

A black and white photograph of several bamboo stalks, showing their characteristic segmented structure and overlapping sheaths. The stalks are arranged vertically, with some showing signs of wear or damage. A solid orange rectangular box is superimposed over the center of the image, containing the text "HERBACEOUS PLANTS" in white, bold, uppercase letters.

**HERBACEOUS
PLANTS**

Herbaceous plants cultivated by the ni-Vanuatu before European contact were few, and the majority of herbaceous species cultivated nowadays, such as onions, chives, carrots and radishes, have been introduced. They are generally propagated from

commercially purchased seed for subsequent sale in markets. However, we draw attention to the existence of two major herbaceous food plants that are local: sugar cane (*Saccharum officinarum*) and pitpit (*Saccharum edule*).

Genus

Allium

Family

Liliaceae

The genus comprises over 600 species spread through the temperate regions of the northern hemisphere. Among these 25 species are edible and eight are of economic importance. Five species are present in Vanuatu.

Species present

Allium ampeloprasum L. var. *porrum* (L.) J. Gay

Leek (minor species; see CD-ROM)

Allium cepa L. var. *ascalonicum* Backer

Shallot, eschalot (aggregatum group)

Allium cepa L. var. *cepa* L.

Onion (common onion group)

Allium fistulosum L.

Spring onion, bunching onion

Allium sativum L.

Garlic

Allium tuberosum Rottler ex. Sprengler

Garlic chive, Chinese chive

Of all the introduced *Allium* species onion is the most valued. Garlic is very uncommon, and garlic chives (or Chinese chives) are mainly eaten by the Asian population.

References

De Candolle (1883), *Encyclopédie des aliments* (1997), French (1986), **Hanelt (1990)**, Ochse & Bakhuizen van den Brink (1980), Phillipps (1982), Rabinowitch & Brewster, eds (1990), Smartt & Simmonds, eds (1995), Viard (1995), Weightman (1989), Zeven & de Wet (1982), Zohary & Hopf (1994). *A. fistulosum*: the above references plus: Inden & Asahira (1990), PROSEA (1994), Täckholm & Drar (1954). *A. sativum*: the above references plus: Jayaweera (1981), Philipps & Dahlen (1985).

Complementary food plant,
introduced

Allium cepa
(*aggregatum* group and
common onion group)

Onion, shallot, eschalot

History

The onion appeared in the centre of Asia, probably in Turkestan and more widely in a region encompassing Afghanistan, Uzbekistan and the Tien Shan region of Kyrgyzstan. From there it spread to the Mediterranean region very early on. It is one of the most ancient of cultivated plants. The Greeks and the Romans acquired it, and their morning snacks then were often raw onion and bread. Charlemagne, who held the onion in high regard, ordered that it be planted throughout his lands. In the 12th century the eschalot appeared in France, derived from the onion. Nowadays the onion and the eschalot are cultivated in numerous countries. They were introduced to Vanuatu at the end of the 19th century, and although the majority of the onions that are consumed are still imported, the Department of Agriculture is encouraging its cultivation, particularly in the southern islands where it grows best, as do all the other *Allium* species.

Description

Herbaceous plant with an edible bulb, made up from the bases of leaves rolled around each other.

Bulbs very variable in shape, size and colour. Leaves (three to eight) cylindrical and hollow, slightly flattened in cross section, 30–50 cm long. Spherical umbel on a long, erect stalk that can reach 1 m in length, bearing 50–2000 greenish or purple flowers. Fruits globular, tiny (0.5 cm in diameter), containing six black seeds. The eschalot is distinguished by having several tiny bulbs closely joined to each other instead of a single bulb, and by flowers that are always greenish.

Morphological variability

The intraspecific variability of the species is such that it has not been possible to develop a classification of the varieties that are found. The common onion (var. *cepa*) can be distinguished from the eschalot (var. *ascalonicum*). Both of these groups are themselves very variable. Around the world a great diversity of onions exists, according to bulb shape (elongate or round), colour (yellow, red, white, straw-coloured) and taste (mild or pungent). For example, there is the Italian red onion (a large red onion, quite strong, which keeps well), the Spanish onion (coppery yellow, with a mild and sweet taste) and the white onion (quite mild). The variability of the eschalot is also very great. Moreover, numerous onions produced nowadays in North America, Europe and Japan are hybrids. Since some local businesses in Vanuatu import commercial seed,

the ni-Vanuatu plant a variety of seed each year according to what has just arrived.

Cultivation and production

Vanuatu, like all tropical countries, imports the majority of the onions that are eaten there, even though the plant is cultivated in the gardens, mixed among other plants, from the second year after the harvest of the yams. The Department of Agriculture in Tanna set up demonstration plots to promote the cultivation of onion. After Independence it continued to encourage onion growing, suggesting in particular the varieties Red Creole, Tropic Red and Yellow Granex. However, even these varieties which are described as 'tropical' have great difficulty in forming bulbs, and a mistake in the growing schedule (for example a delay in the date of sowing) can bring disaster to the crop, which is really only possible to grow in winter. The onions resulting from seeds can also be multiplied by vegetative means. The eschalot is also propagated vegetatively by transplanting the lateral bulbs.

Alimentary uses

On an international scale the onion is undoubtedly the species that is most widely produced and most eaten of all the *Allium* species. The plant is very popular in Vanuatu, and above all is an ingredient in the preparation of new dishes, corned beef stews, curries and other casseroles.

The plant is very rich in vitamin C. Recent studies have shown that regular consumption of onions reduces the risk of atherosclerosis. Mature bulbs of eschalot are not used much. On the other hand the leaves, sold with their immature bulbs, are much sought after. They are sold under the name of 'green onion'.

Food plant occasionally eaten, introduced

Allium fistulosum

Spring onion, bunching onion

History

This is a cultivar from an unknown wild species, originally from Siberia and central China where it was domesticated. The first mention of it is in a Chinese book dating back to 100 BC. It was introduced to Japan around 700 AD. Since then it has been the main onion in Asian gardens, used as a condiment and even as a vegetable in certain dishes. The spring onion reached Europe via Russia in the Middle Ages. It was introduced to Vanuatu by missionaries.

Description

Perennial herbaceous plant with a bulb that is not very clearly differentiated. Bulb not very distinct, protected by thin, papery membranes, reddish. Leaves cylindrical and hollow, circular in cross section, pointed at their tips, 30–50 cm long. Umbel almost spherical, bloom centrifugal,

3–7 cm in diameter, bearing small greenish or white flowers, without bracts, 0.5–1 cm. Fruits round, 0.5 cm in diameter, with minute black seeds.

Morphological variability

The spring onion has two main varieties: the common spring onion, which has a slight swelling at the base of the leaves, and the St Jacques spring onion which has numerous elongate bulbs that are brownish in colour. In Indonesia and Japan several forms are distinguished according to the width and colour of the leaves. The numerous Japanese cultivars are also classified according to the type of environment to which they are adapted. Finally, *A. fistulosum* has been crossed with *A. cepa* to produce fertile hybrids that are propagated by seeds.

Cultivation and production

The spring onion tolerates heat very well and yields quite well in the northern islands, especially Santo. It is grown from seed or vegetatively. Sowing is followed by thinning out of the seedlings, and then earthing up in such a way as to produce long, whitened stalks. The total duration of the growing cycle from sowing to harvest of the bulbs varies from 140–170 days. No serious diseases occur in Vanuatu, where spring onions may be grown throughout the year intercropped with root and tuber crops.

Alimentary uses

In Vanuatu the leaves with or without the bulbs are sold in small bundles under the name of 'green onion' (*oignon vert*), like *A. cepa* var. *aggregatum* and *A. cepa* var. *ascalonicum*. However, they are quite uncommon. They are added to soups and sauced dishes, and they may replace coriander in salads. They are often used in Asian cuisine but not much in others.

Other uses

The spring onion is used very much in Chinese medicine, but does not seem to be used this way by the people of Vanuatu.

Plant occasionally eaten, introduced

Allium sativum

Garlic

History

Garlic is not found in the wild state apart perhaps from in the deserts of Kyrgyzstan. It is believed to have come from an ancient species (*A. longicuspis* Regel) which originated in central Asia. In the earliest times it spread to the eastern Mediterranean. Dried garlic was found in the tomb of Tutankhamen (1325 BC) and carbonised bulbs in sites in Iraq dating back to 2000 BC. The Egyptians, Greeks and Romans used the plant as a therapeutic food, and it has been grown for an equally long time in India and

China. The Crusaders introduced the plant and its therapeutic uses to France, but although its use spread around the countries in the Mediterranean ring, it was not similarly adopted by the Anglo-Saxon world. It was thus probably the French and the Vietnamese who introduced it to Vanuatu. It is still little used in rural areas, even though the country as a whole uses over ten tonnes per year.

Description

Herbaceous plant 30–60 cm tall. Bulb (or 'head' of garlic) rounded, 2–7 cm in diameter, covered with a thin, papery membrane, white or rosy; made up of 10–16 cloves, ovoid, packed tightly together and themselves covered by a thin white outer skin. Leaves flat or folded into a V-shape, with two veins that meet together at the tip, bright green. Flower stalk 1 m long, with a round umbel (2 cm in diameter) at the top, bearing numerous small, rose or purple coloured flowers. Fruits mauve, often sterile, sometimes containing black seeds.

Morphological variability

There are more than 30 varieties of garlic in the world, the best known of which are the white garlic and the rose-coloured garlic. Each region of the world has its own particular varieties.

Cultivation and production

This frost-resistant plant likes cool climates. Since the seeds are sterile, garlic is propagated using fractions of the bulb (cloves). The garlic cloves are planted with the pale green sprouting tip pointing upwards and flush with the soil surface, 20 cm apart. Growth takes 60–100 days, but it is necessary to avoid the summer months with heavy rain that rots the bulbs before they are fully developed. As with the eschalot, there is a direct relationship between the weight of the clove planted and the yield obtained. After Vanuatu's Independence, the Department of Agriculture encouraged commercial production of this plant, which stores well. It was developed in the centre of Tanna during the 1980s, and in 1983 four tonnes were exported to the market in Port Vila. Nowadays, however, it appears that these initial steps have failed, and apart from a few scattered and sparse crops in some gardens, the bulk of the garlic is imported.

Alimentary uses

The bulb is used as a condiment to give extra flavour to all sorts of dishes. It may be crushed, cut into small slivers, chopped, or used whole with or without its membrane. The leaves, which are milder in flavour, are sometimes preferred by the local people.

Other uses

Garlic is a well-known medicinal plant, and was widely used in ancient times. Nowadays it is recognised that garlic guards against atherosclerosis by reducing the amount of fats and lipids in the blood. However, in order to achieve this it is necessary to eat over 20 cloves a day! It also possesses antibiotic properties thanks to the allyl sulphides that it contains.

Plant occasionally eaten, introduced

Allium tuberosum

Garlic chive, Chinese chive

History

This species returns so quickly to the wild state that it is impossible to determine its centre of origin with any certainty. Nowadays it is found from Mongolia to Japan in the east, to the Philippines in the southeast and to India in the southwest. It is an Asian condiment, cultivated for a very long time in China. It was doubtless introduced to Vanuatu by the Vietnamese and Chinese communities.

Description

Herbaceous plant growing in large clumps, furnished with a **rhizome** from which the roots emerge. The bulb is almost absent. Leaves flat, 13–45 cm long. Umbel, 3–5 cm

in diameter, bearing numerous star-shaped flowers, white, scented, with petals 5 mm long. Fruits ovoid, with small black seeds.

Morphological variability

One variety exists with green leaves and another with yellow-green leaves. Numerous other cultivars have been produced in the regions where the plant is cultivated.

Cultivation and production

The seeds of the garlic chive are not viable, and it is propagated by fragments of stem-base or pieces of rhizome. The leaves are picked after three to four months, until they become too cramped together. The plant is then pulled up and replanted. The garlic chive, or Chinese chive, does well in the north of the archipelago throughout the year. In summer there is a risk of fungal and/or bacterial diseases.

Alimentary uses

In Asia the small flowers and the leaves, which have a slight taste of garlic, are used to flavour salads or hot dishes. In Vanuatu the plant is very popular among Vietnamese and Chinese cooks, who use it in the same way. It is sold in small bundles, without the bulbs.

Genus

Ananas

Family

Bromeliaceae

The genus comprises seven species, all originating from South America. One species is present in Vanuatu.

Species present

Ananas comosus (L.) Merr.

Pineapple

This fruit, introduced to Vanuatu at the beginning of the 19th century, rapidly spread throughout the country. It is nowadays a common seasonal plant in rural gardens, grown as much for family consumption as for sale in the markets.

References

Barrau (1962), de Candolle (1883), Coppens d'Eeckenbrugge *et al.* (1997a), French (1986), Hill (1952), Ochse *et al.* (1961), Parham (1972), Purseglove (1988), Sauer (1993), Smartt & Simmonds, eds (1995), **Smith & Downs (1979)**, Viard (1995), Weightman (1989), Zeven & de Wet (1982).

Complementary food plant,
introduced

Ananas comosus

Pineapple

History

Pineapple is originally from the Orinoco Basin of Venezuela and Guyana. Domestication, by vegetative reproduction and selection of mutants, has influenced the appearance and quality of the fruit. The growers have favoured types that have few spines or none at all. When the Europeans arrived, *Ananas comosus* was already widely distributed and

diversified in tropical America. The companions of Christopher Columbus discovered it in Guadeloupe in 1493. Such an attractive fruit was rapidly spread by the first voyagers throughout the tropical world. It reached the Philippines by 1558, Cook planted it in Tahiti, and it entered Australia in 1839. In the 1850s James Paddon introduced pineapple to Anatom, and it was found a little later (1870) being grown in a plantation in Tanna. Several subsequent reintroductions brought in different varieties. The development of commercial cultivation of pineapple in Vanuatu seems feasible.

