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Fruits of Tropical & Sub-Tropical Regions

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This section continues with the discussion of fruits from the previous **Fruits of Temperate Regions**. There are thousands of tropical fruits. Many of them are consumed locally on a daily basis. There are over 250 edible fruits in the Philippines alone. The tropics have the capacity to produce large quantities of fruit and international trade is adding new kinds as rapid shipment possibilities increase. Some tropical fruits such as the banana, mango and pineapple are now as familiar as the apple and pear in temperate regions. In comparison with fruits of temperate regions, many tropical species have been much neglected in international markets. Tropical edible fruits are particularly important in the families Anacardiaceae, Annonaceae, Myrtaceae, Eutaceae, Sapotaceae and Sapindaceae. Of these the Rutaceae is the best known and most important for it includes the citrus fruits.

Citrus Fruits <Photos>

Citrus was domesticated from wild ancestors in Eastern and Southern Asia in ancient times. Some species have been cultivated since before 1,000 B.C. They were at times grown for other reasons than as food. Citron, for example, was planted in the famous Hanging Gardens of Babylon for use in toilet water and pomades. These fruits were early introduced into the Mediterranean region where they have always been an important crop. There are over 100 species of *Citrus* described, many of which are undoubtedly of hybrid origin. However, only a few ever became of commercial importance.

Citrus trees are thorny aromatic with leathery evergreen leaves that are dotted glandularly. Although they appear simple, they are actually unifoliate compound leaves with a joint between the leaf blade and the stalk. The white or

purplish flowers are solitary, but produced in great abundance, and they are often very fragrant. The fruit is a modified berry known as a hesperidium. This type has a thick leathery rind with numerous oil glands. The flesh is very juicy with many juice sacs. A notable feature of these plants is the fact that they do not develop root hairs and are dependent on mycorrhiza. These are fungi that are closely associated with the roots and are for the absorption of liquids.

Citrus cultivation is carried out on a large scale. It is usually grown at sea level where sufficient moisture is readily available, or under irrigation. Any well-drained soil, except an extremely sandy one, is suitable. The various species differ in their resistance to cold, but generally a temperature ranging from 14-120 deg. Fahrenheit is best. Mostly budding propagates them. The species hybridize readily both in the wild and in cultivation, and there is a great tendency to form "sports."

Citrus is grown worldwide although they are tropical plants so that most of the commercial groves are in subtropical regions. The fruits ripen at different times of the year depending on the species and variety. Oranges and grapefruit are allowed to ripen on the trees, while lemons and limes are picked green.

The United States has led the world in the production of citrus fruits. Florida and California are the principal states, while Texas, Arizona, Alabama, Louisiana, Mississippi and Georgia have a small acreage. The Mediterranean countries are second with Spain, Portugal, Italy and Palestine being the most important. The West Indies, Mexico and Central America are of increasing importance. Brazil, Argentina, South Africa, Australia, China and Japan are also large producers.

Grapefruit and oranges are highly prized as table fruits. Apart from their palatability, they constitute a valuable addition to the human diet. All citrus fruits contain considerable quantities of the essential Vitamin C, the antiscorbutic vitamin, as well as fruit acids. They are also made into marmalade and various confections. Canned products, especially in the case of the grapefruit, have been developed. Both the flesh and the juice are preserved in this way. Frequently the juice of citrus fruits is more important than the fruit itself and it is widely used both in alcoholic and nonalcoholic beverages. Frozen juice is readily available. The rind of nearly all citrus yields a valuable essential oil. The dried waste pulp is an excellent cattle feed. Other by-products include citric acid, various glucosides and pectin.

Oranges <Photos>

Sweet Orange

Citrus sinensis is indigenous to Southeastern Asia, most likely China or Cochin China. It was first cultivated sometime between 1,500 and 1,000 B.C. It arrived in India very early in history and was carried to Europe by Genoese traders early in the 15th Century. Spain was responsible for its introduction into America. It reached Florida in 1565 and California in 1769.

The tree is a small evergreen with slender blunt spines. It grows upward to 20 ft. in height under cultivation. The leaves have narrow-winged petioles and the flowers are white and very fragrant. The fruit is almost round, with an abundant, sweet, solid pulp and spindle-shaped juice sacs. Seeds are usually present but may be sparse or absent. The orange is the hardiest member of the genus and can be grown in any warm dry climate where the soil is fertile and well watered. At first it was grown from seed, but today most plants are budded or grafted. Several types of sweet oranges have been developed: Spanish oranges, with large coarse-grained fruits; Mediterranean varieties, with fine-grained fruits; blood oranges with a red pulp, or streaked red and white; and the navel oranges, which are mostly seedless and characterized by the navel at one end. This is formed by the protrusion of additional carpels produced inside the flesh. Oranges contain 5-10 percent sugar, 1-2 percent citric acid and Vitamin C.

