Because the fruit is high in pectin it makes good jams and jellies.
The young leaves are eaten with rice.
Caution: The bark is poisonous.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	81.7	281	0.7			31	69	
Leaves								

Insects:

Diseases:

Pests:

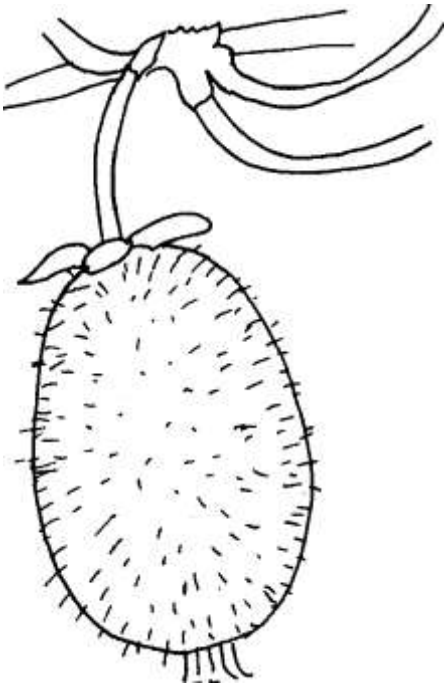
Importance: The fruit are sold in markets. This in only a minor edible fruit of lowland tropical areas. It is important in Indonesia and occasional in Papua New Guinea.

Names

English: Chinese gooseberry, Kiwifruit
Tok pisin:
Tok ples:

Scientific name: *Actinidia chinensis* Planch
Synonyms:
Plant family: Actinidiaceae

Description: A hardy climbing shrub that loses all its leaves at one time. It climbs up to 10 m by twining around its support. The leaves are heart shaped and up to 20 cm long. Male and female flowers are on separate plants. The flowers have a sweet scent. The fruit is up to 8 cm long and 3 cm across and mostly covered with fine hairs. The inside flesh is green. This plant is the parent of Kiwifruit which are now listed as Actinidia deliciosa.



Distribution: Young shoots and fruit are damaged by frost. Plants have fruited at 1000 m altitude in equatorial regions. It grows naturally in China in thickets and oak forests on slopes or in ravines between 200-2300 metres altitude. It cannot tolerate wet soils. It needs shelter from wind and frost. It has a winter chilling requirement of 500-800 hours below 7°C. Fruit are smaller in shade.. It suits hardiness zones 7-10.

Cultivation: It can be grown from seeds or cuttings but often plants of known quality and sex are grafted on. It needs a support to climb over. It needs regular pruning because fruit develop on the current year's growth. Plants or grafted branches of both sexes are needed. Male and female plants must be grown if seed is required. Plants can be grown from seed. Fresh seed germinates in 2 - 3 months at 10°C and stored seed can take longer. Seedlings should be transplanted out when 30 cm tall and after the last frosts. (Most seedlings are male.)

Production: Healthy plants can remain productive for 60 years.

Use: The fruit is eaten fresh. It can also be used in preserves and cooking.
The leaves can be eaten cooked as an emergency food.
The fruit is also made into jams and jellies.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	83.1	255	1.0		0.4	18	98	0.2
Leaves								

Insects:

Oribius spp.	Curculionidae (COL)	Shot hole weevils

Diseases:

Pests:

Importance: It has been introduced to Papua New Guinea on a trial basis.

Names

English: Broad leafed lillypilly

Scientific name: *Acmena hemilampra* var. *hemilampra* (F. Muell. ex Bailey) Merrill & Perry

Tok pisin:

Synonyms: *Eugenia hemilampra*

Tok ples:

Plant family: Myrtaceae

Description: An evergreen tree. It grows to 20 m tall and spreads to 5 m wide. The stout stem has buttresses. The bark is grey. It has a dense bushy crown. The young shoots are dark red. The leaves are dark green and like an ellipse. They have a blunt tip. The top side of the leaf is glossy, while the underside is dull. There are very few oil glands visible. (These leaf characteristics help distinguish it from *Acmena smithii*.) The leaves are 4-12 cm long and 3-4 cm wide. The edge of the leaf often curves backwards. The flowers are small and white and with a fluffy appearance. They occur on branched flower stems near the ends of branches. The fruit are pale bluish purple berries. They are 1-2 cm across. They are globular in shape. The fruit stalks are round in cross section. The flesh is edible.

Distribution: It is a tropical and subtropical tree. It occurs naturally in New South Wales and Queensland in Australia. It also occurs in Papua New Guinea. It prefers a coastal rainforest position with a well composted soil. It is drought and frost tender although established trees can survive moderate frosts. It needs watering during dry periods and probably benefits from fertiliser. It suits hardiness zones 10-12.

Cultivation: It is grown from fresh seed. Seeds germinate slowly. It can be grown by tip cuttings 10 cm long and taken when growth is slowest.

Production: Fruit ripen May to August. (January to September). Large fruited forms can be selected.

Use: The fruit are eaten. It makes a good jam.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	75.9		1.6		1.5			0.5

Insects:

Diseases:

Pests:

Importance: It is used as a food in Australia, but it is not known if it is used for food in Papua New Guinea.

Names

English:
Tok pisin:
Tok ples: Belimbing hutan

Scientific name: *Aceratium oppositifolium* D.C.
Synonyms: *Elaeocarpus edulis* Teysm & Binn.
Plant family: Elaeocarpaceae



Description: A small tree 3-6 m tall but it can grow up to 15 m tall. The tree is very variable in form. It has branches which are slender, long and brown. Young branches have hairs. Leaves are simple and produced opposite one another. The leaves are sword shape but slightly curved in the middle and tapering to the tip. It has a sharp tip. The edges of the leaves are wavy. The leaves have a toothed edge and are green and shiny above but with a bluish green covering underneath. The leaf blade is 6 cm long by 2.5 cm wide. The leaf stalk is 4 mm long. Flowers are yellow. Fruit are bright red, fleshy and juicy. The fruit is 3-5 angled, one seeded and about 3 cm long by 2 cm wide. The fruit stalk is 1 cm long. The seed is 3 sided.

Distribution: It thrives in shady places. It grows from sea level up to 300-800 m in the tropics. It is common on wet soils. It occurs in mountain forest.

Cultivation: It is grown from seed.

Production:

Use: The fruit is eaten. It is acid so is used for jellies or pickles.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

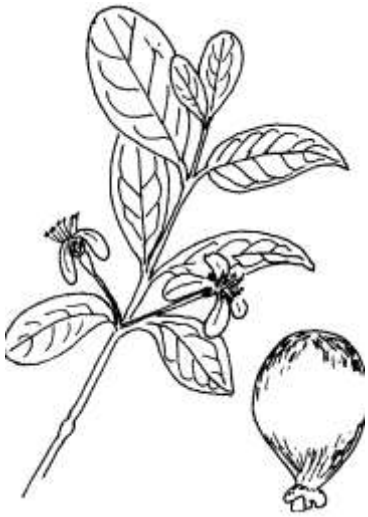
Pests:

Importance: A minor wild edible fruit.

Names

English: Pineapple guava, Feijoa
Tok pisin:
Tok ples:

Scientific name: *Acca sellowiana* (Berg)Burret
Synonyms: *Feijoa sellowiana* (O. Berg) O. Berg.
Plant family: Myrtaceae



Description: A small spreading tree. It can grow to 3-5 m tall and spread to 5 m wide. The bark is pale grey. The branches are swollen at the nodes. The stems are thin, flexible and with white felted shoots. The leaves are 5-8 cm long with shiny bluish green on the upper surface and silver grey underneath. They are thick and leathery. The flowers are 2-3 cm across and purple and white. They are borne in one or two pairs at the base of the current years growth. The fruit is oblong and dull green with several small seeds inside. Fruit are 2-9 cm long. They can be round or pear shaped. The flesh is creamy white. The petals of the flowers are edible. The fruit is edible. There are usually 20-40 small seeds inside the fruit.

Distribution: It suits cool places and can tolerate temperatures below freezing when the plant is in its dormant stage. It needs good drainage but can grow on fairly poor soils. Feijoas prefer cool winters and moderate summers (26°-32°C), and are generally adapted to areas where temperatures stay above -9°C. They need 50 hours of chilling for good flower production. Fruit taste better in cooler than warmer climate. Plants can tolerate seaside locations. It does best in warm and subtropical zones. They are not well suited to tropical regions. It suits hardiness zones 8-11.

Cultivation: Trees can be grown from seed and transplanted. Seedling trees are not always true to type. Seed is extracted by squeezing fruit into water and letting it ferment for 4 days. Seeds are then strained out and dried. Seed can be stored dry for 12 months. Seeds germinate in 3 weeks. Grafting or cuttings can also be used with some difficulty. Young wood cuttings will root in 2 months with bottom heat and mist. Layering can also be used. Some kinds need to have cross pollination to produce fruit. It does not need any special pruning, although lateral branches can be removed to avoid overcrowding. A spacing of 2 metres is recommended.