Description

Herbaceous plant about 1 m high.

Rosette of leaves in a spiral, variable in length (50–200 cm), with smooth or spiny margins. Flowers numerous (100–200), pale violet in colour. **Syncarp** formed by fusion of all these little flowers and their bracts; shape of syncarp (roughly cylindrical) and colour (yellow-green or orange-yellow) varying according to cultivar. It is surmounted by a crown of young leaves which continue growing until the fruit is mature. Seeds small in size and dark brown in colour, generally absent from cultivated forms, but very numerous when the fruit has resulted from pollination.

Morphological variability

A large number of cultivars exist around the world, but over 90% of world production derives from cultivation of a single clone: smooth Cayenne. The cultivars Cayenne, Queen, Spanish and Abacaxi are found in Vanuatu. Despite its somewhat insipid taste, Cayenne has been chosen as the priority clone for promotion because of its high yield. Selected a very long time ago by the Maipure Indians of Venezuela, this cultivar was subsequently distributed to Europe, Australia (1858) and then to Hawaii (1885–1895). The edges of its long, dark leaves are smooth, the flowers are fairly pale violet-blue, and the cylindrical fruit

turns from dark grey-green to yellow and green as it ripens, from the base upwards. The eyes of the fruit are not very protuberant, and the flesh is firm, juicy and pale yellow. It weighs around 2 kg. Queen is an ancient cultivar in Australia and South Africa. The edges of its short, silvery leaves have small spines. The smaller fruit (1 kg) is golden yellow in colour and has protuberant eyes. Its flesh is golden yellow and its taste exquisite, less acid and less sweet than that of Cayenne. Red Spanish is mainly grown in the Caribbean and Mexico. Its long leaves have spiny margins. Its fruit, intermediate in size between Cayenne and Queen, is almost square, orange-red, and has eyes that are not very numerous but are broad. Its flesh is pale yellow or golden yellow, fibrous, and has a slightly spicy taste. Abacaxi is grown mainly in Mexico. Its leaves have spiny margins. The pyramidal fruit weighs on average 1.5 kg and bears small eyes. Its flesh is very pale yellow, contains small fibres and has a mild flavour. Finally we mention Victoria, which comes from the islands of La Réunion and Mauritius. Its apical crown is made up of long leaves with spiny margins. The fruit is small, almost round, and furnished with protuberant eyes, strongly yellow in colour. The flesh is likewise quite yellow.

Cultivation and production

Resistant to drought, pineapple grows in acid and well-drained soils. In Vanuatu it is grown by all households, within the mixed gardens or in small, individual fields. Mainly geared to producing fruit for fresh consumption, pineapple has become an important crop, and the number of small commercial plantations is increasing in periurban areas. Wild escapes from ancient crops are sometimes found in open forest areas. Propagation is by vegetative means, using offsets, small shoots produced at the base of the stem close to the soil, or (most often) the crown of leaves cut from the apex of the syncarp. These propagating materials are left to dry for several weeks upside down, and are then replanted. Harvesting takes place between one and two years after planting according to the weight of the material planted and the season when planted. Large shoots provide fruits faster than small ones, but the plant is sensitive to **photoperiodicity**. It is thus important to induce flowering artificially with the aid of hormones (ethrel) in order to obtain fruits year-round. This technique is hardly used at all in Vanuatu, with the result that the markets of Port Vila and Luganville are saturated with fruits during the harvesting period, while the hotels and restaurants

complain about the lack of pineapples at other times of year. No serious diseases are known, but large fruits sometimes suffer from sunburn which turns their fibrous centres brown.

Alimentary uses

Pineapple is very popular in Vanuatu, and is eaten regularly and everywhere when it is in season. The huge production allows the local population to eat this sweet fruit in abundance, to such a point that it is sometimes used as the base food of a meal, as in Pentecost. In Santo it is also cut into pieces and then boiled in salted water, as an accompaniment to a dish of root crops.

Other uses

In certain countries (the Philippines, Taiwan and China), two year-old leaves are used for extraction of excellent quality fibres – white, pliable and strong. Joined end to end, then woven, they produce a material that is strong and much sought after. It is also used to make fishing lines and hammocks. Pineapple is used in medicine “to treat fatigue and indigestion. The pharmaceutical industry extracts a chemical, bromelianine, from the stems and the hearts of the fruit for use as a cardiac accelerator.

Genus

Arachis

Family

Fabaceae

The genus comprises 4–80 species according to different authors, the majority not being well described. They are all originally from South America. A single species is present in Vanuatu.

Species present

Arachis hypogea L.

Peanut, groundnut

Commercial cultivation of peanut started soon after European contact, but it did not really expand until the 1960s. The main producers, located in Santo and Efate, supply the markets abundantly. In parallel, the local population eats ever-increasing quantities of peanuts.

References

De Candolle (1883), Clavel & Gautreau (1997), French (1986), **Gregory *et al.* (1980)**, Hammons (1994), Krapovickas (1969), Ochse & Bakhuizen van den Brink (1980), Parham (1972), Piperno & Pearsall (1998), PROSEA (1989), Purseglove (1991), Smartt & Simmonds, eds (1995), **Smartt & Stalker (1982)**, Stalker (1980), Viard (1995), Weightman (1989), Zeven & de Wet (1982).

Complementary food plant,
introduced

Arachis hypogea

Peanut, groundnut

History

Vanuatu received the peanut from Europeans, who themselves brought it from South America. The species was domesticated in prehistoric times in the Gran Chaco region (and more widely in southern Bolivia and northwest Argentina), from a wild ancestor

(*A. monticola*). From there it spread through the southern part of the American continent, and nowadays six centres of secondary or tertiary diversity are recognised in that region. In the 16th century the Portuguese brought it from Brazil to West Africa, where it underwent huge development, and then to India; the Spanish spread it from Mexico into the Pacific as far as the Philippines. The plant then reached the countries of Asia. Very soon after European contact the species was grown in some villages in Vanuatu, for export to Australia

up to 1914 and then to New Caledonia. But the production, which is not great, is mainly for the local market. Since the 1960s the main producer has been the village of Fanafo which – curiously – considers it to be an indigenous crop of Vanuatu, in contrast to copra, coffee and cacao which in the villagers' eyes are European crops. In 1974 a Port Vila businessman decided to start peanut as a commercial crop and stimulate production in Fanafo and surrounding areas. Some years later producers who had appeared in Efate were supplying the Port Vila market. In 1978 and 1979 high-yielding seeds were imported from South Africa, multiplied at the Saraoutou experimental station and then distributed to farmers in Efate and Santo. Santo became the most important area of production, and improved varieties were distributed to the producers of Fanafo by the IRHO agronomic research station at the beginning of the 1980s. They came from the CIRAD seed laboratory at Montpellier.

Description

Annual, erect or sprawling herbaceous plant (50 cm tall). Composite leaves with two pairs of opposite leaflets, 4–8 cm long, with elongate stipules at the base of the petiole. Flowers **sessile**, spaced out on the plant, yellow; narrow tubular calyx, 5 cm long, one lobe of which is curved downwards; long style. After flowering, the peduncle curves downwards and buries itself in

the ground to a depth of 2–7 cm. It is in this position that the fruit develops to maturity. The light brown, lignified outer casing, furnished with conspicuous wrinkles, contains 2–4 elongate seeds that are covered with a red epidermis.

Morphological variability

The numerous cultivars present around the world may be divided into two main groups: Virginia–Peruvian (ssp. *hypogea*) and Spanish–Valencia (ssp. *fastigiata*), both of which are present in Vanuatu. Apart from varied introductions on specific occasions, we note the arrival of seeds of Virginia in 1961 from Australia for planting in Tanna, and then the introduction of seeds of Valencia to the Tagabe experimental station in 1968. The Virginia–Peruvian varieties produce sprawling forms, with long lateral branches and dark green leaves. The fruits contain two seeds which germinate after a period ranging from one month to one year. The Valencia varieties produce erect forms, with short lateral branches and light green leaves. The fruits contain three to four seeds which germinate immediately.

Cultivation and production

The plant prefers well-drained, fertile soils, and rainfall of 500–1,000 mm followed by a dry period. Propagation is by planting the seeds in their pods, at a shallow depth and 40 cm

apart. The rows are hoed and slightly mounded up, especially after fruiting which takes place in the soil. They reach maturity in 4–5 months, which allows several harvests per year.

Harvesting is by pulling up the entire plant, with the leaves and stalks then being left on the soil surface.

Alimentary uses

In Vanuatu peanut is eaten raw, or roasted in its shell which makes it more digestible. Grown mainly as a commercial crop, it is not used much by villagers in their everyday consumption. Quite early on the health services tried to make them part of the local diet because of their high protein content. In actual fact

peanut has discovered a new life thanks to the multiplication of kava bars – the kava drinkers like to nibble peanuts to take away the taste of the kava brew. Worldwide, peanut is the second most important source of oil after soybean. By crushing the seeds it is also made into the famous peanut butter, which was first made a long time ago by the Incas.

Other uses

Like all legumes, peanut fixes atmospheric nitrogen in the soil, and its introduction into the subsistence cropping cycle, which has been encouraged in Vanuatu, contributes to soil fertility.

Genus *Brassica*

Family

Brassicaceae

The genus comprises around 40 species, originating for the most part from northern Europe. Vanuatu has received various varieties of *Brassica oleracea* as well as various Asian green brassicas.

Species present

Western green brassicas:

Brassica oleracea L. var. *capitata* L.

Cabbage, head cabbage, Savoy cabbage, red cabbage

Brassica oleracea L. var. *botrytis* L.

Cauliflower

Brassica oleracea L. var. *gongylodes* L.

Kohl-rabi

Brassica oleracea L. var. *italica* Plenck

Broccoli

Asian green brassicas:

Brassica juncea (L.) Czernjaew & Coss

Indian mustard, Chinese mustard

Brassica rapa L. ssp. *chinensis* (L.) Hanelt²⁰

Bok choy (or choy), pak choy

Brassica rapa L. ssp. *parachinensis* (Bailey) Tsen & Lee

Choi (or choy) sum

We also note two plants found in supermarkets in Vanuatu, imported and hardly grown at all in the country:

Brassica oleracea L. var. *gemmifera* L.

Brussels sprouts

Brassica rapa L. ssp. *pekinensis* (Lour) Olsson

Chinese cabbage

All the green brassicas of Vanuatu have been introduced from Europe or Asia. The European ones belong to the species *B. oleracea* while the Asian ones are combined under the species name *B. rapa*. The various different sorts are nowadays established

²⁰ The taxonomy of Chinese cabbages is still very complex and less well elucidated than that of the Western green brassicas. The name *B. rapa* is an ancient name that taxonomists have proposed to use as a replacement for

B. campestris which was for a long time accepted. It includes four subspecies, among them *bok choy* and Chinese cabbage. One may still find it in the literature as *B. chinensis* (or *B. pekinensis* in the case of Chinese cabbage).

in the country and grown to varying degrees, either for family consumption or for sale in the urban markets. The most popular and frequently grown are the various Chinese cabbages, of which the bok choy has become a common food among the ni-Vanuatu.

References

Barrau (1962), de Candolle (1883), *Encyclopédie des aliments* (1997), French (1986), Gray (1982), Hervé (1992), Ochse & Bakhuizen van den Brink (1980), Parham (1972), Phillipps & Dahlen (1985), **Prakash & Hinata (1980)**, PROSEA (1994), Purseglove (1991), Smartt & Simmonds, eds (1995), Snogerup (1979, 1980), **Snogerup et al. (1990)**, Viard (1995), Weightman (1989), Zeven & de Wet (1982), Zohary & Hopf (1994).

Occasional food plant, introduced

Brassica juncea

Indian mustard, Chinese mustard

History

The centre of origin of this species is uncertain, but it is generally accepted to have come from the only region in which the two supposed parents – *Brassica rapa* and *Brassica nigra* – both grow: the Himalayan region of central Asia. *B. juncea* probably appeared at two different times. First of all, a mutation of *B. rapa* gave rise to a new plant which then hybridised with *B. nigra* to give the species that we know today. This ancient plant spread quite early on to India, China and the Caucasus, where it was cultivated either for its oily seeds or its leaves according to region. Chinese peasants selected forms with large leaves which fed them over the centuries. These are the forms that are found nowadays

in the markets of Vanuatu. Many research centres, especially in Canada and India, have bred improved forms of this species.

Description

Main stem robust, notched, dark green, branched in its upper part. Leaves broad and oval; midrib extending well along the petiole, leaf crimped between the leaf veins, dark green; margins dentate; petiole thick, winged, white, 10 cm long. Flowers arranged in a terminal raceme, yellow, small in size (less than 1 cm). Fruits narrow, with a slight beak-like structure, yellow-green. Numerous small seeds.

Morphological variability

Forms are recognised that are more or less robust, and with leaves more or less developed. China possesses numerous varieties with edible leaves. These are distinguished by the morphology of their leaves.