In the United States California leads in the production of oranges. The cultivation of two different varieties enables harvest the year round. The most important of these is the Washington Navel or **Bahia Orange**. This mostly seedless orange originated in Brazil, but in the California climate has become the great commercial orange of the world. It is the largest variety, with a thick bright-orange skin, and bears during the winter months. Another variety, the **Robertson Navel** has a thin skin but is not as productive. There is also a **Summer Navel Orange** that does well in cooler weather.

The three types have slightly different growth habits, with the Summer Navel being the fastest grower and very prolific bearer with large fruit. A smaller **Valencia Orange**, a Spanish type with seeds is grown in California and also in Florida, Texas, Arizona and Louisiana. Sweet orange production is also high in Brazil, Spain, Italy, Palestine and Mexico. In California during the latter 20th Century some new varieties of Valencia orange were developed that had large fruits with easily peeled skins. Also a sport of the Navel Orange, the **Trovita Orange**, bears off and on year round, is very sweet with large fruit and seeds.

The principal use of sweet oranges is for fresh fruit and juice. The peel is candied and oil of orange is extracted from the rind. This essential oil is used in the perfume and soap industries, in medicine and for flavoring. Dissolving a small amount of the oil in alcohol makes orange extract. Orange trees are occasionally grown for ornamental purposes.

Sour Orange

Sour orange, *Citrus aurantium*, also called the Bitter, Bigarade or **Seville orange**, is also native to Southeastern Asia. This plant was brought to Spain by the Arabs in ancient times and was cultivated there several thousand years before the sweet orange. It is a small tree, 20-30 ft. in height with blunt spines. The petioles have broad wings. The flowers are exceedingly fragrant and are the source of the oil of neroli, used in perfumery. The large, globose, orange-red fruits are rough and have a very acid pulp. However, the flesh is of good quality with small spindle-shaped juice sacs. A hollow core develops at the center when the fruit is ripe. In America the sour orange is grown chiefly for ornamental purposes and as stock in grafting. It is grown in Spain extensively where the fruits are used for marmalade, orangeade and candied orange peel. The essential oil obtained from the rind is used in perfumery, medicine, and in the manufacture of the liqueur **Curaçao**

Bergamot Orange

Bergamot Orange, *Citrus aurantium* subsp. *bergamia*, is a small spiny tree with golden-yellow pear-shaped fruit. The pulp is very acid and inedible. This variety is grown in the Mediterranean region as a source of the essential oil of bergamot.

Mandarin Orange

Mandarin Orange, *Citrus reticulata*, comprises the so-called glove oranges: the orange-yellow mandarins and the reddish-orange tangerines. The tree is native to China and Cochin China. The small round fruits have a peel that is easily removed and segments that separate readily. They are widely grown in Japan, South Europe and the Gulf States of America, mainly Florida, Alabama and Mississippi. The Satsuma orange is a small very hardy type with a deep-orange pulp and few seeds. In California during the late 20th Century several new varieties of mandarin or tangerine had been developed with a variety of excellent flavors.

King Orange

Often named as a separate species, *Citrus nobilis*, the King Orange is probably a hybrid between a sweet orange and a mandarin. It was introduced into the United States in 1882. It bears heavily, is frost tolerant and the sweet slightly acid flesh with broad blunt juice sacs is very palatable. This fruit has nevertheless not been very much in demand.

Grapefruit <Photos>

The origin of the grapefruit, *Citrus paradisi*, is somewhat doubtful. But there is some consensus that it originated in Barbados, West Indies as a sport of the shaddock or possibly as a hybrid with the sweet orange. Nevertheless, there is the possibility that it may have been introduced from the Old World.

Grapefruit is a vigorous tree, 20-40 ft. in height with winged petioles. The round or pear-shaped, pale-yellow, smooth fruits are produced in clusters. They are the largest of the edible citrus fruits, weighing from 2-12 lbs. and with a diameter of 4-6 in. The skin is thin with many inconspicuous oil glands. The flesh is acid or sub acid and mildly bitter,

with large spindle-shaped juice sacs.

The plant was brought to Florida from the West Indies in 1809 and was used as an ornamental tree until 1880. In the United States Florida, Texas, Arizona and California produce the major portion of the crop. There are different varieties, with the Florida Indian River and California Coachella White varieties having the best quality. The **Rio Red Grapefruit** with excellent flavor was developed for South Texas, but it also does very well in Southern California. The **Oro Blanco** variety was developed for California's cooler climatic zones where other varieties did not sweeten adequately. Variable acreage occurs in the West Indies, Middle East and South Africa.

[Lemon](#) <Photos>

Lemon, *Citrus limon*, is believed to be native to Southeastern Asia where it has been grown since ancient times. It reached India at an early date as witnessed by the existence of a Sanskrit word for it. It has been grown in the Mediterranean region since the days of the Greek and Roman civilizations, and has always been especially well adapted to that area. The tree is small, 10-20 ft. in height with short spines and large white and purple flowers. The small, light-yellow oval fruits end in a blunt point. The fruit should be picked when yellow when it has peaked in flavor. However, commercial sources often pick the fruit green and later it is ripened in storage. Lemons contain 1/2 percent sugar and 5 percent citric acid. The juice is used for lemonade and other beverages and as a flavoring, bleaching agent and stain remover. Commercial production is restricted to climates with low-frost winters. California has produced the majority of lemons with Spain and Argentina following. The rind is the source of oil of lemon.