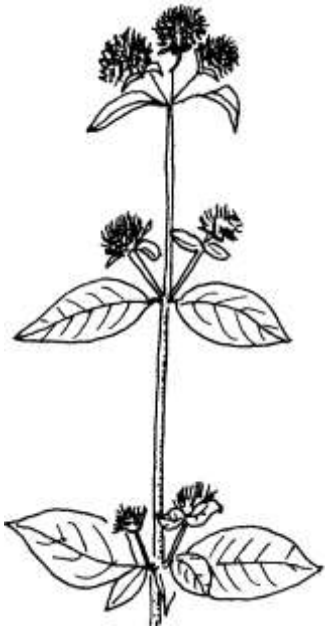
Production: Plants grow slowly. Trees start to fruit after 3-4 years. Fruit needs to be stored for a week or more after it falls from the tree, to become fully ripe. Birds and bees pollinate the flowers. Poor fruit bearing is normally the result of poor pollination. Fruit ripen in 4-7 months. Mature fruit can be stored in a refrigerator for about one week. Fruit can be stored at 3-5°C for 2-3 months. Dipping fruit in lemon juice after peeling stops the fruit turning brown.

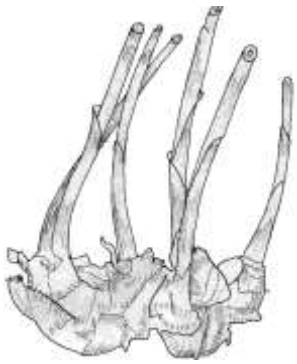
Use: The fruit are used raw or cooked. They can be used for jellies and sauces.
The flower petals can be eaten raw.

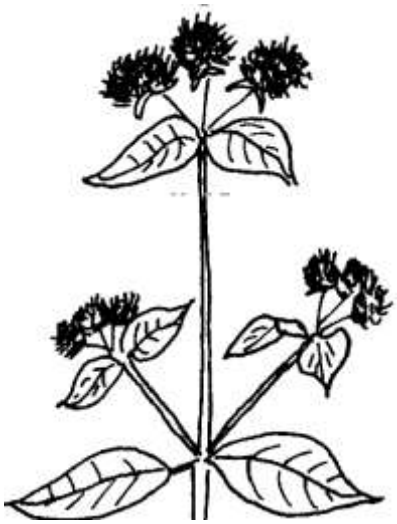
Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	86.6	205	1.2		0.1	0	20	0.04
Flower								

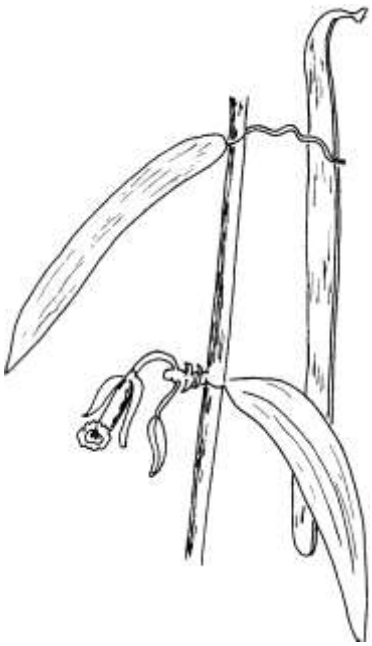
Insects: **Diseases**: **Pests**:
Importance: Trees have been tried in a few highland areas in Papua New Guinea but so far have not established or produced well.







Herbs, Spices and flavourings





English name	Tok Pisin	Scientific name	Page
Marjoram		*Origanum marjorana*	**523**
Oregano		*Origanum vulgare*	**524**
Sweet basil		*Ocimum basilicum*	**525**
Spearmint		*Mentha spicata*	**526**
Lemon grass		*Cymbopogon citratus*	**527**
Dill		*Anethum graveolens*	**528**
Cacao	Kakao	*Theobroma cacao*	**529**
Chilli, Bird's eye chilli	Sili	*Capsicum frutescens*	**530**
Asian pennywort		*Centella asiatica*	**531**
Perilla		*Perilla frutescens*	**532**
Cardamom		*Elettaria cardamomum*	**533**
Native cardamon	Golgol, Gorgor	*Hornstedtia scottiana*	**534**
Turmeric		*Curcuma domestica*	**535**
Coriander		*Coriandrum sativum*	**536**
Resurrection lily		*Kaempferia galanga*	**537**
Lemon balm		*Melissa officinalis*	**538**
Nutmeg & mace		*Myristica fragrans*	**539**
Queensland nutmeg		*Myristica insipida*	**540**
		Myristica schleinitzii	**541**
Tamarind		*Tamarindus indica*	**542**
		Myristica womersleyi	**543**
Betel pepper	Daka	*Piper betle*	**544**
Pepper		*Piper nigrum*	**545**
Thyme		*Thymus vulgaris*	**546**
Vanilla		*Vanilla planifolia*	**547**
Ginger		*Zingiber officinale*	**548**
Wild ginger		*Zingiber zerumbet*	**550**

Names

English: Marjoram
Tok pisin:
Tok ples:

Scientific name: *Origanum marjorana* L.
Synonyms: *Marjorana hortensis* Moench
Plant family: Lamiaceae



Description: An annual bushy plant up to 40-60 cm high. It can keep growing from year to year. It has a strong smell. It has small grey green leaves on tough woody stems. The leaves are oval and entire. They are 2.5 cm long. It has knotted flower heads with white, pink or purple flowers.

Distribution: It is suited to highland areas in the tropics. It is sensitive to frost. It needs a sunny position. It suits hardiness zones 7-10.

Cultivation: Plants are mostly grown from seeds.

Production:

Use: The sweet spicy leaves are used to flavour meat dishes.
Leaves are used to tea.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves dry	7.6	1136	12.7		82.7	807	51.4	3.6

Insects:

Diseases:

Pests:

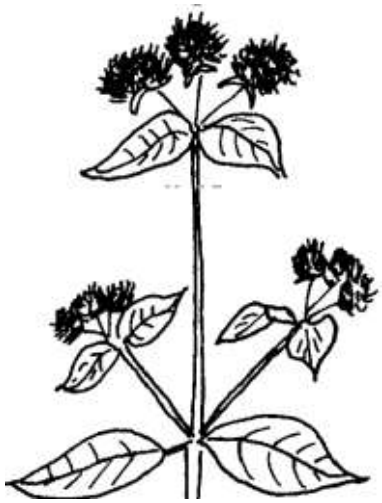
Importance: Only an occasional food plant in Papua New Guinea.

Names

English: Oregano
Tok pisin:
Tok ples:

Scientific name: *Origanum vulgare* L.
Synonyms:
Plant family: Lamiaceae

Description: A creeping plant. It is a leafy bush with creeping roots. It grows to about 1 m high. It has small dark green leaves and red-brown stems. The leaves are 1-3 cm long by 0.5-1.5 cm wide. They are broadly oval. It has purple or pink flowers. They occur in 4 sided spikes. It has a smell like thyme.



Distribution: It can be grown from seed, cuttings or division of established plants. In China it grows between 500 and 3600 m altitude. It suits hardiness zones 5-9.

Cultivation: Plants are grown from seed.

Production:

Use: The leaves and flowers are used to flavour food.
The leaves and seeds are pickled.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves dry	7.2	1280	11.0		44.0	690	50.0	4.4
Seeds								

Insects:

Diseases:

Pests:

Importance: Only an occasional food plant in Papua New Guinea.

Names

English: Sweet basil
Tok pisin:
Tok ples:

Scientific name: *Ocimum basilicum* L.
Synonyms: *Ocimum americanum* Jascq.
Plant family: Lamiaceae

Description: An erect branched woody shrub. The branches are without hairs and smooth. The leaves are without hair and oblong with a more narrow tip and blunt base. The base of the stems is tinged red. The leaf stalk is 1.5 cm long. The leaf blade is 2.5-5 cm long by 1-2.5 cm wide. The flowers are somewhat purplish with very short stalks. The small nuts are oval and slightly flattened. They are smooth. Plants vary a lot and several varieties have been selected. They can have licorice, cinnamon or lemon flavours and vary in size.



Distribution: Found at low and medium altitudes throughout the Islands of the Philippines. It suits both the lowlands and the highlands in the tropics. It cannot stand frost. It suits warm and hot climates. It needs some shade in tropical areas. It needs protection from wind. It needs rich moist well drained soil. Soil should be at 25°-30°C for seed to germinate. It suits hardiness zones 10-12.

Cultivation: It is grown from seed. Seed should be sown 2-3 mm deep and covered with a light sand or soil. Seed germinate within 3-5 days. Seedlings are thinned out to 20 cm apart. Seedlings can be transplanted. If top shoots are picked off, a more bushy plant is produced and flowering is delayed.

Production:

Use: The seeds are soaked in water and eaten.
The leaves are used raw or boiled to flavour foods.
It yields an oil used in flavouring. It flavours sauces, pickles, meats and confectionary.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	91.0	113	2.5		3.2	386	18.0	0.9
Seed	6.4	1051	14.4		42.0	938	61.2	5.8

Insects:

Diseases:

Pests:

Importance: Only a minor plant in Papua New Guinea.

Names

English: Spearmint
Tok pisin:
Tok ples:

Scientific name: *Mentha spicata* L.
Synonyms:
Plant family: Lamiaceae

Description: A creeping leafy herb with numerous long runners. It has underground stems. It grows to 50 cm high. The leaves have a strong smell. The plant tends to be stiff and upright with long narrow pointed leaves. The leaves have short stalks. The leaves are 2-3.5 cm long by 1.5-2.5 cm wide. They have teeth long the edge. It has pink flowers at the top. They occur in a ring of many flowers and small brown seeds.