Cultivation and production

The plant is grown from seed, sown in rich, well-drained soil. It grows best in the cool, dry season. After one month the leaves can start being harvested, and picking can be done a number of times. The plants are grown as inter-crops between legumes and produce modest yields, of the order of 200–500 g per cut. The whole plant is regularly sold in the markets.

Alimentary uses

The leaves, well washed and with part of their petiole removed, are chopped up if they are large or left whole if they are small. They are then boiled in a little salted water, which is changed once if there is any concern about bitterness. They are served as accompaniments to dishes of rice or root crops, or they are added to soups. The species is high in iron and potassium, and also in vitamin C.

Plants occasionally eaten, introduced

Brassica oleracea *var. capitata*

Cabbage, head cabbage, Savoy cabbage, red cabbage

var. botrytis

Cauliflower

var. gongyloides

Kohl-rabi

var. italica

Broccoli

History

Brassica oleracea L. is a very ancient European species, though no archaeological traces of it have been found. It is estimated as having been cultivated for 4,500 years. Very polymorphic, over time it has produced a wide variety of forms in different regions, used as human food or as forage for animals. All these forms derive from a wild ancestor that was originally from coastal Great Britain and the Atlantic coasts of Europe from Denmark to the Charente region in the mid-Atlantic coast of France (even to Spain). It has been cultivated and progressively diversified in each location, people preferring the forms with leaves tightly packed against each other. Some among these then spread to the Mediterranean where other species of *Brassica* grew (for example *B. cretica* in Greece), and the Atlantic forms exchanged genes with the Mediterranean ones. The Greeks then developed and differentiated all the forms by selecting them for leaf morphology (head cabbage, red cabbage, Savoy cabbage), for the inflorescences (cauliflower and broccoli) or for the stem (kohl-rabi). Two hundred and fifty years ago the Europeans introduced all these varieties to their colonies, from India to Australia from where they also reached the islands of the Pacific. Edible brassicas were introduced to Vanuatu by the first missionaries, and by ni-Vanuatu returning from plantations in Australia or New Caledonia. Later on the Department of Agriculture attempted to promote its culti-

vation. Nowadays these vegetables can be found on the shelves of certain groceries, imported from overseas for the most part. The ni-Vanuatu, particularly those close to towns, also grow some varieties of cabbage from Japanese or Taiwanese hybrid seeds purchased in groceries. They grow these for their own use or for sale in the markets.

Description

- var. *capitata*: plant with a stalk so short that the leaves overlap tightly to form a ball-like head of cabbage. Leaves green or red, smooth, crinkled and with wavy margins. The inflorescence continues to grow during flowering, so that new flower buds sit above the flowers that have opened out, with pale yellow petals. The cylindrical fruits measure about 10 cm and contain small beige or brown seeds.
- var. *botrytis*: the inflorescences of cauliflower bear flowers that are atrophied and fused to their peduncle and to the young leaves, forming a compact, white mass of densely aggregated flowers packed together.
- var. *gongylodes*: the short stalk is swollen at the base just above the soil surface, to form a compact globe with a fleshy interior and a fibrous skin, colour greenish or purple, 5–10 cm in diameter. Leaves with a long petiole, arising in a spiral around the swollen stem.
- var. *italica*: broccoli has a mass of true flowers that are greenish or purple, arranged in loose aggregates that are slightly spaced out on the stems.

Morphological variability

- head cabbage was developed in the Middle Ages by the peoples of southwest Europe, from numerous forms spread by the Romans. It quickly became an important vegetable in the diet. Its leaves are smooth and green, then white, red or curly. Numerous cultivars of head cabbage exist around the world, and therefore also numerous different types of seed offered for sale. Distinctions are made between the head cabbage with green or white leaves (f. *alba*), the red cabbage with purplish leaves (f. *rubra*) and the Savoy cabbage with crinkly leaves. The head cabbages of Vanuatu are small in size. They have slightly wavy leaves, less tightly packed than in the country of origin and slightly more elongate.
- cauliflower probably originated in Italy, from ancient Brassica greens spread by the Romans. It could equally have reached Italy in the 15th century from the Levant or Cyprus. Later it spread to Northern and Central Europe, which regions are major producers of the species. It does not grow well in Vanuatu,

which regularly imports small quantities for sale in supermarkets. Numerous cultivars are known.

- kohlrabi appeared in the Middle Ages in Central and Southern Europe. It has been spread in Asia for 200 years, and has become an important vegetable in China. Introduced to Vanuatu, doubtless with other brassicas, it has never been appreciated for its true worth. A number of cultivars exist.
- broccoli is an ancient plant of Northern Europe, but the form that we use nowadays – green broccoli with a main head – appeared in Italy at the beginning of the 20th century, then reached the United States with Italian migrants. From there the improved species reached Northern Europe and then many parts of the world.

Cultivation and production

- the head cabbage and even more so the Savoy cabbage survive frosts well and prefer high altitude areas. They are propagated from seed, bought commercially or collected from plants that have flowered. Some hybrid varieties do not produce seeds, but robust side shoots that emerge from the main stem can be used. In kitchen gardens cabbages are planted in rows, spaced about 50 cm apart. The plants

are pricked out when 30–40 days old and are intercropped with other species. The soil needs to be well weeded and well dug. Cabbages reach maturity after three to five months. Cabbage crops respond to applications of manure, and the cabbage heads keep well at low temperatures. Yields of 20 kg per 10m² can be expected in Vanuatu, the most favourable conditions being found in the centre of the island of Tanna where temperatures are cool.

- cauliflower and broccoli are very hard to grow in Vanuatu, where temperatures are too high and the variations in photoperiod are not sufficiently marked.
- kohlrabi is grown from imported seed. It is much more tolerant of heat than cabbage or cauliflower. It is harvested quite quickly, between 50 and 60 days after planting because it can become very tough if it is left too long in the soil. Yields of 10–15 kg per 10m² can be expected in Vanuatu.

Alimentary uses

- cabbage, boiled or steamed, is a European vegetable that is very important in its region of origin. It may be preserved in the form of sauerkraut. In Vanuatu the white-heart cabbage is eaten raw or boiled. In rural areas it is not used much, and village farmers grow it mainly to sell. In

season it is abundant in the markets, and is found in various sizes though all fairly small. In the urban area, head cabbages and Savoy cabbages are cut in thin strips or pieces that are boiled as an accompaniment to a dish of root crops or mixed into a meat stew.

- cauliflower is eaten raw as a salad or boiled as a vegetable. Broccoli is boiled or fried. Both are most often imported to Vanuatu, and therefore fairly expensive and not eaten much. Asian cuisine uses them as an ingredient in many dishes.
- kohlrabi is not eaten much in rural areas and is grown for sale in the markets. It is, however, a delicious vegetable that can be eaten as a salad, grated or thinly sliced, or as a vegetable, boiled or fried, to accompany a dish of meat.

Complementary food plant, introduced

Brassica rapa
ssp. chinensis

Bok choy (or choy), pak choy

ssp. parachinensis

Choi (or choy) sum

History

The species *Brassica rapa* L. originated from two main centres: the Mediterranean, and the region comprising eastern Afghanistan and Pakistan, with Asia Minor, the Caucasus and Iran possibly as a secondary

centre. The wild form, which no doubt still exists as a relic, has been cultivated since ancient times somewhere in southwest Asia. No archaeological trace has been found, so one must determine the origin of its cultivation by studying linguistic criteria. It would not have been produced for its leaves but rather for its oily seeds. Over time it gave rise to several subspecies that were cultivated for their oily seeds, their bulbous bases or their leaves. In Europe selections were made particularly for the root, giving rise in particular to the turnip (*Brassica napus* L.), while in Asia the selections were for the leaves: bok choy, choi sum and pe-tsai. Bok choy, regarded as a delicacy by the Chinese, was mentioned for the first time in a Chinese text dating back to 500 AD. The Chinese took it to Malacca in the 15th century, to North America during the gold rush, and then to many places in the Pacific including Papua New Guinea and Vanuatu. Nowadays this vegetable has spread to many countries and is extremely popular in Vanuatu. Choi sum, often classified as a variety of bok choy, was probably introduced to Vanuatu at the same time as bok choy. Choi sum is less common than bok choy, but still appears regularly on the market stalls.

Description

- *ssp. chinensis*: plant reaching to 70 cm in height. Leaves in a loose rosette, erect, oblong

Allium sativum, garlic.



© V. Lebot



© V. Lebot

Shallot (leaves and bulbs of *Allium cepa*, var. *ascalonicum*) is very popular among the ni-Vanuatu.

HERBACEOUS PLANTS

Allium tuberosum, garlic chive
or Chinese chive.



© D. Greindl

Ananas comosus, pineapple, is very popular in Vanuatu.



© D. Greindl

Grown everywhere and very popular, pineapple is sometimes used as the main ingredient of a meal.



© D. Greindl

Raw or roasted in their shells, peanuts (*Arachis hypogaea*) are sold in bunches tied by their stalks, or in little bags.

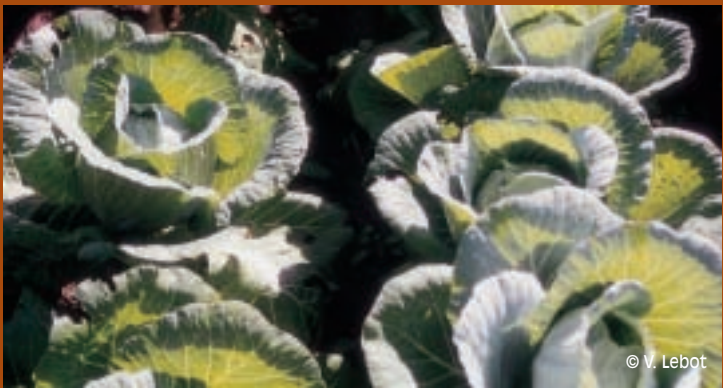


© V. Lebot

Brassica oleracea, cabbage



© D. Greindl



© V. Lebot

Cabbages came from Europe and are grown mainly for sale.

Brassica juncea, Chinese mustard.



© D. Greindl



© V. Lebot

The brassicas from Asia are the more popular.



© D. Creindl

Three varieties of Chinese cabbage, *Brassica rapa*, the best known of which is bok choy.



© D. Creindl

Capsicums or green peppers (*Capsicum annuum*).



© D. Greindl



© D. Greindl

Two varieties of chilli (*Capsicum frutescens*) grown in Vanuatu. The green one is the milder.



© V. Lebot



© D. Greindl

Turmeric is grown in Vanuatu for its deep yellow colouring agent.

Heads of lettuce (*Lactuca sativa*). Although hard to grow, lettuce is present in many gardens.



© A. Walter

Tomatoes grown for sale (*Lycopersicon esculentum*).



© V. Lebot

Mentha piperita (peppermint).



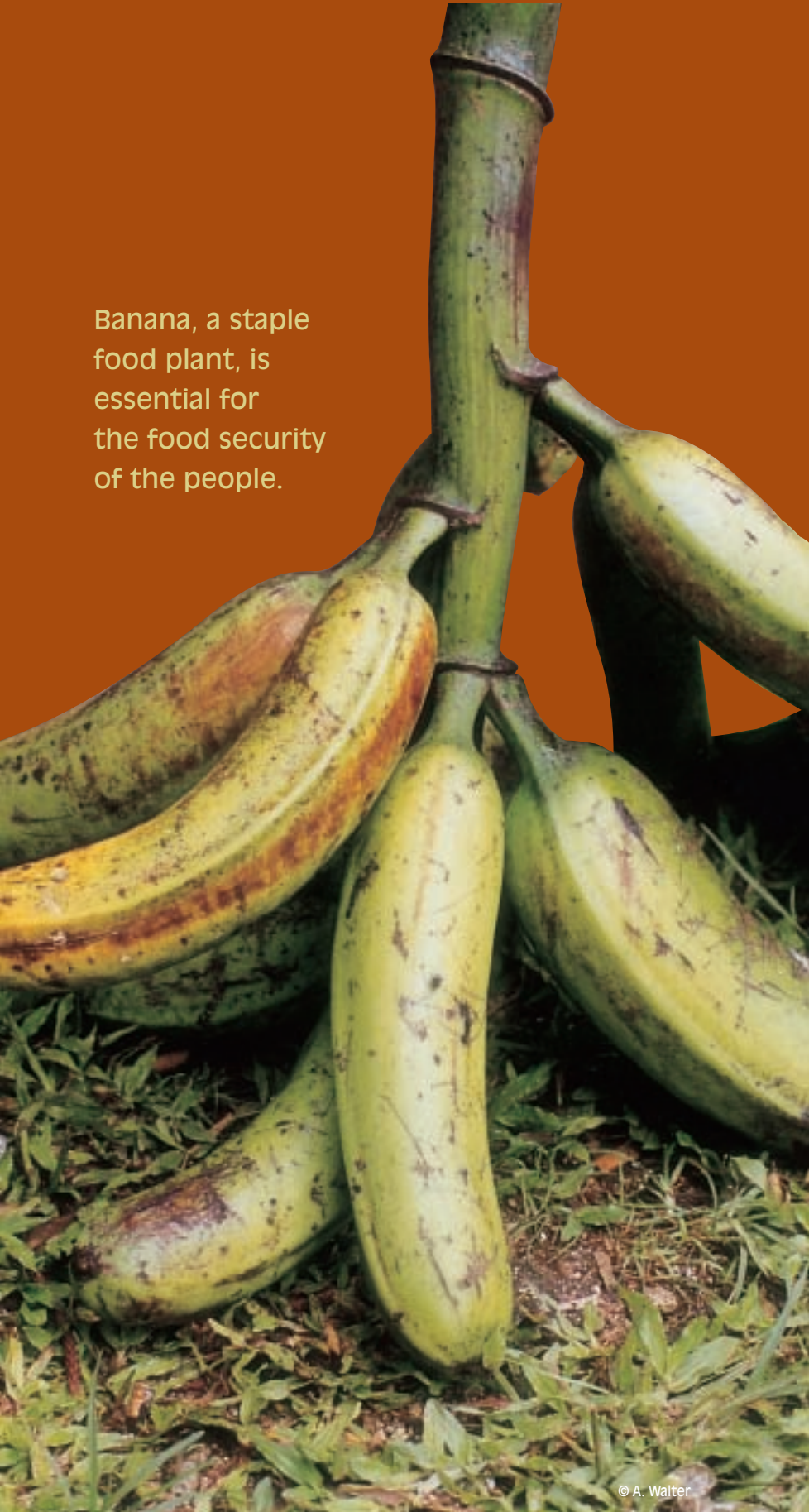
© V. Lebot

Carrots (*Daucus carota*) produced in Vanuatu are small in size and are not grown much.