[Lime](#) <Photos>

Lime, *Citrus aurantifolia*, was first domesticated in the East Indies. It is very susceptible to cold and is a distinctly tropical plant. It is a low straggling shrub or small tree with numerous very sharp spines and small white flowers. The fruits vary in size from 1.25 to 3 in. in diameter depending on the variety. They are thin skinned with an abundant acid pulp and oval pointed juice sacs. The lime is one of the sourest fruits and is not eaten directly. It is grown mainly for the juice that is often extracted and shipped in a raw or concentrated form. Lime juice is used in beverages, as a source of citric acid and medicinally to prevent scurvy. Although famous for the latter purpose, lime juice contains only one-quarter as much Vitamin C as either grapefruit or oranges. Limes are grown to some extent throughout the tropics and are of commercial importance in Egypt, Mexico, The West Indies, Florida and California. The **Barss Lime** or **Tahitian Lime** is a large seedless variety that has some frost resistance. Oil of lime is expressed from the rind.

[Kumquat](#) <Photos>

Kumquats, *Fortunella spp.*, are the smallest of the citrus fruits. They are small evergreen shrubs with white flowers that smell like ants, and golden-yellow fruits produced in clusters. The fruits vary from 1-2 inches in diameter with a thick spicy rind, acid flesh and small seeds. They are grown for ornamental purposes and for their fruit, either eaten whole or preserved. Two species that are commercially grown are *F. japonica* with globose fruits and *F. margarita* with oval fruits.

[Citron](#)

Citron, *Citrus medica*, is the oldest of the citrus fruits and the first to be known in Europe as early as the 4th Century B.C. It is believed to have originated in Northern India and has long been cultivated in Southeastern Asia. It was described by Theophrastus from Babylon (Hill 1952). The citron is a small thorny tree with attractive purple and white flowers and a fruit that resembles a large lemon. It is fragrant, greenish yellow in color, oblong in shape and from 6-9 inches in length. The skin is thick and tough and the acid pulp is low in volume. Commercial citron is the candied rind. It is prepared by treating the fruit with brine to remove the bitter oil. This also brings out the flavor and aroma and prevents decay. The rind is then candied in a sugar and glucose solution. Citron is one of the best and most expensive of the condiments. Citron is cultivated mainly in Corsica, Sicily, Greece and the West Indies. The essential oil of citron used in perfumery is expressed from the rind.

Minor Citrus

Shaddock

Citrus grandis, also known as **Pomelo**, is indigenous to Malaya and Polynesia. Several varieties are grown in Southern Asia. The fruit appears like a grapefruit, but it is much larger, sometimes growing to the size of a watermelon and weighing 10-20 lbs. It is more pear-shaped, with larger juice sacs and a hollow core, and it has a coarse thick rind and thick leathery septa. The reddish flesh is aromatic and spicy, but quite bitter. Captain Shaddock, for whom it was named, introduced it into the West Indies. It is believed that the shaddock gave rise to the grapefruit.

Deciduous Orange

Poncirus trifoliata is indigenous in China and Japan. It is a low tree with large spines and trifoliate deciduous leaves. For this reason it was segregated from *Citrus*. The white flowers are produced before the leaves. The rough hairy orange fruits have a bitter, gummy, inedible pulp. The plant is very hardy and is used to form hybrids and as a rootstock for grafting the other citrus fruits. It has been cultivated as an ornamental as far north as New York.

Efforts to produce edible citrus fruits that are hardier than oranges led to the formation of many hybrids. Some of these such as the **Citrango**, a hybrid between the trifoliate and the sweet orange, may be grown in the Southern United States. Others include the **Tangelo** (grapefruit X tangerine), **Limequat** (lime X kumquat), **Orangequat** (orange X kumquat), **Citrangoquat** (kumquat X citrango), **Tangor** (tangerine X orange), tangerona and orangelo.

Non-Citrus Tropical Fruits

Banana <Photos>

Banana, *Musa paradisiaca* subsp. *sapientum*, is one of the most important of all tropical fruits. It has spread all over the tropical world from its original home in the humid tropics of Malaya or India. It is one of the world's oldest cultivated crops. It was important in Assyria in 1,100 B.C., and it was well known to all the other early civilizations. It reached Polynesia at a very early date and was brought to the West Indies in 1,500.

Banana is one of the tallest of the herbaceous plants. Its robust treelike stem is made up of the sheathing spiral leaf bases that contain fibers of sufficient strength to make possible this erect growth. At the top of the stem, which can vary in height from 10-30 ft., there is produced a crown of large oval deep green leaves. These may be up to 12 ft. in length and 2 ft in width with a prominent midrib.

A single inflorescence is produced that consists of clustered flowers which are nearly surrounded by large, fleshy, reddish, spatelike scales and which drop off as the fruits mature. The flower stalk develops from the rootstalk and pushes its way up through the hollow stem, emerging in the center of the crown. It soon curves over owing to its great weight.