Distribution: In the tropics it mainly occurs in the highlands. It suits damp ground. In Nepal it grows to about 2500 m altitude. It grows in moist, open places. It suits hardiness zones 3-10.

Cultivation: Plants are easily grown by using runners or rooted cuttings. They can be grown from seed.

Production:

Use: The leaves are used for flavouring food.
They are also pickled.
The essential oil is used for flavouring.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	85.6	184	3.3		11.9	405	13.3	1.1
Leaves dry	11.3	1192	19.9		87.5	1058	0	2.4

Insects:

Homona coffearia Nietn.	Tortricidae (LEP)	Coffee leaf roller

Diseases:

Rust	Fungus	

Pests:

Importance: In Papua New Guinea it can fairly commonly be seen near highland villages and gardens.

Names

English: Lemon grass
Tok pisin:
Tok ples:

Scientific name: *Cymbopogon citratus* (Nees)Stapf.
Synonyms:
Plant family: Poaceae



Description: A coarse clumpy grass about 1 m high. It forms dense tufts and clumps. The stem and hollow and cane like. The leaves have a rough edge and are about 1 m long by 1 cm wide. They curve over. They are pale blue-green. It very rarely produces flowers. When flowers are produced they are in a loose branched panicle. These are 5 cm long. It has a lemon smell when crushed.

Distribution: It is a tropical and subtropical plant. It occurs in coastal areas and up to at least 1400 m altitude.
It is a good plant for borders and erosion control. They are frost tender. It needs a temperature above 10°C to grow. It needs good drainage. It suits hardiness zones 9-11.

Cultivation: It is grown from portions of the clump. A spacing of about 1 m between clumps is needed. Plants can be easily grown by putting the stem end of a shoot in water until roots form then planting out.

Production: It can be cut 4-8 months after planting and then every 3-4 months. Harvesting can continue to 3-4 years.

Use: It is mostly used as a flavouring in lemon grass tea and stews. The leaves can be dried and stored for use in tea.
The very young fleshy white bases of the shoots are used in Asian cooking. The outer layers are peeled off.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Shoots								

Insects:

Diseases:

Rust	Fungus	*Puccinia nakanishikii* Diet

Pests:

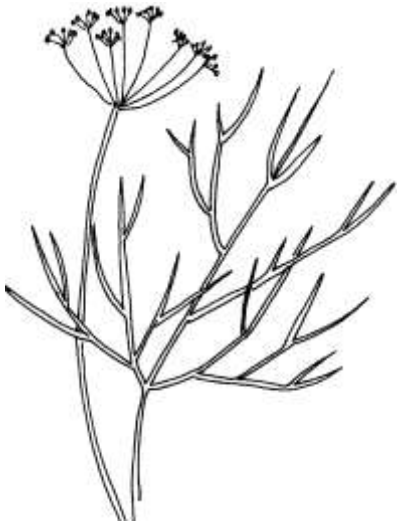
Importance: Common and popular in many areas of Papua New Guinea.

Names

English: Dill
Tok pisin:
Tok ples:

Scientific name: *Anethum graveolens* L.
Synonyms: *Peucedanum graveolens* (L.)Hiern.
Plant family: Apiaceae

Description: A fine leafy herb up to about 1 m tall. It can spread 50 cm across. It is an annual plant regrowing each year from seeds. The root is long and wiry. The stems of the plant are smooth, dark green and with pale stripes. They are finely grooved and hollow. The leaves are bluish-green and fern like. They can be 35 cm long. The leaves are twice divided and have a sheath wrapping around the stem at the base. The small leaflets are like threads. Flowers are yellow and in flat compound arrangements where flowers are on stalks coming from one point. These flower arrangements can be 9 cm across. The fruit are oval one seeded dry ribbed fruits. Plants have an aniseed scent. The fruit are 1.5 times as long as wide.



Distribution: It is a temperate plant. It is suited to shady places but does best in sunny positions. It is easily damaged by wind. It is frost resistant but drought tender. It needs moist, well drained, humus rich soil. It suits hardiness zones 8-10.

Cultivation: Plants are grown from seed. They are not easily transplanted. Seed are therefore best sown where they are to grow. Seed should be 1 cm deep and with 25 cm between plants. (Dill and fennel can cross pollinate.)

Production: Plants are fast growing. The leaves can be cut for use at any time, but they are at their best just before flowering. Plants can be cut 6 weeks after planting. Seeds are harvested when the plants are mature and have finished flowering and the fruits are fully formed. Harvesting during the cool of morning or evening avoids seeds being shattered and lost.

Use: The seeds are used to flavour foods. They are added to pickles.
The young leaves can be eaten. They have an aniseed flavour and are used in soups, salads, sauces, and with vegetables.
It is one of the main ingredients in curry powder.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds								
Leaves								

Diseases:

Insects:

Phytometra orichalcaea (F.)	Noctuidae (LEP)	Larvae of a moth

Pests:

Importance: It is sold in markets. In Papua New Guinea not yet widely grown or used.

Names

English: Cacao
Tok pisin: Kakao
Tok ples:

Scientific name: *Theobroma cacao* L.
Synonyms:
Plant family: Sterculiaceae/ Malvaceae



Description: A small evergreen tree. It grows to 15 m tall. Often it is pruned to be only 6 m tall. The trunk is straight for about 90-159 cm above the ground then a fan arrangement of branches develops. The leaves are large and simple. They are in a spiral arrangement around the branch. They are 17-30 cm long and hang down. They are red brown when young. The leaves are wider towards the pointed tip. The leaves are thin but leathery with prominent veins. The flowers are on short shoots like cushions on the trunk and woody branches. The flowers are small, yellow-white and about 1 cm across. A ribbed pod develops. The pods are large about 15-20 cm long by 10 cm across. They are green when young but become yellow or red. The pods have rows of seeds. There are 20-50 oval seeds. These are white at first then become red-brown as they ripen. There is a sweet pulp surrounding the seeds.

Distribution: It is native from Mexico to Central America. A tropical plant. It grows in lowland areas with a rainfall around 2,000 mm annually. It can grow in areas with rainfall between 1,200 and 7,000 mm. Plants do best in acid or neutral soil which is well drained. It has a long tap root which will not develop on rocky or hard soil. Cocoa does not do well on windy sites where there are sudden fluctuations of humidity. Shade trees help provide these conditions. It needs temperatures above 20°C. It suits hardiness zones 11-12.

Cultivation: Plants are grown from seed. Seed can be sown in pots in a nursery then transplanted or can be sown directly. Seedlings need shade. Plants can also be grown from cuttings. Cuttings from side branches are used. Cuttings are normally raised in a nursery. Seeds should be removed from the pod and dried but should not be stored for more than 3 months. Plants should be spaced 3 m apart. Plants can be pruned. Flowers are pollinated by insects.

Production: Some seedling varieties produce within 3-5 years. They continue to produce for 50 years. Fruits mature after 6 months. Seeds are fermented for 1 week and the temperature should not go above 50°C but once the temperature has come down to 35°C they can be sun dried. During drying the moisture content reduces from 50-60% to 6% over about one week.

Use: The seeds are eaten. The seeds are also processed and used for chocolate. The seeds are fermented for 6 days to remove the flesh then washed and dried.
The pulp in the pod is edible when ripe.

Food Value:

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	3.6	1908	12.0		3.6	15	3	
Pulp								

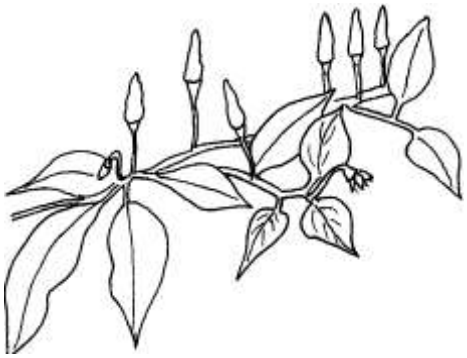
Insects: See other publications
Diseases: See other publications
Pests:
Importance: An important cash crop in Papua New Guinea but rarely used as food.

Names

English: Chilli, Bird's eye chillies
Tok pisin: Sili
Tok ples:

Scientific name: *Capsicum frutescens* L.
Synonyms:
Plant family: Solanaceae

Description: It is a shrubby perennial plant about 1 m tall. The leaves are smaller than round capsicums or bell peppers. Two or more flowers occur together in the axils of leaves. They have small pointed fruit about 1-2 cm long and they are red when ripe. They have a very hot taste when eaten or touched on the lips.



Distribution: The plants grow from sea level up to about 1800 m altitude in the equatorial tropics. They can't stand water-logging or frost. They are tolerant to high temperatures and a wide range of rainfall.
Very high rainfall leads to poor fruit set and rotting of fruit. Soil needs to be well drained and preferably fertile with adequate organic material. Light loamy soils rich in lime are best. It suits hardiness zones 10-12.

Cultivation: The seeds are dried in the sun. They are small. For large scale plantings, 1.8-2.3 kg per ha of seed are needed. Seed is best sown in nurseries and the seedlings transplanted when they have 4-5 leaves. (After 3-4 weeks). They can be transplanted at about 0.8 m spacing. Pruning out the tops can increase branching. This is often done 10 days before transplanting. Excessive nitrogen can reduce fruit setting.