© V. Lebot

Banana, a staple food plant, is essential for the food security of the people.



© A. Walter

Silk banana.



© A. Walter

Several varieties of banana (*Musa* spp.) grown in Vanuatu. On the left: the variety Popo'ulu. Below: the variety Cuban red.



© D. Greindl

Plantain banana, originally from Africa.



Preparation of a dish of bananas with fish.



© V. Lebot

Ocimum basilicum, basil.

Petroselinum crispum, parsley.



© D. Creindl

The large white radish is cooked, and is the one most eaten.



Above and right: White radish and pink radish (*Raphanus sativus*).



© D. Greindl

Bunches of watercress (*Rorippa nasturtium*).



© D. Greindl





© D. Greindl

Solanum melongena, eggplant or aubergine.

Sugar cane and naviso are two important local herbaceous plants.

Saccharum officinarum, sugar cane.



© A. Walter

Sticks of sugar cane. Cut into pieces, they are chewed at any time.



© D. Greindl

Saccharum edule, naviso or pitpit,
is a popular vegetable.

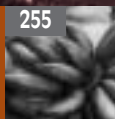


© V. Lebot

Zea mays, maize.



© V. Lebot



Zingiber officinale, common ginger.



© V. Lebot

Two species of ginger: zerumbet or wild ginger, an ancient plant, and common ginger, a plant that reached Vanuatu quite late.

Rhizome of wild ginger (*Zingiber zerumbet*).



© D. Creindl

or rounded, ending abruptly at the petiole, yellowish green, large in size (20–50 cm long), petiole robust, winged, convex and crenate at the back, ivory white. Raceme of bright yellow flowers. Fruits with a long beak, containing about 20 round seeds, dark brown or reddish.

- *ssp. parachinensis*: distinguished by the stalks, regular, slightly crenate, greenish and tender. The leaves are prolongations of a petiole that is only slightly winged. Flowers yellow or cream, in a panicle at the end of the stalk.

Morphological variability

- *ssp. chinensis*: two main forms exist, one with rounded leaves, dark green and with a milk white petiole, the other with pale green leaves and a cream or greenish petiole (Shanghai bok choy). However, there are numerous commercial, cultivated varieties which differ according to the height of the plant, the degree of erectness of the leaves, their shape and their size, and the colour and size of the petioles. Several of these are seen in the urban markets, the most popular among them being the *Waet bon*, which is a form with a white petiole.

- *ssp. parachinensis*: several cultivars exist, varying from year to year according to which commercial seeds have been purchased.

Cultivation and production

Bok choy is often found in the mixed gardens of the villages, after the first harvest of yams, on the holding walls of the irrigated taro pits or in urban kitchen gardens. It is grown from seed supplied by commercial seed companies in Taiwan. Young seedlings are transplanted into beds 30–50 cm apart. This green vegetable reaches maturity after three months, or sometimes two and a half. The majority of varieties bear flowers, and in Vanuatu produce attractive yellow flowering stalks and fertile seeds. The farmers do not have any problem in getting supplies, and sow seeds all the year round. The yields, however, are better in the cool season. Apart from the giant African snail, which eats the young plants, no serious natural enemies or diseases are known. Choi sum is often grown as an intercrop with other species, using pricked out seedlings. The seedbeds are sown with seeds either collected from plants that have flowered or bought from stores. They are harvested three to four months after planting, and yields of 10–15 kg per 10 m² are usual. The young plants require early weeding to avoid

them being quickly smothered by weeds. No serious diseases are known, but the rose beetle (*Adoretus versutus*) eats the soft leaves.

Alimentary uses

Chinese cabbage is used in Vanuatu like island cabbage (aibika; *Abelmoschus manihot*). It is cut into thin strips and boiled, mixed with meat stews, fried dishes and soups. However, its tough leaves do not lend themselves to the making of *lap-lap*. After the toughest leaves have been removed it is carefully washed, the ends of the green leaves are pulled off and the

petioles are cut into small pieces. These are then boiled for some minutes, or even fried. According to individual taste the green parts of the leaves may be added towards the end of the cooking, since they cook very quickly. Bok choy is available abundantly throughout the year in the urban markets. In the case of choy sum, which has a more delicate flavour, everything is eaten. The bases of the stalks and the leaves are washed carefully, then all cut into pieces, flowers included, and boiled in a little salted water or fried on the stove. This vegetable is also used as an ingredient of soups and Asian dishes.

Genus

Capsicum

Family

Solanaceae

The genus comprises 25–30 species, five of which have been domesticated in Central and South America. Two species have reached Vanuatu, though they are sometimes considered to be one single species.

Species present

Capsicum annuum L.

Capsicum, green pepper, red pepper, sweet pepper

Capsicum frutescens L.

Chilli

Capsicum is grown in urban areas for the markets, where they are sold in large quantities. Chilli, more or less naturalised for a long time, was first grown as an ornamental bush before being exploited commercially. The former is increasingly eaten, the latter not very much.

References

Andrews (1984), Eshbaugh *et al.* (1983), Govindarajan (1985, 1986), Messiaen (1998), Neal (1929), Ochse & Bakhuizen van den Brink (1980), Pickersgill (1969, 1988), Pickersgill *et al.* (1979), Piperno & Pearsall (1998), PROSEA (1994), Purseglove (1988, 1991), Rubatzky & Yamagushi (1997), Smartt & Simmonds, eds (1995), Viard (1995), Weightman (1989), Zeven & de Wet (1982).

Plant occasionally eaten,
introduced

*Capsicum annuum*²¹

Capsicum, green pepper,
red pepper, sweet pepper

History

This species was one of the very first grown in Latin America. Distributed from the southern United States to the north of

South America, it was domesticated in the northern part of its area of distribution, probably around eastern Mexico. Its evolution then becomes complicated. Dispersed at the same time as humans and birds, this plant has been subjected to diverse selections. When Christopher Columbus discovered America it was already widespread, and the great navigator brought back some of the fruits to Spain

²¹ Although some consider *C. annuum* (capsicum) and *C. frutescens* (chilli) to be a single species, we treat them as separate here.

from his first voyage. Following this the species was spread by sailors travelling to the tropics. Capsicum first reached the Pacific in the 16th century with the Portuguese, and it came to Vanuatu with the first missionaries.

Description

Branching herbaceous plant or shrub, 0.5–1.5 m in height; leaves simple, lanceolate or oval, variable in size. Flowers terminal; calyx persistent as a cup-shape; one corolla with five or six lobes, colour whitish. Fruits upright or pendant, solitary, hollow, variable in shape (conical, globular, sometimes twisted), very variable in size (1–30 cm long) and colour. Numerous seeds set on white partitions inside the fruit; small, smooth and flat, beige in colour.

Morphological variability

This variability is very important. The cultivars are distinguished according to the sweet or sharp taste of the fruits and according to their shape, size and colour. All these varieties can intercross and give rise to numerous distinct morphotypes and to intermediate forms. Varieties exist that are green, yellow, red, orange, violet or brown when mature. Numerous seed firms offer an enormous choice of varieties whose characteristics suit Vanuatu to a greater or lesser extent, and these are tried out by farmers each year. For example we note varieties with

squarish fruits (from America or Italy), with large, globular red fruits (from Spain or Argentina), with elongate fruits (from central France) and with sharp-tasting fruits.

Cultivation and production

Capsicum grows in all sorts of soils, but does not tolerate frost or heavy rain that leads to rots. It is largely grown in the peri-urban zone to supply the markets of Port Vila and Luganville. It is grown from seed (which the farmers save from one crop to the next), sown into a seedbed and later transplanted. The harvest of green capsicums begins after three weeks, and continues at intervals of one to two weeks for three months. Its production is very irregular, and the yields are better during the cool, dry season.

Alimentary uses

Capsicum, particularly the red one, is a good source of vitamin A, vitamin C and potassium, but the contents of these vary with variety and degree of maturity. Western cuisine uses them raw in salads, or cooked in all sorts of dishes. They are also used in numerous Asian dishes, fried or sauté, after the thin skin has been removed. Vanuatu cuisine uses it less often. After the seeds and the white internal partitions have been removed, it is cut into thin strips and added in small quantities to beef stews.

Plant occasionally eaten,
introduced

Capsicum frutescens

Chilli

History

The history of chilli is the same as that of capsicum, but its natural area of distribution is situated further south, extending from the Amazon basin to the West Indies. It was domesticated in lowland areas of northern South America. Capsicum and chilli were spread together around the world. Asia and India in particular gave rise to hot (peppery) forms, selected for the heat and dryness of some of the regions. Asia is nowadays a secondary centre of diversity of the species. In the Pacific and in Vanuatu chilli was adopted very early on, but more as an ornamental than as a food plant. It is found growing spontaneously in traditional gardens.

Description

Very branched shrub which resembles capsicum (*C. annuum*), from which it is distinguished by its greenish flowers and the narrow, elongate fruits that arise in pairs or in clusters. Only the variety *baccatum* has rounded fruits²².

Morphological variability

A great variety of chillis exist according to the size and shape of the fruit, as well as the taste

which can be more or less hot. Without doubt the hottest is *habanero*, quite small, round and vermilion coloured, followed by Cayenne pepper, wrinkled, curved and bright red. The bird's eye chilli (*piment oiseau* or *piment enragé*) small, elongate and bright red, is very hot; the banana chilli, red and as large as a small capsicum, and conical in shape, is mild like most African chillis. In Vanuatu the main forms growing are a small pointed chilli that grows wild, the variety *baccatum* and a large green chilli that is quite mild. Increasingly all sorts of forms can now be found that come from commercial seed supplies.

Cultivation and production

Chilli grows in the wild state in all the islands of Vanuatu, close to gardens and in the villages. Originally garden escapes, these are nowadays an integral component of the local flora. They prefer very sunny positions and dry weather. They are prone to root rots, nematodes and bacterial wilt, so rotation with other market garden crops is therefore avoided. Yields are high, and it is common to see bushes heavily laden with fruits. Some private enterprises harvest the chillis for use in the dried state, as a powder or a paste. This crop, although it has potentially good financial rewards particularly for export to the Indian community of Fiji, has not been exploited much.

²² Some botanists consider this to be a separate species, *Capsicum baccatum*, which was domesticated in Bolivia.



Capsicum frutescens

Alimentary uses

Harissa, Tabasco and pili-pili are manufactured spices made from chilli. Not found much in the rural populations of Vanuatu, it is used more and more in meat stews, and sometimes raw as an accompaniment to a dish of root crops. It is sold regularly in urban markets, in small sachets or –

more attractively – in plaited garlands. They are also sold in bottles or dried.

Other uses

In Vanuatu it is used first and foremost as an ornamental shrub, and for marking the boundaries of plots of land.

Genus

Coriandrum

Family

Apiaceae

The genus contains two species, one of which is cultivated. It has been introduced to Vanuatu.

Species present

Coriandrum sativum L.

Coriander, cilantro,
Chinese parsley

In Vanuatu coriander is grown for its leaves that are used to flavour many dishes, but the ni-Vanuatu only eat it in moderate quantities. Its seeds are not used as a food.

References

Boisvert & Hubert (1977), *Encyclopédie des aliments* (1997), French (1986), Norman (1991), Ochse & Bakhuizen van den Brink (1980), **PROSEA (1999)**, Purseglove (1991), Purseglove *et al.* (1981), Zeven & de Wet (1982).

Plant occasionally eaten,
introduced

Coriandrum sativum

Coriander, cilantro, Chinese parsley

History

Coriander, a weed of cereal crops in the Middle East, became one of the oldest spices of the Mediterranean region. It was grown as a medicinal and food plant by the Egyptians, Greeks and Romans. Its name comes from the Greek *koris*, which indicates bed bugs, from the characteristic odour of the young plant. It later spread throughout Europe,

in Asian countries and then America, for both its seeds and its leaves. This European plant reached Vanuatu with the arrival of Asian people.

Description

Erect and branched, annual herbaceous plant, 30–70 cm tall. Coriander is **heterophyllous**. Leaves flat with dissected margins (upper leaves) or lobate margins (lower leaves). Inflorescence an umbel bearing white or pink flowers, small in size in the middle and broad at the periphery. Fruits rounded, small, yellowish and grooved, containing two seeds.