These drooping inflorescences develop into the "bunches" of bananas. Marketable bunches may weight from 80-140 pounds and consist of from 6-15 clusters, known as "hands" or "combs." Usually each hand contains 10-20 individual bananas, or "fingers." Bunches with as many as 22 hands and 300 individual bananas have been produced, but these are not common. The fruit of cultivated varieties is a modified berry and lacks seeds. Wild species do occur that produce normal seeds. As soon as the tree bears it dies or is cut down, and suckers develop from the rhizome that give rise to new plants. A single clump may be productive for several years. Bananas grow rapidly and have a very high yield. Of course, this varies with the locality and may be as low as 125 or as high as 300 to 400 bunches to the acre. The same area of land that can produce 4,400 lbs. of bananas only may produce 33 lbs. of wheat and 98 lbs. of potatoes. Leading exporters are Jamaica, Mexico, Central America and Ecuador.

Over 300 varieties of banana are known. Only a few of these reach markets of the world, the principal type being the Gros Michel. Tropical American markets have about 15 kinds, but the majority are grown in tropical Asia. There are

other species of banana, one of which, the dwarf banana, *Musa nana*, is occasionally exported. This species is especially important in Southern Asia, Africa and the Pacific islands. Red bananas, *Musa velutina*, are quite common. *Musa cavendishii* is a dwarf that is especially suited to home gardens

Bananas for export are picked and shipped green. When thoroughly ripe, as indicated by brown blotches on the yellow skin, they constitute a very healthy and nourishing food. They have a high content of carbohydrates with some fats and proteins. Their food value is three times that of wheat. Bananas are usually eaten raw, but may be cooked, especially when still green. Banana flour is made from dried green fruits. Banana ‘figs’ are dried slices of ripe fruits. A wine is also made from the ripe fruit

Plantain

Musa paradisiaca is a close relative of the banana and one of the great food plants of the tropics. Indigenous to Southern Asia, it has furnished food for the inhabitants since ancient times. There are over 80 varieties; many so old that seed has never propagated them within recorded time. Plantains are allowed to ripen and then are always consumed cooked, fried or made into flour and are very digestible.

Custard Apples <Photos>

Several tropical American fruits in the genus *Annona* have been called Custard Apples. In all species the fruit is a fleshy syncarp that is formed by the fusion of numerous ripened ovaries and the receptacle. The family Annonaceae includes over 600 species most of which have edible fruits. It affords promise for future development.

Cherimoya <Photos>

Annona cherimolia is a favorite dessert fruit. It was known from ancient times in the Andes of Ecuador and Peru. It is now grown in Central America, Mexico, the West Indies, California, Florida, Africa and India. The tree is small and shrubby with very fragrant flowers that have the odor of tropical fruit such as pineapple and coconut. The light green fruits are globular or conical and from 4-10 in. long. The delicious white or yellowish flesh is very aromatic with a soft and custard like consistency.

Sweetsop <Photos>

Annona squamosa, also known as **Sugar Apple**, is indigenous in South America and the West Indies. The yellowish-green tuberculate fruit is 2-3 inches in diameter. It has white custard like pulp and is the most highly prized of the group.

Soursop <Photos>

Annona muricata, also known as **Guanabana**, is a small slender tree of the West Indies. It bears large ovoid spiny fruit that are deep green in color. Some fruits may weight as much as 8-10 pounds and be a foot in length. The white juicy flesh is very aromatic and is unrivaled for sherbets and drinks.

True Custard Apple <Photos>

Annona reticulata, also known as **Bullock’s Heart**, is very common in the tropics. The fruit is heart shaped, 4-6 in. long and brownish or reddish in color. The soft white or cream-colored sweetly aromatic pulp is somewhat glandular toward the rind and rather insipid and cloying. It is indigenous in the West Indies.

Dates <Photos>

Phoenix dactylifera is an ancient crop that was known before 3,000 B.C. Its origin has been thought to be either in Arabia or India, but it has been domesticated throughout Southwestern Asia and Northern Africa. It was of great

importance in Babylonia and had reached Egypt long before the Christian era.

The date is a palm tree with slender trunk that can reach 70-100 ft in height. It produces offshoots from its base and is therefore often found growing in clumps. It has a crown of stiff, pinnate, ascending and descending leaves of 20-20 ft in length. The numerous flowers, sometimes 10,000 to an inflorescence, are surrounded by a spathe. Male and female flowers are produced on different trees, and in cultivation 90 percent of the male trees are removed. The fruit is a nearly round drupe or one-seeded berry. It is hard and green at first but later turns yellow or red. The flesh is thick and very sweet, soft or dry and hard, according to the variety. The date palm is very drought resistant, but in arid regions grows best in areas where there are springs or subterranean water sources (oases). It often serves as a staple food as well as the main source of fruits and sugar in dry regions of the world. Typically it is a plant of hot sunny climates with low humidity. Seeds or cuttings propagate dates. They are very long-lived, often reaching an age of over 200 years. There are over 1,000 varieties grown. Unripe fruits are consumed a month or more before harvest as a crunchy, sweet delicacy. Fruits that are ripened on the tree command a higher price than those that are picked unripe and subjected to a steam ripening process. Unlike most fruits they have a high food value, with 54 percent sugar and 7 percent protein as well as pectin and gums.