Production: The first picking of fruit can occur 3 months after planting and continue about every two weeks. Plants continue to be harvested for about 4-5 years before replanting. For dried chillies, the fruit are dried in the sun for 3-15 days. The fresh weight is reduced by about two thirds during drying. Yields of dry chillies can be from 300 kg to 2500 kg per hectare depending on growing conditions, irrigation etc.

Use: The leaves are eaten cooked. The fruit can be used in very small quantities to spice food. The small red fruit are very hot to eat due to a chemical called capsaicin. They are therefore used to add spice and flavour to other foods.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Fruit spice	74.0	395	4.1		2.9	7140	121	

Insects:

Diseases:

Pests:

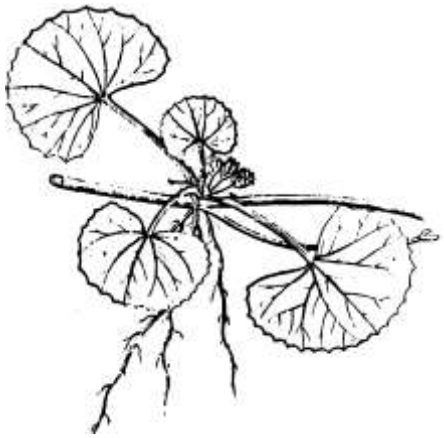
Importance: Chillies are a common and popular leafy green in lowland areas in Papua New Guinea.

Names

English: Asian pennywort
Tok pisin:
Tok ples:

Scientific name: *Centella asiatica* (L.)Urban
Synonyms:
Plant family: Apiaceae

Description: A slender perennial plant with creeping stems which root at the nodes. It grows to 10 cm high and spreads to 50 cm across. The stems are creeping and form roots at the nodes. Groups of leaves develop in clumps at the nodes. Leaves are round or heart shaped with a wavy edge. The edge has teeth or indentations along it. The leaves can be 8 cm across, when grown in shady places. The leaves have 7-9 forked veins. The leaf stalks are 6-15 cm long. The stems and flowers are dull red or pink. The flowers are small and occur in small clusters. The fruit is round but flattened. It is very small and 2 mm across.



Distribution: A tropical plant. It is a ground cover plant in old gardens, in light rainforest. It grows best in sunny, moist, fertile places. In Papua New Guinea it grows mostly up to about 500 m altitude but will probably grow up to 2500 m. It is drought and frost tender. In Nepal it grows to about 2800 m altitude. It suits hardiness zones 9-12.

Cultivation: New plants can be produced by seeds or by runners. Mostly plants grow and spread naturally. Cuttings or runners are the easiest way to grow the plants.

Production:

Use: The whole plant is eaten raw or cooked.
The plant is also used for medicine.
The leaves are made into tea.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves	89.3	143	3.2		3.1		37	

Insects:

Diseases:

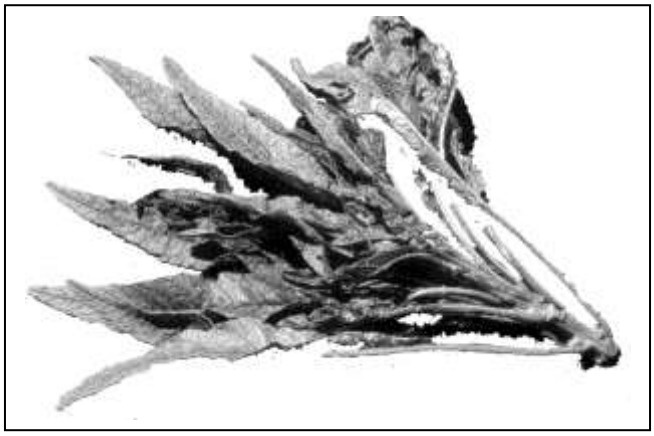
Pests:

Importance: A minor edible green only occasionally eaten in a few coastal areas in Papua New Guinea.

Names

English: Perilla
Tok pisin:
Tok ples:

Scientific name: *Perilla frutescens* (L.)Britt
Synonyms:
Plant family: Lamiaceae



Description: An erect herb. It regrows each year. It grows from 30 cm to 2 m tall. Plants can be green or purple. The leaf stalk is 3-5 cm long. The leaves are oval and 4.5-10 cm long by 2.8-10 cm wide. It is toothed along the edge. Leaves are hairy on both surfaces. The flowers are white. They are in equal stalked flower clusters either in the axils of leaves or at the ends of branches. The fruit is a 1-seeded nutlet.

Distribution: Plants are frost tender. In Nepal they grow between 600-2400 m altitude. It needs rich, well-drained soil and full sun. It suits hardiness zone 8-11.

Cultivation: Plants are grown from seed. The seed need to be cooled to 5°C for 3 days before planting. Seed need light to germinate. Plants should be spaced about 30 cm apart.

Production:

Use: The young leaves, flowers and seeds are eaten. They can be dried and used later. They are also used for flavouring.
The young cotyledons are sprouted and eaten.
The roasted seeds are pickled.
The seed oil is used as an ingredient in cooking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								
Flowers								
Seeds								

Insects:

Diseases:

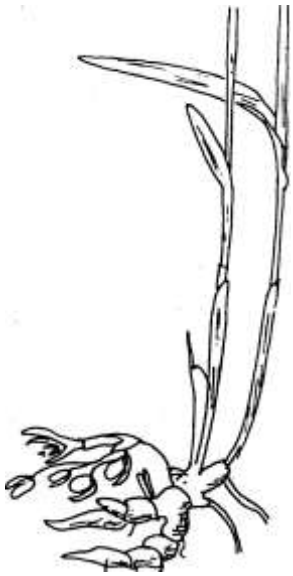
Pests:

Importance: A recently introduced plant and probably only used in small amounts.

Names

English: Cardamom
Tok pisin:
Tok ples:

Scientific name: *Elettaria cardamomum* (L.)Maton
Synonyms:
Plant family: Zingiberaceae



Description: A ginger like plant. It keeps growing from year to year. It grows to 3 m high and spreads to 1 m across. It has a clump of leafy aerial stems and then thick fleshy underground stems. The leaves are long and can be 1 m x 30 cm. They are dark green and alternate. The leaves are paler and softly hairy underneath. The flowers are green and white and produced on a branched flower stalk near the ground. The flowers have a violet tip. Seed capsules with several wrinkled seeds develop. The capsule has 3 cells. They are pale green and have a sweet smell.

Distribution: It is a tropical plant. It grows from sea level up to about 1200 m altitude in the tropics. It prefers warm, rich, moist soils. It needs a protected and partly shaded position. It is drought and frost tender. Seed need a temperature between 19 and 24°C to grow. Plants need a temperature above 10°C. It suits hardiness zones 10-12.

Cultivation: Plants can be grown from seed. It is normally grown under the shade of the primary rainforest. Seeds are slow to germinate. It can be grown from slips of plants.

Production: The capsules are harvested when they are almost ripe but before they turn yellow. They are then dried in a warmed and ventilated shed.

Use: The seeds are used as a flavouring. They are used in biscuits and cakes. It is also used in curries and added to coffee.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	8.3	1303	10.8		14.0	0	21.0	7.5

Diseases:

Insects:

Abroma sp.	Cicadidae (HOM)	
Actinus imperialis Fauvel	Staphylinidae (COL)	
Aphodius lividus Olivier	Scarabaeidae (COL)	
Calliphara dimidiata Dallas	Scutelleridae (HET)	
Chauliognathus papuanus Bourgeois	Cantharidae (COL)	
Cladophorus ornatus Waterhouse	Lycidae (COL)	
Cyphagogus splendens Kleine	Brenthidae (COL)	
Ganae pulchella Pascoe	Curculionidae (COL)	
Glenea papuensis Gahan	Cerambycidae (COL)	
Glyptoporopterus sharpi Faust	Curculionidae (COL)	
Leiochrinus fulvicollis Westw.	Tenebrionidae (COL)	
Menesesiella weylandi occulta Rehn.	Pyrgomorphidae (ORTH)	
Onthophagus iris Sharp	Copridae (COL)	
Ragwelellus horvathi Poppius	Miridae (HEM)	Cardamom mirid
Rhyparida sovria Gress.	Chrysomelidae (COL)	
Stenoxyphus aurantiacus Karasch.	Pyrgomorphidae (ORTH)	

Pests:

Importance: It is being grown commercially in some lowland areas of Papua New Guinea.

Names

English: Native cardamon
Tok pisin: Golgol, Gorgor
Tok ples:

Scientific name: *Hornstedtia scottiana* (F.Muell) Retz.
Synonyms: *Elettaria scottiana* F.Muell.
Plant family: Zingiberaceae

Description: A perennial ginger family plant. The stalks reach up to 1.5-4 m high and have a swollen base. The leaves occur one after another in two rows along the main stem. The leaf blade is 60 cm long and 12 cm wide. The edges of the leaves are softly hairy. The leaf sheath on the stem is about 13 cm long. The leaves are shiny and smooth on top and dull underneath. The midrib has a dent inwards on the top surface and the veins go off at 30° angles. The flower is a cone like structure up to 12 cm high at the base of the plant. The flower grows without a stalk and near ground level. The flowers are white and the flower has overlapping bracts. The outside of the lower bracts is red. The seeds are 2 mm across and they are grouped inside casings of the cone. The red bracts hide these casings. The pulp around the seeds is edible.



Distribution: It is a tropical plant. A rainforest species. It is common in the lowland rainforest in the tropics. It is very frost tender.

Cultivation: Plants can be grown from seed or by division of the rhizome.