Morphological variability

Several varieties exist, distinguishable by the height of the plant, the morphology of the leaves and the fruits, and above all by the chemical composition. We note among others Moroccan coriander with spherical, grooved seeds, and Indian coriander with more elongate and smooth seeds. A distinction is also made between *C. sativum* var. *sativum* (weight of 1,000 fruits over 10 g and average diameter of fruits over 3 mm) and *C. sativum* var. *microcarpum* (weight of 1,000 fruits less than 10 g and average diameter of fruits less than 3 mm).

Cultivation and production

In Vanuatu coriander is grown for its leaves which are supplied to the markets. It is also planted in kitchen gardens. The plant

does not tolerate very strong sun and its cultivation is tricky. It is grown from seed, mostly bought commercially. The plant reaches maturity in three months, but leaves can be harvested after 60 days. In Vanuatu nematodes weaken the plant roots, and a bacterial wilt impairs their good development when they are grown in the hot and wet season, namely November to April.

Alimentary uses

In Vanuatu coriander leaves, which are very rich in vitamin A, are sold fresh in bunches in the markets. They are used in Asian cuisine and for seasoning salads, soups, fish and various other dishes. Coriander seeds are imported and are sold in groceries. They are purchased by the expatriate population which uses them in their cuisine.

Genus

Curcuma

Family

Zingiberaceae

The genus comprises about 70 species, mainly originating from the Indo-Malayan Region, with some species from Madagascar and Southeast Asia. Vanuatu possesses at least one species.

Species present

Curcuma longa L.

Turmeric

Present in Vanuatu from olden times, turmeric is naturalised there. It is grown for the colouring agent extracted from its roots, and to a lesser extent as a spice.

References

Barrau (1962), Boisvert & Hubert (1977), de Candolle (1883), French (1986), Norman (1991), Ochse & Bakhuizen van den Brink (1980), Peekel (1984), Pétard (1986), PROSEA (1999), Purseglove (1988), Purseglove *et al.* (1981), **Sastri, ed. (1950)**, Smartt & Simmonds, eds (1995), Sopher (1964), Zeven & de Wet (1982).

Plant occasionally eaten, local

Curcuma longa

Turmeric

History

Unknown in the wild state, turmeric has been cultivated for a long time in India from where it probably originates. It has been domesticated in Southeast Asia, and early on reached China where it was already seen by Marco Polo, and then the countries of Oceania. The Arabs introduced it to Europe in the Middle Ages. It reached Vanuatu with the first human migrations, and became

naturalised there. This autochthonous (or indigenous) plant, which is used as a food colorant and a pharmaceutical (food additive E-100 in the EU list), is certainly worth developing into a commercial crop.

Description

Perennial herbaceous plant with a straight and tough stem, reaching up to 1 m in height. Central rhizome surrounded at a right angle by numerous, smaller, lateral rhizomes, smooth but furnished with flexible scales, straight or slightly curved, orange or yellow. Leaves sheathing the stem with their slightly winged

petioles, lanceolate, longitudinally striated, pale green, 30 x 7 cm. Long terminal inflorescence bearing white or yellow, tubular flowers separated by large bracts. Fruits absent.

Morphological variability

Several cultivars of turmeric exist in India, but the diversity of the plant in Vanuatu has not been studied.

Cultivation and production

The plant likes hot and wet climates, and aerated and well-drained soils. It is propagated from pieces of rhizome. In Vanuatu this plant grows spontaneously, and is not really cultivated but is simply propagated. It is, however, the object of occasional small trade. It is found hither and thither, and as an intercrop in gardens, particularly in Fanafo and on the island of Santo.

Alimentary uses

Used in India and Asian countries as a fragrant flavouring for food, turmeric is used as an ingredient in curries and in Worcestershire sauce. It is one of the rare spices that was used in Melanesian cuisine before the arrival of Europeans and Asians. With a mild flavour, it gives meat dishes a subtle fragrance, slightly tangy, and an attractive yellow colour. In earlier times in the centre of Santo a ritual existed in which men cooked large roots of turmeric in an oven of hot stones and then ate them²³.

Other uses

A dark yellow colouring agent (curcumine) is extracted from the root, which can be used to dye vegetable fibres, wool and silk. Nowadays in Vanuatu the plant is used for dyeing the pandanus fringes of certain ceremonial mats, and wooden objects used in dances, and for making coloured designs on the faces and bodies of the dancers. It is also used as a medicine and a cosmetic.

²³ Though this could have been *Curcuma angustifolia* Roxburgh.

Genus

Daucus

Family

Apiaceae

The genus comprises 22 species, mainly European and Mediterranean. *Daucus carota* is itself a complex of 13 species. Vanuatu has only the cultivated carrot with the orange root.

Species present

Daucus carota L. subsp. *sativus* (Hoffm.) Thell

Carrot

In Vanuatu carrot is not grown much because of its poor agronomic performance. The carrots are small and thin. Always popular as a food, however, the great majority are imported.

References

De Candolle (1883), **Cullen (1972)**, **Heywood (1983)**, Ochse & Bakhuizen van den Brink (1980), PROSEA (1994), Purseglove (1991), Smartt & Simmonds, eds (1995), Viard (1995), Villeneuve & Leteinturier (1992), Weightman (1989), Zeven & de Wet (1982).

Plant occasionally eaten, introduced

Daucus carota

Carrot

History

It was in Afghanistan that the carrot, originally violet or straw-coloured, was first cultivated over 2,000 years ago. It reached successively Iran, China and Turkey, and then the Arabs spread it to the Mediterranean basin. In the 16th century this vegetable appeared on the tables of Europe, and it was then introduced to America. The violet carrot was gradually replaced in Europe by a pale

yellow carrot, the greater part of which grew above the soil, and finally by the orange carrot that we know today which appeared in the Netherlands after much selection. All the varieties of orange carrot cultivated today throughout the world derive from this last selection. It was this form that was introduced to Vanuatu by missionaries in the middle of the 19th century.

Description

Plant reaching to 1 m in height. Leaves composed of leaflets that are themselves made up of smaller segments that in turn are made up of lanceolate segments;

petiole long. Umbel reaching 37 cm in diameter bearing flowers with five white or pink petals, with a toothed calyx. Small, oblong fruits a few millimetres long. Root swollen, variable in size, squat and dumpy or elongate, yellow or orange.

Morphological variability

D. carota is a complex comprising very variable species, wild or cultivated. There are two major groups of cultivated carrots. The first, which is Asian, encompasses the forms with a yellow or purple root, divided; the second, which is western, contains the forms with orange roots, sometimes yellow or white, not divided. In Turkey the two forms coexist and hybrids between the two groups occur. The cultivated forms cross easily with the wild forms, and numerous cultivars have been selected around the world. The Vanuatu carrot is always cultivated, and varies according to which seeds have been available to purchase.

Cultivation and production

In Vanuatu the carrot is a plant of market gardens, grown in the

centre of Tanna and in peri-urban zones. It is grown from seed bought commercially, sown into well-dug and well-drained ground. The young seedlings are thinned, and the plants are later harvested before they have reached full maturity, while the roots are still tender. The cultivation of carrot is made difficult by the fact that it is prone to nematode attack, and its roots are never very large. Carrots are sold in the markets during the cool season, generally in small quantities. The supermarkets import larger and more tender varieties from Australia, and these are generally preferred by consumers.

Alimentary uses

This vegetable is not eaten much by rural people or by those who do not have the means to buy the imported varieties. Carrots are eaten raw, in salads, or cooked. They are boiled after being cut into pieces or into strips. They are added to meat stews or are mixed with other vegetables and boiled or sautéed.

Other uses

The leaves may be fed to animals.

Genus

Lactuca

Family

Asteraceae

The genus comprises about 100 species, many of which originated from northern Europe or western Asia. A single species is present in Vanuatu.

Species present

Lactuca sativa L.

Lettuce

Lettuce is a popular vegetable, present in all the villages. However, its sensitivity to low temperatures and to nematodes makes its cultivation in open soil difficult. It is, however, sold regularly in the markets.

References

De Candolle (1883), **Ferakova (1976)**, Harlan (1987), Lindqvist (1960), Ochse & Bakhuizen van den Brink (1980), Purseglove (1991), Robinson *et al.* (1983), Smartt & Simmonds, eds (1995), Viard (1995), Weightman (1989), Wien (1997), Zeven & de Wet (1982), Zohary (1991), Zohary & Hopf (1994).

Complementary food plant,
introduced

Lactuca sativa

Lettuce

History

Lettuce is depicted on Egyptian monuments and mentioned in Greek and Roman literature. A plant of western Asia and the Mediterranean, it was first produced for the oil extracted from its seeds. The exact path of hybridisations that led to the lettuce that we know today is

no longer clear. The Persians, the Romans and then the Arabs selected a number of forms, with dense foliage and short stems. The Roman legions introduced them to Europe, then the first navigators took them to America where they became very popular. They reached China in the 7th century AD. The human selections were for characteristics of the seeds, and then the shape of the leaves (flat or curly, ability to form a heart, colour), finishing up with a great diversity of forms that are often grouped within a complex, *L. seriola-sativa*.

Description

This herbaceous plant initially forms a dense rosette of leaves arranged in a spiral around a short, squat stalk. Their shape, size, colour and texture are very variable. The leaf blade is whole, segmented or slightly undulating. The long flower stalk (1 m in height) appears later. It is made up of numerous flowering heads bearing small yellow flowers. Fruit an achene²⁴, oval, surmounted with a plume of hairs.

Morphological variability

This kitchen garden plant has a multitude of varieties. The forms that are closest to the ancient species, with leaves that are erect, thick, narrow, stiff and crisp (for example cos lettuce which is common in northern Europe) are grouped together under the variety *longifolia* Lam. The Americans prefer forms with dense hearts and tightly packed leaves, pale green and crisp (var. *capitata* L.), or heading lettuces. Europeans particularly like butter lettuce (likewise var. *capitata* L.), with broad, flexible leaves, slightly open, in various shades of green. The forms with a curly head (var. *crispa* L.), which never form a heart and have broad, wavy leaves, have quite recently become popular in the countries of northern Europe. Lettuce is grown from seeds purchased commercially, and one may therefore find numerous different

morphotypes in Vanuatu according to which particular seeds have been imported that season.

Cultivation and production

Lettuce is a plant of temperate countries, and no variety is really adapted to the tropics. In Vanuatu the leaves have difficulty forming hearts and the plants have a tendency to produce long stalks. Principally grown in the centre of Tanna, and by market gardeners around Port Vila, lettuce is also grown by women in peri-urban villages for sale at markets during the cool season from May to October. It is grown from seed, sown in seedbeds and then transplanted into growing beds after six weeks. It is harvested three months after sowing. Since the 1970s it has been produced by hydroponic²⁵ culture and sold in plastic bags in the supermarkets. Despite its proneness to nematodes, many growers sow it in their gardens for their own home consumption.

Alimentary uses

Lettuce is eaten raw, seasoned with a little salt and lemon juice or vinaigrette. The leaves are also cooked as a vegetable, alone or mixed with other vegetables. Without being very common, consumption of cooked lettuce is regular in rural regions. In urban areas it is most often served as a salad.

²⁴ A dry, indehiscent fruit with a single cavity and a single seed, the pericarp of which is not fused with the seed (the hard seeds that are found on a strawberry are achenes).

²⁵ Culture without soil, where the roots develop in nutrient solutions.

Genus

Lycopersicon

Family

Solanaceae

The genus comprises the cultivated tomato, and seven wild species which grow in a coastal belt of land stretching from the Equator to northern Chile. The cultivated tomato is present in Vanuatu.

Species present

Lycopersicon

esculentum Miller

Tomato

Formerly known as the love apple, the tomato, which is introduced, is nowadays grown in all the gardens. It is mostly eaten cooked, in meat or vegetable dishes.

References

Anais (1997), Atherton & Rudish, eds (1986), Hawkes *et al.*, eds (1979), Jenkins (1948), Mathon (1981), PROSEA (1994), Purseglove (1991), Ochse & Bakhuizen van den Brink (1980), Smartt & Simmonds, eds (1995), **Taylor (1986)**, Viard (1995), Weightman (1989), Zeven & de Wet (1982).

Complementary food plant,
introduced

Lycopersicon
esculentum

Tomato

History

The tomato as we know it is the cultivated form of a wild species with small, acid fruits (*L. esculentum* var. *cerasiforme*), originally from the equatorial and Peruvian Andes. This weed plant spread throughout tropical America, and was then domesticated and improved in Mexico.

It was from there that the Spanish took it to Europe. For a long time this plant, which was reputed to be poisonous, was not eaten outside Italy but was instead used as a medicine or an ornamental plant. At the end of the 18th century the Europeans introduced it to the United States where its improvement really began, giving the round, fleshy, sweet tomatoes that we know today. The Spanish introduced it to the Pacific and the Philippines after 1650. It spreads easily in the subsistence gardens and often becomes naturalised. Finally, the improved varieties of tomatoes were introduced to the islands

of Oceania. Nowadays in Vanuatu one may find spontaneously growing forms with small fruits and cultivated forms with large fruits in the indigenous gardens, mainly in the peri-urban zone. In season, tomatoes (cherry tomatoes or round ribbed) appear in large quantities in the markets.

Description

Plant shrubby, reaching up to 2 m in height, or scrambling, with a robust, hairy stalk and a strong smell. Leaves made up of 6–9 leaflets, lobed or entire, oval, with short hairs; margins with small teeth. Flowers hermaphrodite, in flower spikes separated by three leaves (indeterminate pattern) or two leaves and then one (determinate pattern); calyx persistent, made up of six pointed lobes; five to six recurved petals, yellow. Fruits variable in shape, rounded (smooth or ribbed), elongate or pear-shaped, yellow or red in colour, size likewise variable (1–10 cm in diameter), containing numerous small brown seeds.