Dates are consumed as a table fruit and in jams, pastes, cooking and alcoholic beverages. In some desert regions there are more than 800 uses made of this plant. Every part of the plant is utilized and the fruits have even served as currency. Iraq has produced over 80 percent of the commercial crop. Arabia and Northern Africa are also large producers. Although date palms have been grown in California since the 18th Century, they did not become commercially important until 1890. By the 21st Century commercial dates, including over 20 varieties, were being grown in both California and Arizona. There they are hand pollinated and the ripening clusters are protected from birds and rain by special paper sacs.

[Durian](#) <Photos>

Durian, *Durio zibethinus*, is indigenous to Malaya and occurs locally in that area and west to Burma and south to the East Indies. It is rarely cultivated. It is a tall handsome tree that reaches 80 ft in height with large conical spiny fruits, 6-8 in. in diameter. The leaves are densely covered with golden hairs on their undersides. The flowers are yellow or creamy white. The custard like flesh has an exquisite flavor and is at the same time aromatic and sweet with a unique balsamic taste. However, the odor can be extremely offensive to persons with a particular gene so that the fruit has been banned in certain hotels and public places. Durians are nevertheless highly prized by people and animals. It has been associated with rejuvenating powers.

[Figs](#) <Photos>

The edible fig, *Ficus carica*, has been under cultivation since ancient times. It is indigenous to Southern Arabia and had spread to the Mediterranean region in prehistoric times. It is often mentioned in the Bible. Theophrastus was familiar with many varieties and his "Enquiry into Plants" gives a detailed account of fig cultivation (Hill 1952). Today figs are grown worldwide where the climate is suitable.

The fig is a shrub or small tree with typically lobed leaves. The fruit is a synconium, a fleshy hollow receptacle with a narrow aperture at the tip. The true fruits, which are small achenes, are borne on short stalks on the inside of the synconium. There are several different kinds of edible figs: Smyrna, Caprifigs, Common Figs and San Pedro Figs.

Figs are used fresh, dried, canned or preserved. A large amount is used in baking and ground up for fig coffee. Additional to their food value they have definite laxative properties and are important in medicine. In the United States most of the fig crop comes from California and Texas.

[Common Figs](#)

These have no staminate flowers and thus the fruits develop without pollination and have no seeds. Two crops are produced annually. The first crop (brebas) is larger and juicier and is usually consumed fresh. They are borne on the old

wood. The second crop is produced in the axils of the leaves. They are used fresh or dried. There are over 800 varieties of common figs. Propagation is by cuttings.

Capri Figs

These are wild figs that grow naturally in the Mediterranean region and in Western Asia and are thought to represent the primitive type. There is no commercial value for the fruit but cultivation is essential to the development of the Smyrna fig. The life history of the Capri Fig is closely related with that of a small wasp, *Blastophaga psenes*, which affects pollination. Three crops of fruit are produced yearly. The spring crop (profichi) contains staminate flowers and the so-called gall-flowers. These are similar to pistillate flowers but they have short styled ovaries. The fig wasp enters the young figs and lays eggs in the gall flowers. After about two months the new generation of wasps hatches and emerges from the fig, becoming covered with pollen in the process. By this time the summer crop of figs (mammoni) has been produced that contain mainly gall flowers. The wasps enter these and deposit eggs in most of them. Although the wasp pollinates these, the presence of the larvae inhibits seed development. Flowers in which eggs were not placed are able to develop fertile seed. There is usually a continual crop of these summer figs until cold weather, and figs and wasps can be found in all stages of development. Later in the season the winter crop of figs (mamme) is developed and after being visited by the wasps remains on the tree over winter. The larvae mature in April when a new crop of profichi figs is ready to receive the wasps and the annual cycle is resumed.

Smyrna Figs

There are no staminate flowers produced in Smyrna Figs, and thus these figs are completely dependent on cross-pollination from Capri Figs. The process is called **Caprification** and is carried out artificially. Branches of Capri figs of the profichi crop are suspended on the Smyrna tree. The wasps on emerging enter the partly developed Smyrna figs and pollinate them. Unlike the Capri figs, the ovaries have styles so long that the wasp is unable to deposit eggs in the correct location. Therefore the ovules are able to develop normally after fertilization. The wasps then emerge from the fig or die within the cavity. Smyrna figs have a superior nutty flavor due to the presence of the fertile seeds. They are the most important commercial fig and are extensively grown in Asia Minor, Algeria, Greece and some sections of Portugal and California.

San Pedro Figs

These are grown in California with two crops annually. The first develops without pollination, while the second fails to mature and falls from the tree, unless it is caprifigged.