Production: The flower can be broken off the underground stem or rhizome and the seeds and sap are sweet and cardamom like.

Use: The seeds are edible.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit	42.0	912	4.0					

Insects:

Diseases:

Pests:

Importance: A common plant in lowland regions and occasionally sucked for the sweet sap.

Names

English: Turmeric
Tok pisin:
Tok ples:

Scientific name: *Curcuma domestica* Val
Synonyms: *Curcuma longa* Koenig non L.
Plant family: Zingiberaceae

Description: A herb in the ginger family which continues growing from year to year. For harvesting it is grown as an annual crop. It grows up to 1 m high and spreads to 50 cm across. The stem is erect. Under the ground it has bright orange fattened stem or rhizome. These have a sweet smell. The main fattened part is about 5-8 cm long by 1-5 cm across. It has thinner branches off it. These are thickened with secondary tubers. The leaves are in a cluster and have leaf stalks that clasp the stem. The leaves are sword shaped and have long leaf stalks. Leaves are long, flat and bright green. The flowers are dull yellow. They occur in clusters of 3-5. Normally the cultivated turmeric is a sterile triploid plant that does not bear fruit.



Distribution: It is a tropical plant. It is widespread in coastal areas up to 1000 m altitude in the Philippines. It needs a hot moist climate and a well drained soil. The soil needs to be loose for good rhizomes. Plants can grow in the shade but the yield is lower. Plants are drought and frost tender. It suits hardiness zones 10-11.

Cultivation: Plants are normally grown from pieces of the rhizome. Pieces with one or two buds are used. Larger side tubers are best. They are planted 6-8 cm deep. The distance between plants needs to be 30-40 cm. They can also be grown from seed where these occur. The roots are harvested as the leaves start to die back.

Production: Leaves appear above ground in about 4 weeks. The crop is harvested in about 9-10 months when the lower leaves turn yellow. When the roots are harvested they are put in boiling water for an hour. This assists drying and avoids sprouting. They are then dried in the sun. The outer layer is removed by rubbing.

Use: The orange coloured rhizome is used as seasoning especially in curry. They are also used for food colouring. They can be used fresh or boiled and dried.
The young shoots are also eaten.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Rhizome dry	11.4	1481	7.8		41.4	0	25.9	4.4
Shoots								

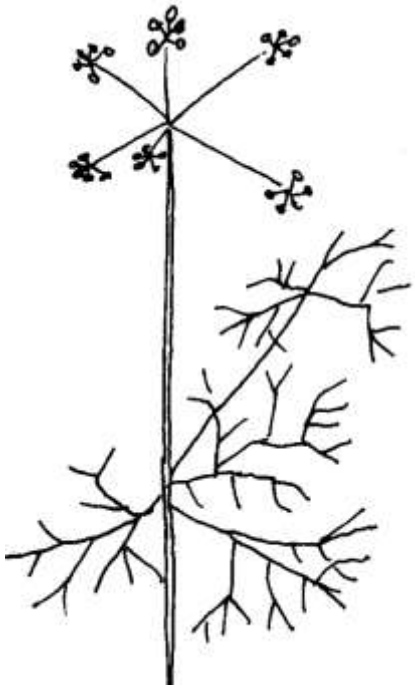
Insects:

Diseases:

Pests:
Importance: An important spice in rice eating cultures. It is rarely used as food in Papua New Guinea although some is grown commercially. It is used to dye "bilums".

Names

English: Coriander
Tok pisin:
Tok ples:
Scientific name: *Coriandrum sativum* L.
Synonyms:
Plant family: Apiaceae



Description: An annual herb up to 70 cm high. It spreads to 50 cm across. It has a fleshy taproot. The stem is erect and finely grooved. The leaves are compound, and divided along their length. The lower leaves have lobes, while the upper leaves are finely divided. The leaves are bright green, and glossy. Flowers are pink to white. They occur in flat arrangements, with stalks coming from the same point. The plant has an unpleasant smell until the fruit ripens. The fruit are pale brown. The fruit have lines along them. Some lines are wavy and some are straight.

Distribution: A Mediterranean plant. Sometimes it does not set seed in the lowland tropics. It grows up to about 2200 m altitude in the tropics. It prefers light to medium, well-drained soils. It suits an open sunny position. It is drought and frost tender. In Nepal it grows to 3000 m altitude. It suits hardiness zones 6-9.

Cultivation: Plants are grown from seed.

Production: Plants mature after about 3 months. It is important to dry the fruit before use, to get rid of an unpleasant smell.

Use: The dried fruit are used in curry and flavourings.
The young plants and leaves are used in soups, sauces and as flavourings.
The root is also crushed and used as a seasoning.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	11.0	1218	14.0		18.0	300	21	4.7
Leaves	92.8	84	2.4		2.0	613	11	0.5
Leaves dry	7.3	1167	21.9		42.5	585	567	4.7
Root								

Insects:

Phytometra orichalcaea (F.)	Noctuidae (LEP)	Larvae of a moth

Diseases:

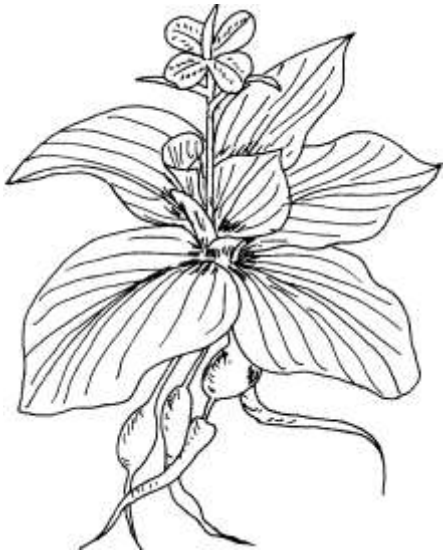
Pests:

Importance: One of the world's most commonly used herbs and spices. It is probably not grown or used a lot in Papua New Guinea.

Names

English: Resurrection lily
Tok pisin:
Tok ples:

Scientific name: *Kaempferia galanga* L.
Synonyms:
Plant family: Zingiberaceae



Description: A slow growing perennial herb. It grows 15 cm high. The rhizome has tuberous roots. They are fleshy. The rhizome is much branched crowded, tuberous and aromatic. The rhizomes are pale green or greenish white inside. The leaves have a mild smell like liquorice. It usually has two leaves pressed flat against the soil. The leaves are broadly oval. They are 7-20 cm long by 3-17 cm wide. They are green but often have a red upper edge. The flowers occur at the end of the shoot. The flower bracts can be 4 cm long and 1 cm wide. Each bract surrounds one flower. The flowers have a 4.5-5 cm long corolla tube and narrow lobes. Flowers are 2.5 cm long and are white. There are 2 varieties described based on the size of the leaves.

Distribution: It grows in open areas in S China.

Cultivation: It is grown from tuber cuttings.

Production:

Use: The rhizomes and leaves are eaten as a condiment. The rhizomes are dried and pounded. They are used in fish curries and also served as a raw vegetable.
They are used to flavour rice.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Rhizome								
Leaves	91.1	97	2.5				11	

Insects:

Diseases:

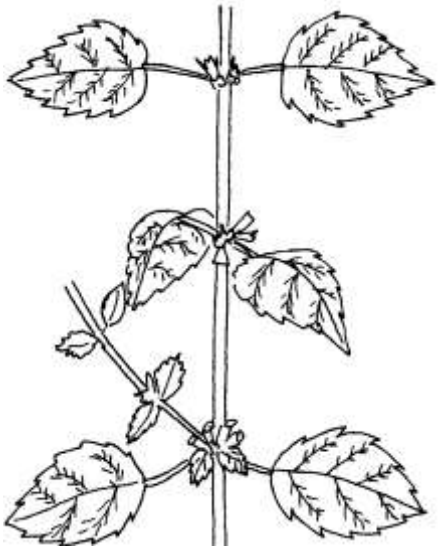
Pests:

Importance: It is widely cultivated in SE Asia. It is sold in markets. It is probably not widely used in Papua New Guinea.

Names

English: Lemon balm
Tok pisin:
Tok ples:

Scientific name: *Melissa officinalis* L.
Synonyms:
Plant family: Lamiaceae



Description: A vigorous herb up to 0.5-1.2 m high. It spreads to 30-45 cm wide. Plants keep growing from year to year. The stems are erect, square shaped, branching and hairy. The leaves are produced opposite one another and are oval. The leaves are wrinkled and toothed at the edge. They are 7 cm long. The leaves have a lemon smell when crushed. The leaf stalk is long. The flowers are small and whitish yellow. These are produced on long loose clusters. The flowers are in the axils of leaves. The fruit is made up of 4 oval nutlets.

Distribution: It does best on light, well-drained soils. It needs an open sunny position but can grow in light shade. It can tolerate drought and frost. It benefits from well composted soil. It grows in Europe up to 60° north. In the tropics it is grown in mountainous regions. It suits plant hardiness zones 5-9.

Cultivation: It can be grown from seeds or division of the root. Seed are slow to start growing. It can also be grown by tip cuttings which are put into water to form roots. The flowers should be picked off. Plants can be cut back to near ground level and allowed to regrow.

Production: It is best used fresh.

Use: The lemon flavoured leaves are used for drinks or flavouring foods and is used either raw or cooked.
It is also used to flavour liqueurs.
It is added to meat and vegetable dishes.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves								

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea it occurs in some highland gardens.