Morphological variability

Two to five varieties of tomatoes are known, according to the mode of growth of the plant and the morphology of the fruit. The following three varieties are present in Vanuatu:

- var. *cerasiforme* (Dun.) Alef.: cherry tomato. Originally from Peru and Ecuador, this wild form (subsequently improved and cultivated) is spread

throughout the tropical world and nowadays is often naturalised. The flowers have five petals and the yellow or red fruits are small in size (2 cm in diameter). In Vanuatu it is found in all the gardens, along footpaths and around houses;

- var. *pyriforme* Alef.: pear tomato. The flowers have five petals and the yellow or red fruits are pear-shaped. It is not grown much in Vanuatu;
- var. *commune* Bailey: common tomato. The flowers usually have six petals and the fruits are variable in shape and size. It is grown in all the islands of Vanuatu. The ribbed form is very much predominant.

Besides these, very many other cultivars have been produced in temperate regions since the end of the 19th century, varying according to the shape, colour and size of the fruit, the taste and the vitamin content, the degree of precocity (early maturity), whether the growth form is erect or scrambling, and the disease resistance.

Cultivation and production

Tomato is adapted to many environments, but in hot and humid tropical regions such as Vanuatu it produces fewer fruits and more leaves. In the islands it is grown in the mixed gardens that are planted after the first harvest of yams. It is grown from

seed, most often bought commercially or collected from the fruits and dried, or by grafting on to eggplants (aubergines) which are more resistant to bacterial diseases. The seeds germinate 7–10 days after being sown into seedbeds. The young seedlings are transplanted after five weeks into prepared beds of soil.

Although under some conditions the plant can give three harvests per year, in Vanuatu the fruits generally appear only once a year in the markets, from June to November. In the 1980s the Department of Agriculture began trials to produce high quality tomatoes throughout the year, resistant to bacterial diseases and nematodes. Numerous resistant varieties

from Taiwan were distributed to growers. The hardiest of these have fruits of medium size (5–8 cm in diameter), and were popular with the producers who continue to grow them using the seeds collected from the fruits.

Alimentary uses

The small cherry tomatoes which grow spontaneously in garden areas are eaten raw between meals. It is often children who pick them and eat them as snacks. They are also cooked before they are fully ripe, as an accompaniment to a dish of root crops. The improved forms with larger fruits, grown in the gardens, are sprinkled with salt and eaten raw, or cooked in meat stews.

Genus

Mentha

Family

Lamiaceae

Twenty-five species of mint exist, plus very many cultivars. Two species are particularly important in Vanuatu.

Species present

Mentha piperita L.
Peppermint

Mentha spicata L.
Spearmint, garden mint

Mentha spicata is the commonest mint in Vanuatu, but other cultivars and other related species are also found, spontaneous or cultivated.

References

Encyclopédie des aliments (1997), French (1986), **Harley (1972)**, Hill (1952), Purseglove (1991), Ruttle (1938), Tucker & Fairbrother (1990), Tucker *et al.* (1980).

Plants occasionally eaten, introduced

Mentha piperita
Mentha spicata

Peppermint
Spearmint, garden mint

History

Known since biblical times and originating from temperate Europe and Asia, the different species of mints have been progressively spread around the world. They have undergone numerous interspecific hybridisations with parental and/or secondary (derived) species, yielding new species and culti-

vars. Accordingly, *M. piperata* is a sterile hybrid resulting from the crossing of three species of mint, one of which is *M. spicata*. Mint is generally grown in kitchen gardens or in pots close to houses. Introduced to the United States in the 19th century, it was improved and is widely grown there. In Vanuatu it is naturalised but also cultivated in the gardens.

Description

- *Mentha piperita* L.: herbaceous plant with a square stem 50 cm long, green-mauve, branched and erect; stolons leafy. Leaves with

a strong smell, lanceolate, dentate, hairy, bright green, quite large (5 cm). Violet flowers in terminal heads.

- *Mentha spicata* L.: leaves with a less strong smell, rounded, slightly dentate, grey-green, smaller. More or less violet flowers in heads.

Morphological variability

Very important and occurring almost continuously, but not studied in Vanuatu.

Cultivation and production

Naturalised in Vanuatu, mint is found in all garden areas and in damp places. It is cultivated both from seed and from planting of stolons in the vegetable gardens. The species that is commonest in rural areas and that is most often seen in the wild state is *M. spicata*.

Alimentary uses

Mint leaves are used to flavour soups, salads, food dishes, sauces and some ices. Rural people use it in moderation.

Genus *Musa*

Family Musaceae

Bananas are hybrids between different species. In Vanuatu both cooking bananas and dessert bananas are found, as well as the celebrated *Fe'i*.

Species present

Musa spp.
Interspecific hybrids

Musa fehi Bert. ex. Vieill.

In some of the islands of Vanuatu bananas are the staple food plants, essential for the food security of the local people. The plantains are often made into *lap-lap*, and the dessert varieties are eaten throughout the day. The various species of banana are treated together here.

References

Bakry *et al.* (1997), INIBAP/IPGRI (2001), Lebot *et al.* (1994), Sharrock (1995), **Stover & Simmonds (1987)**.

Staple food plant, local
(and introduced)

Musa spp.

Banana, plantain

The genus *Musa* is divided into four sections which include forms with seeds and seedless forms. Two sections have a base chromosome number of 10 (*Callimusa* and *Australimusa*) and the other two sections (*Musa* and *Rhodochlamys*) have a base number of 11 chromosomes. The section *Australimusa* is endemic to Oceania and does not exist in Asia, and includes the famous *Fe'i* banana with its erect bunches that is so popular

in Tahiti and the Marquesas. This section in fact originated in Melanesia where wild and cultivated individuals coexist. The great majority of banana cultivars belong to the section *Musa*, which is also the most important in the genus and the most widely distributed. It is found from India to Southeast Asia and certainly in the Pacific. The most ancient cultivated bananas originated from Papua New Guinea and Melanesia, but domestication has occurred for tens of thousands of years across to India and southern China. The Austronesians introduced it to Madagascar, and from there to Africa where the population

adopted it as a staple food plant, particularly in East Africa and the equatorial region. Marco Polo, Arab traders, the Portuguese and then other Europeans spread them endlessly around the world. Nowadays 80% of the world production is of the variety Cavendish, which is a cultivar originally from southern Yunnan in China.

Description

Giant herbaceous plant, with a trunk-like pseudostem formed from many **leaf sheaths** tightly rolled around each other. Leaves are produced by the terminal meristem of the underground stem (or corm) that is reduced in size. The root system is shallow and the number of shoots varies according to variety. The vertical inflorescence forms a cluster or bunch, made up of imbricate (partially overlapping) spathes arranged in a spiral, in the axils of which arise rows of flowers. The female flowers are made up of a basal ovary, and staminodes or reduced, functionless stamens. Female sterility is absolute in many clones. In the commercial cultivars, the ovaries fill with flesh to make the fruit, without pollination and without seeds being formed. The growth of the inflorescence continues and it produces a male flower, which is generally purple and hangs beneath the bunch of fruits.

Morphological variability

The cultivars derive from two species: *Musa acuminata* (genome A), fragrant and rich in sugar, and *M. balbisiana* (genome B), which is relatively tasteless

and is rich in starch. The seeds of bananas are numerous, the size of a lentil, not very nice on the palate and very hard between the teeth. The first selections were therefore towards sterile forms that did not have these seeds, and were diploids of *M. acuminata* (AA). It is, above all, this parthenocarpy (fruit development without the need for pollination) that makes banana appealing and edible. At some moment or other in their history, the diploid and triploid cultivars of *M. acuminata* exchanged pollen with *M. balbisiana* to give rise to interspecific hybrid cultivars that were diploid (AB), triploid (AAB, ABB) and even tetraploid (AAAB, AABB, ABBB). The banana varieties most grown in Vanuatu belong to the group called "Pacific plantains" in international nomenclature. They comprise three triploid AAB varieties, the fruiting stalks of which carry bunches of large cooking bananas, and they are staple food plants. These varieties are known by experts under their Hawaiian names of *Maia Maoli*, *Popo'ulu* and *Iholena*. *Maoli* (= Maori banana) is the variety with the largest fruits, and corresponds to *Mao'i* of the Marquesas, *Ma'ohi* of Tahiti and the *Chef* banana of New Caledonia. *Popo'ulu* are short, fat, squat bananas, sometimes as broad as they are long, known under the name *Po'u* in Tahiti, *Po'upo'u* in the Marquesas and *Poingo* in New Caledonia. Finally the *Iholena* of Hawaii, or *Ore'a* of Tahiti, are remarkable for their deep orange flesh which, like the *Fe'i* bananas, gives a fluorescent yellow colour to the urine, which

surprises even regular eaters. Within each of these varieties, *Maoli*, *Popo'ulu* and *Iholena*, the farmers distinguish numerous forms according to the colour of the plant, the epidermis and the flesh of the fruit. Because of the linguistic diversity of Vanuatu, these forms are known under dozens of different names in the vernacular languages. The missionaries introduced numerous cultivars of dessert bananas that are also now very popular. One may find Ney Pouvan (Lady Finger), the very small fruits of which are quite fragrant; also the Brazilian, which has a more acid taste, and the Cavendish which has a rather bland taste but yields exceptionally well. The number of varieties has not been tallied exactly but easily exceeds 50 or so, and distinct morphotypes can be counted in the hundreds.

Cultivation and production

Banana is one of the most important food plants of Vanuatu. It is regularly planted in the borders of gardens, either as a windbreak or simply to mark the border. The species is planted using large suckers cut from the base of a mother plant. The suckers are usually placed at the bottom of holes 30 cm deep made with a crowbar. The first bunch appears after 8–10 months. At each harvest the pseudostem is chopped down, but the daughter shoots are left and they then fruit

in their turn. The plant becomes a perennial and remains in the soil for three to five years, the time that it takes for a cyclone to come and knock it down. Black Sigatoka disease (*Mycosphaerella fijiensis*) is the most serious problem, and banana weevil (*Cosmopolites sordidus*) bores into the bases of the stalks and can lead to them falling over.

Alimentary uses

Omnipresent in the markets, the Pacific plantains, which have yellow flesh, are sold as cooking bananas and for preparation of *lap-lap*, and are very popular with consumers. These bananas may be boiled and then mashed for children, or cut into slices and fried. They are very rich in complex carbohydrates and therefore nutritious. Dessert bananas, which are eaten when fully ripe, are eaten by the ni-Vanuatu at any time of day as snacks.

Other uses

Banana leaves are used mainly as table mats, plates or dishes. They are sometimes used instead of *Heliconia* leaves for wrapping foods before or after cooking, but they are not as strong. The sap of certain varieties, particularly the *Fe'i* bananas, is a popular dye for colouring mats to an attractive purple. Finally, the trunk-like stalks may be crushed in order to obtain long fibres, used as string or rope or for weaving skirts.

Genus

Ocimum

Family

Lamiaceae

The genus comprises 30 species spread around tropical and subtropical regions. Three species are present in Vanuatu.

Species present

Ocimum basilicum L.

Basil

Ocimum tenuiflorum L.

Basil (very close to *O. basilicum* and difficult to distinguish from it)

Ocimum gratissimum L.

Wild basil (foraged species; see CD-ROM)

Basil is found in all urban gardens, but also frequently in rural areas. It is regularly used, in small quantities like all aromatic herbs.

References

Darrah (1974), Germosen-Robineau, ed. (1999), Grayer *et al.* (1996), Messiaen (1998), OMS (1998), **Paton (1992)**, Paton & Putievsky (1996), Pétard (1986), PROSEA (1999), Purseglove (1991), Pushpangadan & Bradu (1995).

Plant occasionally eaten,
introduced

Ocimum basilicum

Basil

History

Originally from west Asia, basil was cultivated by the Egyptians, then by the Greeks and Romans. From there it reached the rest of Europe and then the continent of America. Grown for a long time as a medicinal plant and an aromatic herb, the species

comprises numerous cultivars. It is nowadays present throughout the world. It was introduced to Vanuatu where it grows abundantly, often spontaneously.

Description

Aromatic herb with a robust stalk, erect and quadrangular. Leaves simple, **decussate**, oval or elliptical, dentate or entire, reaching 8 cm in length. Inflorescence terminal, reaching up to 30 cm, with three spikes of purple, white or cream flowers;

calyx fringed; pedicels very short. Fruits consisting of four small, dark maroon nuts, 1 mm in diameter.

Morphological variability

The species, whose taxonomy is not well known, may be confused with other closely similar species (*O. tenuiflorum* in particular). Moreover, it is extremely variable, with the cultivars being differentiated mainly by the content of aromatic compounds. Thus many forms of basil exist in Vanuatu, and they have not been studied in any detail. One may distinguish, however, a form with broad leaves, and a form with small, oval leaves which is more shrubby.

Cultivation and production

Basil grows in all the villages and gardens, but above all in pots or in kitchen gardens in urban areas. It is grown from

seeds bought commercially or collected from mature plants. The seeds germinate in about five days, the plant grows quickly, and picking of the leaves stimulates further growth. It flowers after three months.