Granadilla <Photos>

Granadillas are the edible fruits of several species of passion flower. These are woody tendril-bearing vines with solitary showy flowers and a many-seeded berry. They are indigenous to tropical America.

The **Purple Granadilla**, *Passiflora edulis*, is native to Brazil but has been cultivated worldwide. In Australia it is of considerable economic importance. It is also grown in Sri Lanka, The Mediterranean area and the southern United States. The flowers are white with a white and purple crown. The deep-purple fruit is about 3 in. long and is used as a table fruit and in sherbets, candy and beverages.

Other common species are the **Giant Granadilla**, *Passiflora quadrangularis*, with greenish-yellow flowers that reach 10 in. in length; and the **Sweet Granadilla**, *Passiflora ligularis*.

Guava <Photos>

Guava, *Psidium guajava*, is native to tropical America where it has been cultivated for centuries. It was known to the Incas and had spread all over tropical America before the European colonization. It is now common in the tropics everywhere and is of especial importance in Florida and California. The small tree or shrub has white flowers. The

yellow berrylike fruit is about 4 in. long and has a variously colored flesh. The guava is very aromatic and is sweet and juicy and highly flavored with a fine balance between the content of acid, sugar and pectin. It is a rich source of Vitamins A, B, and C and of ascorbic acid. It is usually used for preserves, pastes and jellies and for beverages. The powder from dehydrated fruits is used to fortify other jellies and jams.

Strawberry Guava, *Psidium littorale*, is native to Brazil and cultivated elsewhere. It has small red fruits with a very sweet juicy pulp. They are used fresh or in beverages.

Other Myrtaceae <Photos>

The family Myrtaceae, which includes guavas, probably has as many, if not more, species with edible fruits than any other family. Besides guavas of which there are at least 155 species, there are the eugenias and syzgiums with almost 700 species. Some of these are of great importance.

The **Rose Apple**, *Syzygium jambos*, is indigenous to tropical Asia but has spread worldwide. It is grown in Florida for its greenish-yellow fruits that are used in preserves and candy.

The **Pitanga** or **Surinam Cherry**, *Eugenia uniflora*, is grown in Florida and California for use as a fresh fruit and in jellies and sherbets.

The **Grumichama**, *Eugenia dombeyi*, The **Jambolan** or **Java Plum**, *Syzygium cumini*, and the **Chia** or **Mountain Apple**, *Syzygium malaccensis*, are all native to South Eastern Asia but may be found growing in other tropical countries. Other related species are the **Feijoa**, *Feijoa sellowiana*, and the **Jaboticaba**, *Myrciaria cauliflora*. The Jaboticaba is a very beautiful tree native to Brazil. It is frequently planted as an ornamental. The grapelike fruits are borne on the branches and trunk and are used for fresh fruit, jellies, wines and cordials.

Jujube <Photos>

Jujube, *Zizyphus jujuba*, is indigenous to China and has been cultivated there since before 2,000 B.C. It is one of the principal fruits consumed in China and is also grown elsewhere in the subtropics worldwide. The plant is remarkably free of pests. It is a large bush or small spiny tree with small dark-brown fleshy drupes that have a white, crisp, rich flesh. It is consumed fresh, dried or preserved and is also used in cooking and making candy.

Lychee (Litchi) <Photos>

Lychee, *Litchi chinensis*, is indigenous to Cochin China and Thailand. It has been an important fruit in Southeastern Asia since before 100 B.C. The plant is now widely grown in the tropics and subtropics. The tree is also a valuable ornamental. It reaches a height of 35-40 ft. and has a broad round-topped crown and leathery shiny leaves. The fruits are distinctively round, 1-2 in. in diameter and are borne in loose clusters. The pericarp is bright red and leathery, turning brown and brittle on drying. The translucent white flesh surrounds a single large seed. In the dried fruit, the so-called "Litchi Nuts," the flesh is very aromatic and has a raisin like consistency. Litchis produced in China and Taiwan are canned for the export market.

Loquat <Photos>

Loquat, *Eriobotrya japonica*, is one of the few tropical fruits that belong to the Rosaceae, a family which has such a large number of edible fruits in temperate regions. The tree is native to China but is now grown in most tropical and subtropical areas. It has flourished in California, The Gulf States and Florida. It is a small evergreen tree with broad leaves and fragrant white flowers that appear in autumn. The small, round, downy, yellow-orange fruits are produced in the spring. The flesh is lightly acid and not as sweet and rich as most tropical fruits. It is highly valued in the Orient and has been grown there since antiquity. Japan and Australia produce the largest crop. The fruit is used fresh and is made into jellies, sauces and pies.

[Coco Plum](#) <Photos>

Chrysobalanus icaco L occurs on the sandy shores of southern Florida to the West Indies and Brazil. It has plumlike fruits that make excellent preserves but which are too acid for consuming fresh.