Names

English: Nutmeg and mace
Tok pisin:
Tok ples:

Scientific name: *Myristica fragrans* Houtt.
Synonyms: *Myristica officinalis* L. f.
Plant family: Myristicaceae



Description: An evergreen tree. It grows up to 10-23 m tall. The bark is light brown. Leaves are simple, pointed and dark green on top. They are pale green underneath. They are 12 cm long. Male and female flowers are separate but often on the same tree. Fruit occur on female and bisexual trees. The flowers are small and yellow and 1 cm across. They do not have petals. The sepals are cup shaped and 2-3 lobed. The fruit are round, about 5-6 cm across and yellow when ripe. When the fruit is ripe it splits into two halves. All parts of the tree when bruised have a smell of nutmeg. The seed is used as nutmeg while the red seed coat is dried and ground to produce mace.

Distribution: It is native to Maluku in Indonesia. Tropical. It suits tropical humid places and needs a fertile well drained soil. It grows in lowland areas and needs protection from wind. It cannot tolerate drought. It suits hardiness zones 11-12.

Cultivation: Trees are normally grown from seed. Seeds are slow growing. They can take 30 months to germinate. Plants can also be grown by cuttings and grafting. A spacing of 9 m apart is suitable. A ratio of a male tree to 10 female trees is used. Extra male trees are removed.

Production: Seeds take 3 months to germinate. Trees begin producing after 5-7 years. Trees can keep producing for 40 years. The mace is peeled away from the nutmeg and dried. When the nutmeg is dry it rattles.

Use: The seed is used for the spice called nutmeg.
The red layer (aril) around the seed produces the spice called mace.
The outer shell of the fruit is sliced, cooked and crystallised to make a candy. It is also used for pickles.
Caution: The oil in the seed contains a poisonous drug called myristicin.

Food Value: Per 100 g edible portion (These would be poisonous in large amounts)

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Aril - mace	8.2	1989	6.7		11.9	80	21.0	2.3
Nut - nutmeg	6.23	2196	36.3		3.0	10	3.0	2.2
Fruit								

Insects:

Diseases:

Pests:

Importance: Occasional trees have been planted in Papua New Guinea.

Names

English: Queensland Nutmeg
Tok pisin:
Tok ples:

Scientific name: *Myristica insipida* R. Br.
Synonyms: *Myristica muelleri*
Plant family: Myristicaceae



Description: A large spreading tree. It grows 10-20 m high. The branches spread out horizontally. The bark is tight, rough and grey-brown. The leaves are alternate and smooth. They are leathery and oval. They are 10-21 cm long by 4-8 cm wide. They are dark and glossy green on top. Underneath the leaf is paler and the midrib is raised. The tip is pointed and the leaf stalk is short and thick. The trees are separately male and female. The male flowers are small and cream. They occur in clusters in the axils of leaves. Female flowers are in smaller clusters. The fruit is oblong and smooth. The skin is thick and leathery. They are about 3-4 cm long by 1.5-2 cm wide. They are a dull yellow when ripe. They enclose a single large seed wrapped in a bright red, thread like aril.

Distribution: Tropical. It grows in coastal areas on sand dunes. They can be in lowland forest near permanent water. It needs good drainage.

Cultivation: Plants can be grown from fresh seed. They can also be grown from cuttings.

Production: It is slow growing. In Australia, plants flower from February to March and fruit from September to December.

Use: The seeds can be used as a nutmeg substitute.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds	48.5	1250	4.3				100	

Insects:

Diseases:

Pests:

Importance:

Names

English:
Tok pisin:
Tok ples: Uskeke

Scientific name: *Myristica schleinitzii* Engl.
Synonyms:
Plant family: Myristicaceae

Description: A medium sized tree. It grows to 15 m tall. Sometimes it has stilt roots. The twigs are slender and smooth. The leaf is oval and 8-32 cm long by 5-12 cm wide. The base of the leaf if often rounded or heart shaped. The midrib and veins are sunken in the top surface of the leaf and raised underneath the leaf. The leaf stalk is 1-2 cm long. The male and female flowers are separate on the same tree. The male flower cluster is 5-7 cm long. The female flower cluster has fewer and shorter branches than the male. The fruit are oval and 3.5 cm long by 1.5 cm wide. They are yellow. The base of the fruit is narrowed into a false stalk 3-4 mm long. The fruit stalk is slender and 2-2.5 cm long. The seed is 3 cm long by 1 cm wide. It is covered with a red aril. It is divided irregularly.

Distribution: A tropical plant. It grows naturally near the coast. It is often growing on coral rocks.

Cultivation:

Production:

Use: The fruit have been recorded as being used as a spice.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								

Insects:

Diseases:

Pests:

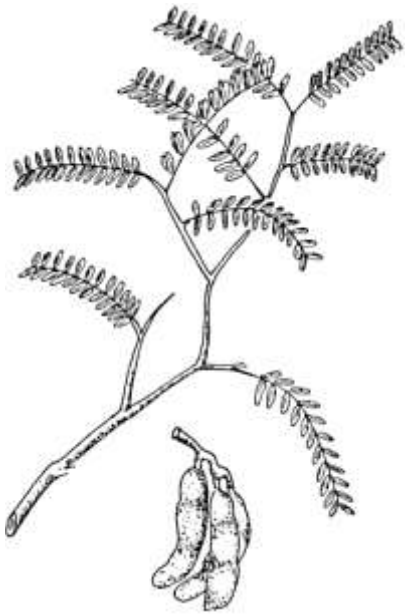
Importance: A minor food in Papua New Guinea.

Names

English: Tamarind
Tok pisin:
Tok ples:

Scientific name: *Tamarindus indica* L.
Synonyms: *Tamarindus officinalis* Hook
Plant family: Fabaceae/Caesalpinoideae

Description: A large spreading tree up to 24 m tall. It has a broad dense evergreen crown. In dry areas the tree can lose its leaves. The trunk can be 1 m across. The bark is rough and grey with a checkered pattern. The leaves are carried one after another along the branch. The whole leaf is 6-12 cm long and it is divided into 10-17 pairs of leaflets. These are oblong and without stalks. The whole leaf has a leaf stalk about 15 cm long. The leaflets are 1-2.5 cm long and 4 9 mm wide. They are a dull dark green and with a rounded tip. The flowers are pale yellow with brown markings. The flowers are about 2.5 cm across and hang on long many flowered stalks. The fruit is an oblong thin skinned fleshy capsule. The brown seeds are inside this long rough surfaced, sausage-like fruit. This pod is 6-8 cm long and about 2 cm wide and contracted between the seeds. The pod cracks when mature. It is a legume. The pulp is date like and reddish brown. The seeds are shiny and hard. The pulp of the pods is edible.



Distribution: A tropical plant. The tree is cultivated in a number of coastal towns in the tropics as a street tree. It is probably best grown below 800 m altitude in the tropics. It is drought resistant. It cannot stand waterlogging. It does well on coastal dunes above high water level. It suits semi-arid areas. It must be in frost free locations. In Nepal it grows up to about 1200 m altitude. It suits hardiness zones 11-12.

Cultivation: It can be grown by seeds or cuttings. It is best to sow seedlings in pots then transplant them but seed can be sown direct. There are about 1400 seeds per kg. Seed should be soaked in hot water or the seed coat nicked before sowing. Seed can be stored for 2 years if kept dry, cool and away from insects. Trees can be topped or cut back and allowed to regrow. Nothing grows under the trees due to the acidity of the leaves.

Production: It grows very slowly. Trees are long lived. Fruiting is seasonal. The season tends to be April to June. It is about 8-9 months from flowering to ripe fruit.

Use: The pulp of the fruit is edible. It is also used for drinks.
The seeds are also edible, cooked. They can be roasted and ground into flour. The outer skin is removed. The young leaves, flowers and young pods are also edible. They are eaten in curries. They are used to make dishes acid. They are used in sauces and chutneys.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit pulp	38.7	995	2.3		1.1	20	3	0.7
Seeds								
Pods								
Leaves								
Flowers								

Insects: **Diseases**: **Pests**:
Importance: The fruit are sold in markets. In Papua New Guinea only occasionally seen and at present little used.

Names

English:
Tok pisin:
Tok ples:

Scientific name: *Myristica womersleyi* J. Sinclair
Synonyms:
Plant family: Myristicaceae

Description: A tree. It grows up to 27 m tall. It has a rusty covering on the twigs. The leaves are oblong and 14-20 cm long by 6-9 cm wide. They have brown hairs underneath. The leaf stalk is 1.3 cm long. The fruit is round and 6-9 cm across. It has brown hairs. The seed is round and 5 cm across. It has a strong smell.

Distribution: It grows in Papua New Guinea between 800-2300 m altitude.

Cultivation:

Production:

Use:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg

Insects:

Diseases:

Pests:

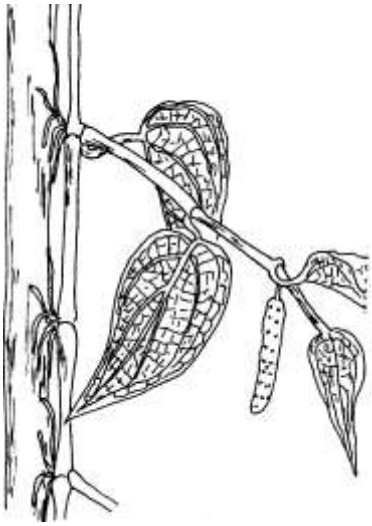
Importance: The nut has possible uses as a spice.