Alimentary uses

The leaves have been used for a long time to flavour soups, sauces and various different dishes. They are the basic ingredient in the famous pesto sauce of Italy and southeast France. In Vanuatu they are used in small quantities to flavour soups and certain stews. However, it is mostly the Asian and European expatriate populations in the urban areas who use it to flavour their dishes.

Other uses

Oil extracted from the leaves is used in the cosmetic industry, in particular to scent soaps. It is also a medicinal plant.

Genus

Petroselinum

Family

Apiaceae

A single species occurs in Vanuatu.

Species present

Petroselinum crispum (Mill.) Nyman ex. A.W. Hill

Parsley

Parsley is a European introduction to Vanuatu.

References

PROSEA (1999), Purseglove (1991), Smartt & Simmonds, eds (1995), Zeven & de Wet (1982).

Plant occasionally eaten,
introduced

Petroselinum crispum

Parsley

History

Parsley, originally from the western Mediterranean, was already known to the Greeks and the Romans. It is nowadays spread throughout the world, and is naturalised in most of the temperate zones.

Description

Biennial or perennial herb with a hollow stem, 70 cm high on average. Leaves arranged in rosettes, made up of three leaflets with deeper and shallower indentations (particularly on the lower leaves), flat or curly, bright green, 1–2 cm long. Flowers borne on

flattened umbels 2–5 cm in diameter, small, yellow. Fruits ovoid and laterally compressed, 1–2 cm long, containing the seed.

Morphological variability

Parsley is a very ancient cultivated plant, which varies according to its habitat and to the size and shape of the leaves. Three main groups of cultivars may be distinguished:

- flat-leaved parsley (var. *neapolitanum* Danert), preferred by continental Europeans, with flattened and well spaced out leaves, strongly flavoured;
- curly-leaved parsley (var. *crispum*), preferred by Anglo-Saxons, with compact, curly leaves, mildly flavoured;
- parsley with a tuberous root, not found in Vanuatu.

Within each group a number of cultivars exist, many of which have been developed in agricultural research stations.

Cultivation and production

Parsley is grown by sowing seeds, which germinate with difficulty. When the plantlets have six leaves they are transplanted into a bed, or at least thinned out. Leaves are then picked as needed, with flowering heads being removed whenever they form. In the gardens the growers allow some inflorescences to develop, however,

to produce seeds that will germinate spontaneously and maintain the crop.

Alimentary uses

Parsley, so common as a decoration on a plate or a seasoning for sauces, has still not been incorporated into the cuisine of Vanuatu. Only people of Asian or European origin use it with any regularity. It is therefore mainly grown in urban vegetable gardens or by peri-urban market gardeners who sell it in the markets. In the rural areas it may be found in the gardens, mainly in well-drained, moist hollows, but it is not used much.

Genus

Raphanus

Family

Brassicaceae

The genus contains six species originally from the shores of the Caspian Sea. The only cultivated species has been introduced to Vanuatu.

Species present

Raphanus sativus L.

Radish

Only the varieties of radish with large roots are eaten by the ni-Vanuatu, though various sorts may be grown within a garden for sale in markets or for experimenting with new plants.

References

Messiaen (1998), **Pistrick (1987)**, PROSEA (1994), Purseglove (1968), Rubatsky & Yamagushi (1997), Smartt & Simmonds, eds (1995).

Plant occasionally eaten,
introduced

Raphanus sativus

Radish

History

Radish originated between the Mediterranean and the Caspian Sea. A weed among cultivated crops and harvested for its oily seeds, it was finally recognised as a vegetable by the Egyptians and then the Greeks and Romans. It was at that time a black radish. Parallel to that development another centre of domestication appeared in China, with the two groups of plants later exchanging genes after the Silk Road had

opened up. Progressive selection split the cultivated radish into two forms – one with a small root, predominant in temperate regions of Europe, and the other with a large root and predominant in Asia. The small red radish that appeared in the 16th century belongs to the first group. Radish is nowadays grown throughout the world, and both forms have been introduced to Vanuatu.

Description

Pilose herbaceous plant, 20–100 cm in height. Base of the stem and **hypocotyl** swollen, cylindrical or round, white, black or red in colour, variable in size. Leaves in a rosette, oblong,

downy; margins **crenate**. Long **raceme** bearing small, scented, white or violet flowers. Fruits flattened, long (10–30 cm), containing 6–12 yellowish seeds.

Morphological variability

The group of small radishes comprises several types according to shape (long or round) and colour of the epidermis (white or red). The group of radishes with large roots (*Raphanus sativus* var. *longipinnatus*) is even more polymorphic, comprising types that are elongate in shape, with the epidermis yellow, green, black or violet and the flesh white, red, purple or green. Forms also exist in which the root is not swollen, and these are grown for their leaves. In Vanuatu one finds the forms that are round and red (Cherry belle type), ovoid and white with a red collar (Pernot type), and elongate and white (Daikon or Japanese radish type).

Cultivation and production

Cultivation of radish is only successful in the cool season. Commercially bought seeds are sown in beds whose soil has been well worked. After germination the seedlings are thinned, and the most vigorous ones are replanted with 20 cm spacing. Radishes need to be hoed a couple of times to remove weeds, and are harvested ten weeks later before they become too fibrous. No serious pest or disease problems are known.

Alimentary uses

The small red radishes are eaten raw, but are not used much by rural populations. The large radishes are more common and are eaten cooked. Peeled and cut into pieces or small rings, they are added to dishes with sauces and are an ingredient of many Asian dishes.

Other uses

The leafy cultivars are grown for use as a green manure.

Genus

Rorripa

Family

Brassicaceae

A single species exists in Vanuatu.

Species present

Rorripa nasturtium (L.) Mensfeld

Watercress

Watercress, regularly sold in buckets in the markets, is eaten cooked as a vegetable or raw in salads. It is grown mainly in irrigated taro pits for home consumption or in peri-urban villages for supply to the markets. It is grown commercially in Efate and Santo.

References

Bailey (1992), Guillaumin (1946), **Jonsel (1988)**, Messiaen (1998), Ochse & Bakhuizen van den Brink (1980), **PROSEA (1994)**, Purseglove (1991), Rubatzky & Yamaguchi (1997), Zeven & de Wet (1982).

Complementary food plant,
introduced

Rorripa nasturtium

Watercress

History

Originally from west Asia and the eastern Mediterranean, this aquatic plant is nowadays present throughout the world, naturalised or cultivated. It is sometimes – e.g. in New Zealand – a weed of riverbanks. It was introduced to Vanuatu at the beginning of the 19th century.

Description

Aquatic herbaceous plant with a hollow stem 10–60 cm long, producing roots at each node. Leaves composite with 3–9 leaflets, round or oval, wavy, light green, 3 x 3 cm. Inflorescence terminal, bearing numerous small white flowers 5 mm in diameter. Fruits minute, less than 2 mm long and longer than broad.

Morphological variability

Poorly known in Vanuatu. At most one may distinguish forms that vary in the size of the leaves.

Cultivation and production

The plant likes clear water with no stagnation and not very deep, such as that in irrigated taro pits, but it grows equally well in water-saturated soils and flooded banks of watercourses. It is very common in Vanuatu. Cultivation may be from seed (often commercially bought), but is most often from stem cuttings. It does not flower much in the tropics. Harvesting may begin after a month, and the more the stem tips are cut the more the plant branches and grows. It is sold throughout the year in the markets, in large bundles.

Alimentary uses

The young leaves, the stem tips and often the whole plant are eaten raw in salads or cooked as a vegetable. In Vanuatu, where local people do not eat many salads, the plant is usually boiled, alone or mixed with taro leaves to accompany a dish of root crops. In some regions, such as the west coast of Santo where it is grown in irrigated taro pits, it is served several times a week. Its fresh and slightly tangy taste goes well with dishes of taro. It is necessary to wash the watercress well in clean water in case the water in which it was growing was muddy. In urban areas, expatriate and Asian people mostly eat it raw in salads or sometimes in a soup.

Genus

Saccharum

Family

Poaceae

The genus comprises six species. Two of these are found in the wild state – the rest are only known in cultivation. Two species are present in Vanuatu.

Species present

Saccharum edule Hasskarl

Naviso, pitpit

Saccharum officinarum L.

Sugar cane

These two species have been present for a long time in Vanuatu, and are an integral part of traditional crop systems. Naviso is a popular vegetable, and sugar cane is chewed throughout the year.

References

Barrau (1962), Brandes (1958), **Daniels & Roach (1987)**, Fauconnier & Bassereau (1970), French (1986), Galloway (1989), Hill (1952), Ochse & Bakhuizen van den Brink (1980), Purseglove (1988), Roach (1995), Sauer (1993), Weightman (1989).

Complementary food plant, local

Saccharum edule

Naviso, pitpit

History

The species originated in New Guinea. It is probably from a sterile form of *S. robustum*, a wild species of cane found only in New Guinea and the adjacent islands, or even the product of introgression between *S. officinarum* and other genera. It entered Vanuatu with the movement of aboriginal

people into the land, and it is nowadays found in all the gardens. This ancient plant did not spread beyond Vanuatu, or according to some authors Fiji.

Description

Large herbaceous plant with a tall stalk (2–3 m), slender, growing in clusters of three or four stalks together. The pale green leaves are slightly hairy and rough. The stalks are often streaked with different colours according to the variety. The terminal inflorescences abort

before reaching maturity, and the numerous flower buds are pressed tightly together inside a white or cream sheath.

Morphological variability

Several distinct forms of naviso exist but they are poorly known at this time. They are distinguished by the colour of the stalk.

Cultivation and production

This species never produces seeds and is propagated vegetatively. The slender and dry stalks do not lend themselves to the production of cuttings, so instead suckers are used and are transplanted into gardens or close to homes. The suckers are planted directly into the soil in pairs, often tilted, after the soil has been somewhat broken up. The inflorescences are harvested after six months, and then regularly over two to three years after which the planting is replaced. No serious diseases or pests are known.

Alimentary uses

The sterile inflorescence, delicate and fragile, is extracted from its sheath and then braised in small bamboo containers or boiled in a *marmite*. It is then sprinkled with coconut milk and served as an accompaniment to a dish of root crops. It may also be grilled on hot stones, still enclosed in its sheath. Naviso is sold in urban markets, in large bundles.



Saccharum edule

Complementary food plant, local

Saccharum officinarum

Sugar cane

History

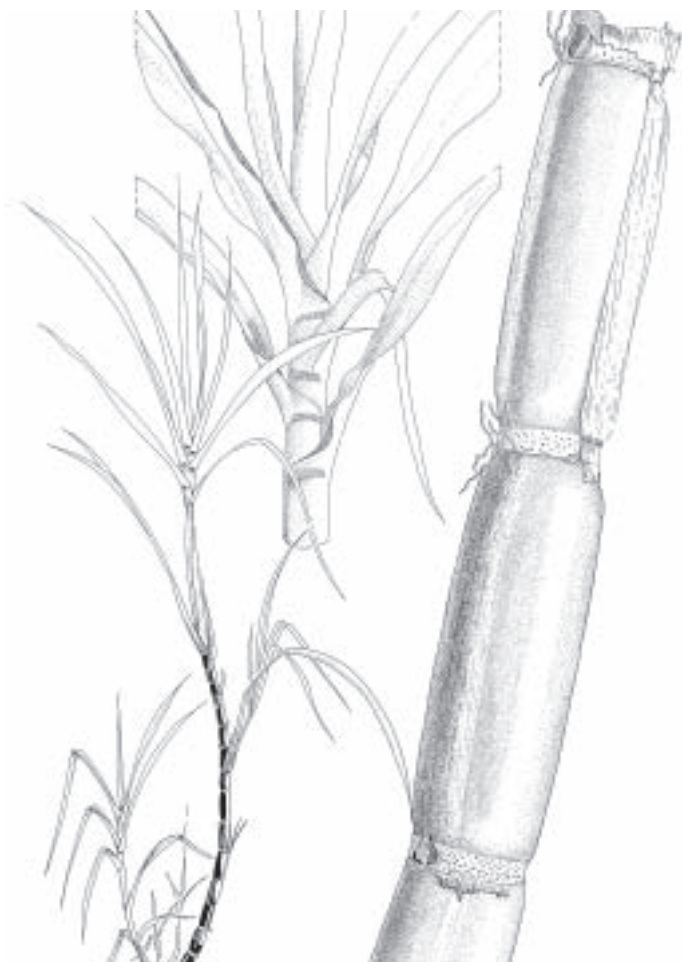
Saccharum officinarum exists only in the cultivated state, and its centres of diversification and domestication are incontrovertibly New Guinea; its ancestor was *S. robustum*. This species probably corresponds with a complex of species that includes spontaneous populations derived from spontaneous hybridisations between *S. spontaneum* and other genera (*Erianthus* and *Miscanthus*) present in a region stretching from the Sunda islands to New Guinea. Repeated selections for high sugar content by regular chewers of the cane maintained, through cloning, the forms of *S. officinarum* that were low in fibre content. Sugar cane was part of the freight carried by the first canoes of the peoples who progressively colonised the entire Pacific. It is thus found in Vanuatu and in all the islands to Hawaii. It also moved northeastwards. Papuan farmers grew a tall variety of sugar cane, and likewise those of Vanuatu. It is worth noting that the manufacture of sugar in India must have been from cane introduced from New Guinea, but the Melanesians never attempted such a process. The large colonial plantations of sugar such as those of Fiji were not developed in Vanuatu.