[Mango](#) <Photos>

Mango, *Mangifera indica*, is one of the oldest and most important of tropical fruits. It was cultivated since before 4,000 B.C. It is a sacred tree in India. Indigenous to Southern Asia, it is now widely grown in all tropical and some subtropical areas. Mango is one of the few tropical plants that have been improved under cultivation and there are over 515 horticultural varieties grown. The tree is a handsome evergreen, reaching 90 ft. in height with small pink flowers in large panicles. The fruit is a fleshy drupe with a thick yellowish-red skin and a large seed. The size, shape, and quality mangos vary greatly. The lengths are 3-5 in. The pulp is orange, yellow or red and when ripe has a rich, aromatic flavor with a perfect blending of sweetness and acidity. Young and inferior fruits are often fibrous and unpleasantly acid.

Mangos are of much greater importance among tropical fruits than apples are among temperate fruits, and they furnish food for at least one-fifth of the world's inhabitants. Most of the harvest is consumed fresh. They are also used in preserves, sauces, and salads and as chutney. They are also cooked, dried and canned.

The related genus *Spondias* includes three species that furnish fruits often found in tropical markets. The **Golden Apple**, **Otaheite Apple** or **Ambarella**, *Spondias cytherea*, is native to the Society Islands and is cultivated in both hemispheres. Although inferior to the mango, it is consumed fresh, cooked and in sherbets and beverages.

The **Yellow Mombin** or **Hog Plum**, *Spondias mombin*, and the Red Mombin or Spanish Plum, *S. purpurea*, are natives of tropical America where they are widely distributed as both wild and cultivated trees. The fruits are consumed raw, cooked or in jams and jellies.

[Mangosteen](#) <Photos>

Mangosteen, *Garcinia mangostana*, has been called The World's Best Flavored Fruit. It is highly valued in areas where it can be grown. Native to Malaya it is common in the East Indies, Cochin China and Ceylon. It has also spread to other tropical areas of the world. The tree is small and rarely exceeds 30 ft. in height. It has deep-green foliage and the fruit is a dark purple berry, 2-3 in. in length with adherent sepals at the base. The rind is one-half inch thick and the flesh is so delicate that it melts almost like ice cream. The pulp is white or yellowish, with crimson veins and exudes a yellow juice of exquisite flavor

[Mamey](#) <Photos>

There are more than 200 species of *Garcinia*, about two-third of which have edible fruits. The **Mamey** or **Mamme Apple**, *Mammea americana*, is a close Neotropical relative that is an important fruit in the West Indies and tropical America. The aromatic flesh is magenta colored with the consistency of an avocado.

[Olive](#) <Photos>

Olive, *Olea europaea*, is one of the oldest of fruits and had been grown from prehistoric time. It is actually used more like a vegetable and an **edible oil**, however. It was known in Egypt in the 17th Century B.C. and is often mentioned in the Bible and in Roman and Greek writings. It is now cultivated everywhere throughout the tropics and subtropics. It has been grown in California since 1769.

The tree is a small evergreen 25-40 ft in height with leathery entire leaves. It bears whitish flowers and a one-seeded drupe. The fruit is shiny purplish black when ripe. Although they live to a great age under favorable conditions, olive trees require careful cultivation. A deep fertile soil and a temperature averaging 57 degrees Fahrenheit, and no lower than 14 deg. Fahrenheit are preferred. Irrigation is often required for a good crop. Cuttings propagate the tree.

The fruit contains a bitter glucoside and have to be processed before they are palatable. After a heavy frost some fruits may be eaten directly from the tree. The processing is done by pickling and heating with sodium hydroxide. Ripe olives have high food content for they are one of the few fruits rich in oil. They are cultivated for eating, but more especially as a source of olive oil. Green olives are also a favorite preparation. These are picked by hand when fully grown but still unripe. They are cleaned, heated with lye, which softens them and removes the bitter contents that are present, and pickled in brine. Stuffed olives, with the pit removed and replaced by a pimiento or nut, are a familiar product. The best quality olives are grown in the Mediterranean area, especially Greece and southern Italy. The oil that is extracted from California grown olives lacks the flavor of that from Mediterranean crops.

[Papaya](#) <Photos>

Papaya, *Carica papaya*, is indigenous to the West Indies and Mexico. It is now grown worldwide in the tropics and subtropics. The fruit is valuable for food and medicinal purposes. The tree is in reality a giant herb that will grow to 25 ft. in height. Varieties may be either dioecious or monoecious. The straight stem is rather succulent, with a crown of large deeply 7-lobed leaves and yellow flowers. The fruits are fleshy berries that resemble melons. They are yellow-orange in color and may weight up to 20 lbs. They are borne on long stalks just below the crown of leaves. The growth rate is very rapid and the yield high. Papaya is an excellent breakfast fruit especially when served with the juice of limes. It is also used for salads, pies, sherbets and confections. Unripe fruits are cooked like squash or preserved. The fruit and other parts of the plant contain a latex that is used in chewing-gum manufacture. One of the constituents of the latex is a digestive ferment, **Papain** that acts on proteins in a manner similar to pepsin. This ferment is important in medicine and is also used for tenderizing meat.