Names

English: Betel pepper
Tok pisin: Daka
Tok ples:

Scientific name: *Piper betle* L.
Synonyms:
Plant family: Piperaceae

Description: A woody vine which attaches to trees by roots at the nodes on the main vine. The stems are 2.5-5 mm thick. The leaf stalk is 2-5 cm long. It has a fine powdery covering. The leaves can be 7-15 cm long and 5-11 cm wide. The leaves are papery or slightly leathery. The flowers are separately male and female. Male spikes are thinner and longer than female. The spikes droop. The fruit is composed of fused parts making a compound fruit.



Distribution: It occurs in the lowlands and up to about 700 m altitude. It needs a reasonably good rainfall. It suits hardiness zones 10-12.

Cultivation: Plants are grown from cuttings of the main vine. It also grows wild. It needs stakes or a tree to climb. Fruiting branches can be increased by pruning.

Production: Plants can last for 10-12 years.

Use: It is used as a masticatory with betel nut. The leaves and /or fruit are used.

Food Value:

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Fruit								
Leaves								

Insects:

Diseases:

A diffuse black spot	Fungus	*Myrothecium roridum* Tode ex Fr.
Mosaic	Possibly due to a virus	

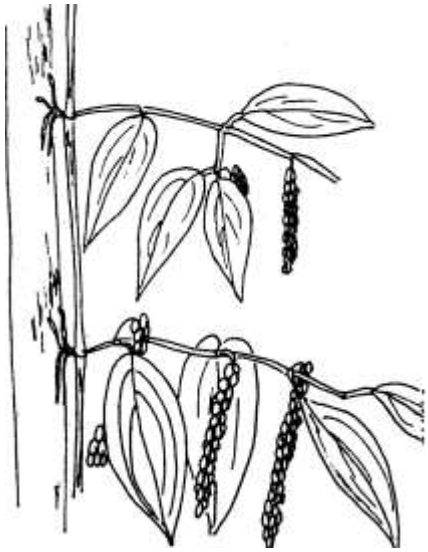
Pests:

Importance: A common and important condiment in the lowlands of Papua New Guinea and the SE Asian region.

Names

English: Pepper
Tok pisin:
Tok ples:

Scientific name: *Piper nigrum* L.
Synonyms:
Plant family: Piperaceae



Description: A climbing, green, leafy vine. It is woody. The nodes are enlarged. The plant has roots on the main stem which attach to tree trunks. The vines can be 8-10 m long. The leaf stalk is 1-2 cm long. The leaf blade is oval and 10-15 cm long by 5-9 cm wide. It is thick and leathery. The base is rounded and it tapers to a short tip. The flowers are usually of one sex but many flowers occur together. The spikes are opposite the leaves. The spikes are 3-3.5 cm long by 0.8 mm wide. They can be 10 cm long. It has clusters of berries on the side branches. The berries are red when ripe. They are 3-4 mm across.

Distribution: It is a tropical plant. It grows from sea level up to at least 1100 m altitude in equatorial places. It suits areas with a temperature between 24° and 26°C. It cannot tolerate frost. It likes high humidity and shade. It does best with a rainfall between 1200 and 2500 mm per year. It has been planted in commercial stands in a few coastal areas of Papua New Guinea. It originally came from the tropics of India. It suits hardiness zones 10-12.

Cultivation: Plants are normally grown from cuttings of the main (rooted) vine. Pruning of the tips can increase branch formation on which berries are produced. It needs a support to climb.

Production: Berries dried with the skin give white pepper. Berries where the skin is soaked off produce black pepper. To do these they are soaked in water for a few days. Plants produce in the third year. They can continue producing for 20 years. Flowering normally follows rain. Fruit ripen after 3-4 months.

Use: The berries are used as a spice.
The dried fruit are used as pepper. Black pepper is dried with the skin on and white pepper has the skin soaked off and removed before drying. Immature green berries are sold in brine or dried.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Seeds white	11.4	1238	10.4		14.3	0	21.0	1.1
Seeds black	10.5	1067	11.0		28.9	19	21.0	1.4

Insects:

Antestiopsis semiviridis (Walker)	Pentatomidae (HEM)	Variegated bugs
Nesocypselas piperica	(HEM)	Pepper bug
Valanga sp.	Acrididae (ORTH)	Grasshopper

Diseases:

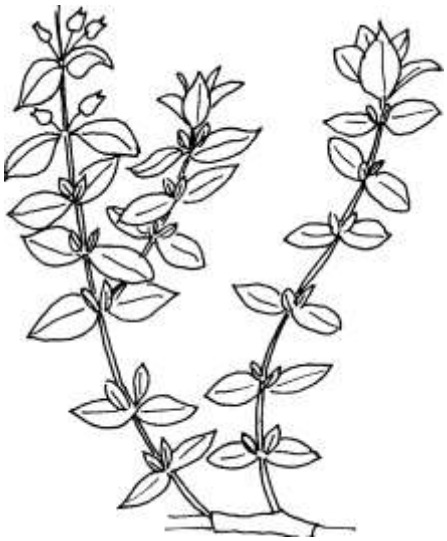
Leaf blotch	Fungus	*Colletotrichum piperis* Petch
Algal spot	Algae	*Cephaleuros virescens* Kunze

Pests:
Importance: In Papua New Guinea it is becoming of some importance as a cash crop but is little used locally as a spice.

Names

English: Thyme
Tok pisin:
Tok ples:

Scientific name: *Thymus vulgaris* L.
Synonyms:
Plant family: Lamiaceae



Description: A low shrub. It grows to 20 cm tall and spreads to 30 cm across. It forms a bushy cushion. It keeps growing from year to year. It is an evergreen with woody grey roots. The branches are square in cross section and hairy. The leaves are very small and greenish grey. They do not have leaf stalks and are produced opposite one another. The leaves are 0.6-1.5 cm long. The edges of the leaves curl backwards and the underside of the leaves is very hairy. The flowers are pale mauve or purple. They form tubes with two lips. The flowers occur in rings towards the end of the branches. The plant has a sweet smell.

Distribution: A Mediterranean plant. It does best in dry arid places. Plants are occasional in the highlands in the tropics. They grow up to 2600 m altitude. It will grow on most soils and in most locations. It is resistant to drought and frost. They need sun. It suits plant hardiness zones 7-10.

Cultivation: It can be grown from seeds or by cuttings or by dividing up an established plant. Cutting tips off plants often will encourage a bushy growth.

Production: The leaves are used as a seasoning and dried and stored. They are dried in the shade with warmth and low humidity.

Use: The leaves and flowers are used as a seasoning to flavour foods.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Leaves fresh	65.1	423	5.6		17.5	475	160.0	1.8
Leaves dry	7.8	1156	9.1		123.6	380	50.0	6.2

Insects:

Diseases:

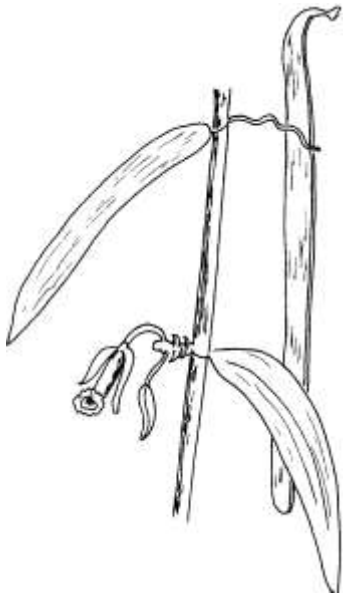
Pests:

Importance: It occurs in some highland gardens but is not yet widely used.

Names

English: Vanilla
Tok pisin:
Tok ples:

Scientific name: *Vanilla planifolia* Andrews
Synonyms: *Vanilla fragrans* (Salisb.)Ames
Plant family: Orchidaceae



Description: A climbing orchid. The vine is fleshy and climbs by means of roots. It can climb to 10-15 m high. It is 1-2 cm across and flexible but easily broken. There are 5-15 cm between nodes. It is often trained to a lower height to allow easier pollination and harvesting. Aerial roots arise from the stem opposite the leaves. These are white and 2 mm across. They attach to supports. It has long pointed fleshy leaves. They have almost no stalk and can be 8-25 cm long by 2-8 cm wide. The tip of the leaf is pointed and the base is rounded. The flowers are greenish yellow and large and waxy. They occur in groups of up to 30 in the axils of the leaves. The fruit is a long fleshy pod with small black seeds inside.

Distribution: It needs a warm moist climate. The best temperature is between 21°-32°C with an average around 27°C. It will grow up to at least 1300 m altitude. It does best with an evenly distributed rainfall of 2,000-5,000 mm per year. Ideally it should have 2 drier months to allow the flowers to develop. Light shade is necessary. It needs a well drained location and lots of humus and organic matter to grow in. It suits hardiness zones 11-12.