Description

Herbaceous plant with clumps of 3–5 strong, thick stalks about 5–8 cm in diameter, fibrous; epidermis with a base colour of yellow-green, green, purple and violet. Internodes 10–30 cm long. Pale green leaves long and narrow, with the mid-vein white or yellow. Inflorescences feathery and decorative, producing seeds only under exceptional circumstances. The clumps are perennial, and re-shoot regularly after the mature stalks have been cut.

Morphological variability

Numerous varieties exist, recognised according to the size and colour of the stalk, the length of the internodes, the colour of the pith and the sugar content of the juice. All have been selected since ancient times for high sugar content and relative flexibility of the stalk. Cuttings of a number of these varieties have been taken by overseas scientific missions in order to establish collections. Australia in particular has used Melanesian varieties in its programs of sugar cane improvement. The varieties do not fruit in the gardens, and probably result from mutations selected by the farmers in the gardens.



Saccharum officinarum

Cultivation and production

Sugar cane is propagated from cuttings of young, immature stalks. Its cultivation was more abundant in earlier days, when it was the sole source of sugar – nowadays sugar is bought from groceries. It is planted each year in all new gardens and harvested a year later, and it continues to be cut for a number of years in gardens that are in fallow.

Alimentary uses

Sugar cane, sold in long sticks over 1 m in length, is cut into chunks and then crushed to extract the sugary juice. The bark is torn away with the teeth, the juicy fibre is crunched and chewed, and then spat out when it is dry. Sticks of sugar cane are carried on all journeys, are chewed in the gardens or along footpaths, are sold in urban markets and are munched in the evenings while drinking kava.

Genus

Solanum

Family

Solanaceae

The genus comprises close to 1000 species and its classification is not stable. Two species have been introduced to Vanuatu.

Species present

Solanum americanum Miller

American black nightshade (minor species; see CD-ROM)

Solanum melongena L.

Eggplant, aubergine

Solanum torvum Swartz

Devil's fig, turkeyberry, prickly solanum (foraged species; see CD-ROM)

Solanum tuberosum L.

Potato (minor species; see CD-ROM)

Eggplant and potato are not used much in Vanuatu cuisine. They are mainly grown in commercial ventures by some farmers for supply to urban centres and their expatriate populations.

References

D'Arcy (1979), D'Arcy, ed. (1986), Daunay (1997), Fernandez-Munoz (1978), **Hawkes (1990)**, **Hawkes *et al.*, eds (1979)**, Lebot (1988), Messiaen (1998), Pearce & Lester (1979), PROSEA (1994), Purseglove (1991), Rubatzky & Yamagushi (1997), Sauer (1993), Siemonsma & Piluek (1993), Smartt & Simmonds, eds (1995), **Symon (1979, 1981)**, Weightman (1989).

Plant occasionally eaten, introduced

Solanum melongena

Eggplant, aubergine

History

The ancestral forms of eggplant (nowadays grouped under the name *S. incanum*) appeared in

East Africa. They moved very early, in a natural progression following the movement of humans, towards the region of Indochina. They were progressively domesticated in the Indo-Burmese region, then Arabia, Japan and China. The cultivated forms migrated westwards following the Silk Route, and then the Moors introduced them

in the 9th century to the whole Mediterranean basin and Spain. Eggplant, introduced to Vanuatu in the 19th century by missionaries, is nowadays grown in all tropical and temperate regions.

Description

Herbaceous plant about 1 m in height; stem hairy, rugose, green or violet. Leaves simple, oval, hairy, cordate at the base; petiole 2–10 cm; margins broadly toothed. Flowers solitary, with five lobes, mauve or violet, broad (5 cm in diameter); calyx tubular, woody and persistent, with 5–7 lobes. Fruits pendant, very variable in shape (ovoid, oblong, globular, very elongate), smooth, shiny, white, yellow, mauve, purple or black, sometimes bicoloured, up to 40 cm long; flesh white or green. Numerous light brown seeds.

Morphological variability

The phenotypic variability is extensive and covers the weight, colour and shape of the fruit. In reality eggplant belongs to a species complex whose limits are not well determined. In Vanuatu imported commercial seeds include all sorts of varieties distinguished mainly by the shape and colour of the fruits varying from black to dirty white. Thus over different years one may see eggplants that are round, ovoid, oblong or elongate, small or large

in size, white, mauve, purple or bicoloured, marbled or striped. Among the main varieties are: *Violette longue* (early maturing, South of France), *Zebrina* (striped violet-white or brown-green, Spain), *Black Beauty* (late maturing, black with green flesh, American) and *Porcelaine* (white and round, West Indies).

Cultivation and production

Eggplant in Vanuatu is a perennial plant that is propagated from seeds or by transplantation of lateral shoots. The seeds germinate in two weeks, the seedlings are transplanted after three weeks, and harvesting begins three months later. Picking continues for three to four months as the fruits become large enough. Attention is needed to pick the fruits while they are still immature, or the skin becomes too thick and the seeds too hard. Eggplants are hardy, and more tolerant than tomatoes to bacterial wilt and nematodes.

Alimentary uses

Occasionally eaten by the local people, eggplant is cut into pieces or slices, then fried or boiled in a sauce. They can be used to make excellent curries. They can also be added to many sorts of meat stew.

Genus

Zea

Family

Poaceae

The genus comprises four species originally from Central and Latin America. One species has been introduced to Vanuatu.

Species present

Zea mays L. subsp. *mays*

Maize

Introduced to Vanuatu in the 17th century, maize has been adopted by the ni-Vanuatu who nowadays grow it in all the gardens. It is mostly eaten as a vegetable or simply nibbled while still on the cob.

References

Beadle (1977), Buckler & Holtsford (1996), **Doebley (1990)**, Freeling & Walbot, eds (1994), Galinat (1992, 1995), Goodman (1995), **Iltis & Doebley (1980)**, Mangelsdorf (1974, 1986), Mangelsdorf *et al.* (1964), Marchand *et al.* (1997), Ochse & Bakhuizen van den Brink (1980), Piperno & Pearsall (1998), Purseglove (1988), Weightman (1989).

Complementary food plant,
introduced

Zea mays

Maize

History

Maize derives from teosinte, a wild species of maize, or (nowadays thought less likely) from an extinct species. It is possible that this ancient teosinte was first collected for its fruits and its sweet stem, or maybe just for its seeds. But much later, at the start of the Holocene, a form with a number of rows of seeds was selected and apparently

multiplied, resulting in a first population of maize with bare seeds and a soft glume. This initial population, born in the valley of Balsas in central Mexico, then became dispersed, giving rise to a number of secondary, local populations, adapted to the ecological conditions and progressively improved by farmers. Initially a complementary food plant in the diet, it later became a staple food in certain regions. Since the discovery of the Americas these many varieties of maize have been spread around the world, and have been hybridised and greatly improved. Maize reached Vanuatu in 1606 when Queiros established a small

plantation of it near Matantas, and then came in much later but on a much greater scale in the second half of the 19th century. It was adopted – as a complementary food plant – by the ni-Vanuatu who planted it in all their gardens, but the plant was not subjected to any particular selection. The first colonists made maize a favoured commercial crop, exported to New Caledonia and Australia.

Description

Erect annual herb, reaching up to 3 m in height. Stalk rigid, with internodes. Leaves arising at each internode, long, narrow strips in shape, with their bases sheathing the stalk, variable in size (30–150 cm x 3–15 cm). Inflorescence in male and female spikes on the same plant; males grouped in a terminal panicle at the end of the stalk and furnished with lateral branches; females axillary and solitary, enveloped by about ten thick bracts, **rachis** white, yellow or violet; styles filiform (threadlike) and close to 45 cm long, all emerging at the top of the spike, green, yellow, red, brown or violet. Fruits with seeds arising in multiple rows, rounded and compressed, yellow, white or violet.

Morphological variability

Maize is an **allogamous** plant, and cross-pollination followed by repeated selection has produced forms that adapt quickly to local conditions. Repeated introduction

of different forms of maize and natural hybridisation within gardens has produced some local variability of the species. The forms vary in the size of the spikes, the colour of the seeds, the time taken to reach maturity, and the taste. The two most widespread varieties are Tuxpeno from Hawaii and Philadelphie, introduced and distributed by the Department of Agriculture during the 1960s. Since then they have been the objects of numerous spontaneous hybridisations, and as farmers mix the varieties and replant their own seeds, the result is quite heterogeneous populations but with selection tending to be for fresh usage. In fact maize in Vanuatu is hardly grown for dry seed. A very common variety is *Dent de cheval* (Horse Tooth maize), which produces long cobs and whose plants are very tall (over 2 m). The dried stalks of this robust variety are used as stakes for yam vines.

Cultivation and production

Maize is planted in new gardens at the beginning of October, from seeds stored in small baskets. It is often intercropped with other plants, and its dried stalks make good stakes for yams. The seeds are hand-sown directly into the soil, three per hole, about 5 cm deep. The plants are not thinned and generally grow in clumps. Yields per plant are reasonable and no serious diseases are known. The local varieties

have cycles ranging from 100 to 130 days, and better yields are obtained in winter. Heavy rain causes the stalks to lodge.

Alimentary uses

In Vanuatu maize is picked at maturity for home consumption. It is grilled on hot stones or

embers, or boiled in a *marmite*. It is a complementary food that is very popular in season. It is eaten during a meal, accompanying or replacing root crops, or it is nibbled between meals especially by children. Many also grow it for sale in markets.

Genus

Zingiber

Family

Zingiberaceae

The genus comprises 85 species spread through Asia and tropical Australia. Two edible and cultivated species occur in Vanuatu.

Species present

Zingiber officinale Roscoe

Common ginger

Zingiber zerumbet (L.) J.E. Smith

Wild ginger, Shampoo ginger, pinecone ginger, zerumbet ginger

The wild or zerumbet ginger is an ancient Melanesian plant, while the common ginger was introduced in the 19th century. The latter is nowadays grown commercially, and appears in abundance in the markets, together with a few rhizomes of zerumbet which itself is always grown in the villages.

References

Bois (1934), Clair (1963), Germosen-Robineau, ed. (1999), Lagriffe (1968), PROSEA (1999), Purseglove *et al.* (1981), Smartt & Simmonds, eds (1995), **Theilade (1996)**, Weightman (1989).

Plant occasionally eaten,
introduced

Zingiber officinale

Common ginger

History

Ginger has not been found in the wild state but it probably originated in India. It was cultivated early on in China and then introduced to the Mediterranean. From there the Arabs took it to Europe. The Greeks and Romans used it for its medicinal properties as well

as for flavouring their dishes. Fresh, dried or processed, it was one of the main commercial spices of the Middle Ages. In the 17th century Francisco de Mendoza introduced it to America and it then spread to all tropical regions. Its arrival in Vanuatu, which already had other species of ginger, was quite late.

Description

Erect herbaceous plant reaching up to 1.5 m, grown as an annual. Tuberos rhizome, irregular in

shape and aromatic, growing horizontally, very pale yellow. Lanceolate leaves, 30 x 2 cm, with parallel veins. Cylindrical and fleshy flower spike, 20-30 cm high, bearing pale yellow flowers, arising under yellow-green bracts, slightly convex. Fruits red with small seeds.

Morphological variability

Two groups of cultivars exist, one with very pale yellow rhizomes (*cv. officinale*) and the other with smaller, reddish rhizomes (*cv. rubrum*). Only the former occurs in Vanuatu. Ginger varies in its aroma amongst other features.

Cultivation and production

Ginger is propagated vegetatively through pieces of rhizome planted in soil and then mounded up. The mounding up is important because it allows the buds to initiate more stems which makes the plant more vigorous, and it protects the rhizome from light which would increase the chlorophyll content and alter the taste. If the mounding up is not done, in Vanuatu as elsewhere the result is rhizomes that are small in size. The main constraint on the crop is nematodes that attack and spoil the plant roots. After ten months the rhizomes are carefully harvested. It is then either sold fresh after being washed, or commercially as a powder after being chopped into pieces and dried.

Alimentary uses

Ginger is used throughout the world as a spice, and is used in the preparation of beverages, cakes and pastries. In Vanuatu it is mainly used in Asian cuisine. It is grown in one commercial enterprise in Fanafo, but the outlets are at present limited.

Other uses

The plant is also medicinal, and the rhizome tenderises meat with which it is cooked.

Plant occasionally eaten, introduced

Zingiber zerumbet

Wild ginger, shampoo ginger, pinecone ginger, zerumbet ginger

History

Originally from India, this ginger is grown throughout Asia. It was probably introduced by the ancestors of the ni-Vanuatu, and is found in all the islands in a spontaneous or cultivated state.

Description

Perennial plant with a tuberous rhizome, yellow and then whitish. Erect leafy stem reaching to 1.5 m. Leaves lanceolate, 20–40 cm long, veins parallel. Flowering head cylindrical and fleshy, 12 cm high, bearing white or pale yellow flowers arising under green or reddish bracts, slightly convex. Fruit red with small seeds.

Morphological variability

The species is extremely variable. At least four varieties are recognised:

- var. *americanus*: ellipsoidal flower head;
- var. *aromaticum*: ovoid flower head;
- var. *zerumbet*: globular flower head;
- var. *littorale*: oblong flower head.

Cultivation and production

The species grows in damp, rich forest soils. It is propagated with pieces of rhizome, and its cultivation is identical to that of common ginger.

Alimentary uses

The rhizome is used in certain meat dishes, after having been washed and sliced up.

Other uses

The plant is often used in traditional medicine.