Cultivation: Plants are grown from cuttings in a layer of rotting plant material and forest debris. It needs a pole to climb and should have light shade. When the vine extends along a branch it is pulled down to promote flowering. The flowers need to be hand pollinated in the early morning. It is most successful on a sunny morning following rain. Using a small match sized stick the pollen is removed by squeexing the flower then putting the pollen onto the sticky stigma. Flowering tends to be seasonal and occur once per year during the drier months. If fertile cross-pollinated seed is required, it is necessary to cross pollinate the plants. (In Mexico small bees in the genus *Melapona* naturally pollinate vanilla)

Production: Fertilised flowers produce pods in 6 weeks. The pods are ready for harvest about 9 months after pollination. This is indicated by the pods turning slightly yellow at the end. The beans are partly dried and allowed to sweat to increase flavour. They are normally sweated for 2-3 weeks then dried. They become dark brown in colour.

Use: The pods are used to flavour foods. The flavour is extracted in alcohol.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Pods								

Insects:

Diseases:

Shoot blight	Fungus	*Gloeosporium sp.*
Rot of cuttings	Fungus	*Sclerotium rolfsii* Sacc.
Leaf spot		

Pests:

Importance: It is grown commercially in a few lowland areas of Papua New Guinea. It is also commercial in some other tropical countries.

Names

English: Ginger
Tok pisin:
Tok ples:

Scientific name: *Zingiber officinale* Rosc.
Synonyms:
Plant family: Zingiberaceae

Description: A perennial herb with swollen underground stems. It can grow 30-100 cm tall. The underground stem or rhizome branches and is horizontal near the soil surface. It is about 1.5-2.5 cm thick. Inside the rhizome is yellow and it is covered with scales forming a circle around it. The leaves are long (30 cm) and narrow (4 cm). Each leafy shoot usually has 8-12 leaves in two vertical lines on opposite sides of them. The leaf blade narrows evenly to the leaf tip. The flower is a cone 6 cm long on a stalk up to 30 cm long. (Flowers are not produced in all locations.)



Distribution: It is a tropical plant. It is mainly grown from sea level up to 1900 m altitude in the tropics but will grow at higher places. It needs a loose fertile soil. It does best with plenty of humus. It requires a rainfall of 1500 mm or more per year. It does best where there is a short dry season and a good hot temperature. It cannot stand waterlogging. In Nepal it grows to about 2500 m altitude. It suits hardiness zones 9-12.

Cultivation: A portion of the rhizome is planted 5-7 cm below the surface of the soil. Sometimes light shade is used but it can be grown without shade.

Production: It takes 12 months to mature. It is harvested several times. The young shoots are cut when about 7.5 cm high.

Use: The underground rhizome is eaten.
The young shoots are spicy and can be eaten.
The rhizome can be dried and powdered.
Oil of ginger is used as a flavouring.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Rhizome								
Rhiz dry	9.4	1452	9.1		11.5	15	7.0	4.7
Shoots								

Insects:

Aspidiella hartii (Cockerell)	Diaspididae (HEM)	Armoured scale
Dichocrocis sp. nr. *punctiferalis* Guenee	Pyralidae (LEP)	Peach yellow moth
Dindymus pyrochrous Boisd.	Pyrrhocoridae (HEM)	
Ferrisia virgata (Cockerell)	Pseudococcidae (HEM)	Mealy bug
Henosepilachna haemorrhoea (Biel)	Coccinellidae (COL)	Leaf eating ladybird
Henosepilachna signatipennis Boisd.	Coccinellidae (COL)	Leaf eating ladybird
Icerya seychellarum (Westwood)	Margarodidae (HEM)	Soft scale
Lema variator Gres.	Chrysomelidae (COL)	
Lema wauensis Gres.	Chrysomelidae (COL)	
Meijerella inaequalis Becker	Chloropidae (DIPT)	

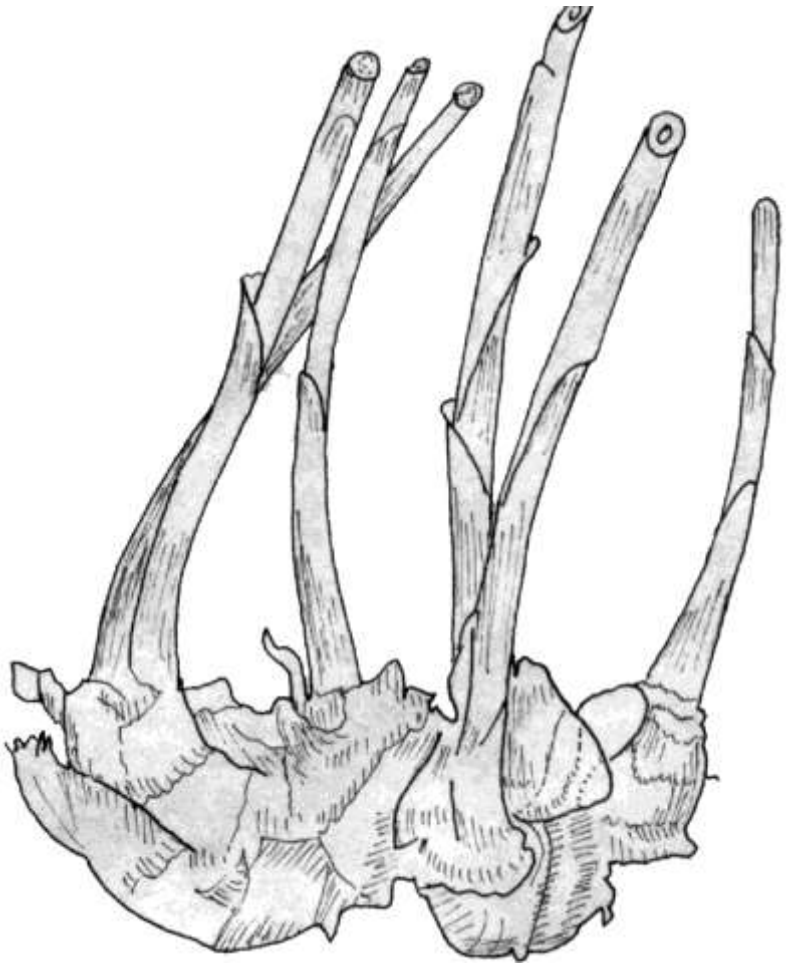
Pentalonia nigronervosa Coq.	Aphididae (HEM)	Banana aphid
Pinnaspis strachani (Cooley)	Diaspididae (HEM)	Armoured scale
Planococcus pacificus Cox	Pseudococcidae (HEM)	Mealy bug
Ragwelellus horvathi Poppius	Miridae (HEM)	Cardamom mirid
Thressa punctifera de Meijere	Chloropidae (DIPT)	

Diseases:

Leaf spot	Fungus	*Pyricularia zingiberi*
Leaf spot	Fungus	*Phaeodactylium alpiniae*
Leaf blotch	Fungi	*Curvularia sp.*
	And	*Glomerella cingulata* (Stonem)Spauld & Schr.
	& Bacteria	*Corynebacterium sp.*

Pests:

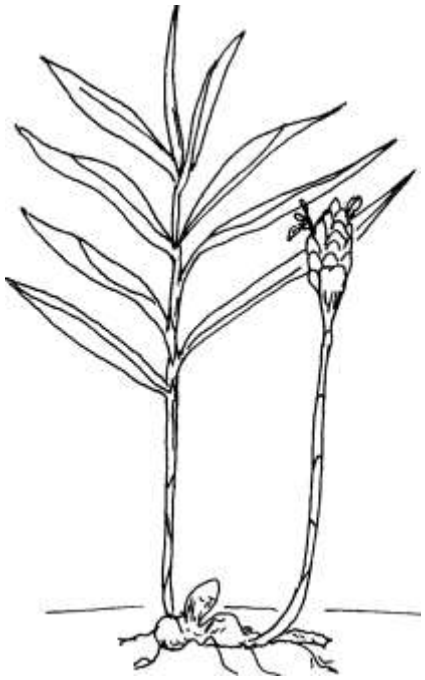
Importance: Common in most areas of Papua New Guinea and eaten in quantity as a vegetable and as a spice. In some places it cannot be eaten by women.



Names

English: Wild ginger
Tok pisin:
Tok ples:

Scientific name: *Zingiber zerumbet* (L.)Roscoe ex Smith
Synonyms: *Amomum zerumbet* L.
Plant family: Zingiberaceae



Description: An upright clumpy plant up to 0.4-1 m high. The rhizome is thick and yellow. The stems are stout. The leaves do not have a leaf stalk. Leaves are broadly sword shaped. The base is narrowed. They taper to the tip. The leaves are shorter and fatter than true ginger. They are 15-40 cm long by 3-8 cm wide. The flower cone is also longer and thinner than true ginger. The flower comes from the rhizome and is cone shaped and 6-15 cm long by 3.5-5 cm wide. The stalk is 10-30 cm long. The sheaths are scale like. The bracts are green when young and red when old. The fruit is a capsule which is 0.8-1.2 cm across. The seeds are black.

Distribution: It grows in tropical Asia. It occurs in coastal areas in the Philippines. It is most common in damp open forest. It suits seasonally moist and dry climates. It needs a fertile, organically-rich, well-drained soil. It grows in S China. It suits hardiness zones 8-12.

Cultivation: It mostly grows wild in regrowth forest.

Production:

Use: The rhizome and leaves are eaten aa flavouring in cooking.
They are also used in medicine and magic.

Food Value:

Edible part	Moisture %	Energy KJ	Protein g	Calcium mg	Iron mg	proVit A µg	proVit C mg	Zinc mg
Rhizome								
Leaves							19	

Insects:

Diseases:

Pests:

Importance: In Papua New Guinea this is a quite common plant but only a minor food plant.

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