[Papaw](#)

Papaw, *Asimina triloba*, is native to temperate North America. The tree is deciduous with drooping leaves, axillary purple flowers that show before the leaves, and edible fruits. It grows from New York to Florida and Texas.

[Persimmon](#) <Photos>

American Persimmon, *Diospyros virginiana*, is a hardy small tree of the Eastern United States. The fruits ripen after a frost and are of high quality and delicious flavor. The unripe fruits are very acid but the ripe fruits do not hold up well in storage and have more pulp.

Japanese Persimmon, *Diospyros kaki*, is indigenous to China but has spread from there worldwide. There are over 810 varieties grown in Japan. The tree is cultivated in France and other Mediterranean countries and is common in California, Florida, Texas and the Gulf States. It is a large tree, 20 ft or more in height, with orange-red fruits about 3 in. in diameter. Persimmons are edible berries with an enlarged calyx at the base. They are consumed fresh or dried. Intestinal allergic reactions may occur in some who eat this fruit.

[Pineapple](#) <Photos>

Pineapple, *Ananas comosus*, is one of the first tropical fruits to be grown commercially. No other tropical crop except rubber has had a more rapid rise in international commerce. This is due in large part to good luck and management as well as to its own high quality.

Pineapples are indigenous to Northern South America. It was widely grown in the West Indies in Pre-Columbian times. Wild varieties still exist in Brazil. The ananas, as they were called, were carried by the Europeans to the Old World and from there spread all over tropical Asia, Africa, the East Indies and Polynesia.

The plant is a biennial, with a short stem and rosette of stiff leaves, 3 ft. in length, with spiny tips and prickly margins (Hill 1952). The flowers occur in dense beads and are crowned by a tuft of leaves. The large fruits, weighting from 1-20 lbs., are syncarps. These are multiple accessory fruits formed from the whole inflorescence. The individual

ripened ovaries are embedded in a fleshy mass formed from the bracts, sepals, petals and axis of the inflorescence. The cultivated varieties are mostly seedless. Pineapple is a very dependable crop. Propagation is by suckers, slips or by planting the crown. They can be grown in a poor dry sandy soil, but often require iron supplements. There are many varieties.

Few fruits with better flavor or more wholesome qualities are known. Besides the content of sugar and fruit acids, a valuable digestive ferment, **Bromelin**, is present. Pineapples must ripen on the plant to develop the best flavor. However, most of the fruits that are exported are picked before maturity and often tend to be too acid and are not as full flavored. Pineapples have been preserved in cans since 1900, either as juice or slices. A fiber called **Piña** is obtained from the leaves.

The principal commercial areas are Hawaii, Central America, the West Indies and Southeast Asia. Garden plantings are common in California, Florida and some Gulf States.

[Pomegranate](#) <Photos>

Pomegranate, *Punica granatum*, is native to Iran. It has been grown for centuries and very early spread throughout the Mediterranean region and Southern Asia. It grew in the Hanging Gardens of Babylon. The plant is a bush or low tree with orange-red flowers. The round berry-like brownish-yellow or reddish fruits are 2-4 in. in diameter and are crowned with a thick persistent calyx. A leathery rind encloses the pulp with amethyst colored juice surrounding many seeds. The segments enclosing the seeds are very bitter so that some experience is necessary in eating this fruit. Pomegranates are very refreshing and are used as a table or salad fruit and in beverages. The roots, rind and seeds are medicinal. In the United States California, Arizona and New Mexico lead the production.

[Sapodilla](#) <Photos>

Sapodilla, *Achras zapota*, is a delicious dessert fruit of tropical America. The tree is a stately evergreen, 75 ft. in height, with a dense crown and horizontal branches. The flowers are white and the fruit is rough brown and 3-4 in. in diameter. The yellowish-brown flesh is translucent and very sweet. Young fruits contain tannin and are unpalatable. The tree is grown in Florida and in the tropics and subtropics of the Old World. The principal commercial product from this tree is not the fruit but the milky latex that is the chief source of chicle for making chewing gum.

There are over 400 species in the family Sapotaceae, most of them being edible. Of these the sapote, star apple and canistel are most important.

Sapote, *Calocarpum sapota*, and other species, are common in Central America and the West Indies. The russet-brown fruit, 3-6 in. long, has a sweet spicy flesh and is important in the local diet. It is consumed fresh, in salads or as a conserve.

Canistel or Egg Fruit, *Lucuma nervosa* and other species, is a beautiful tree with orange-yellow fruit and a sweet and aromatic pulp. native to Northern South America, it is cultivated in Brazil and has been naturalized in Florida and the West Indies. The fruit is consumed fresh, in salads, or for pies, puddings and jam.

[Tamarind](#) <Photos>

Tamarind, *Tamarindus indica*, is believed to have originated in tropical Africa or Southern Asia. it is a large tree, 80 ft. in height, with a dense crown and is often grown for shade and ornamental purposes in semiarid regions. The fruits are brown pods, 3-8 in. long. The sour pulp contains 12 percent tartaric acid, 30 percent sugar. Tamarinds are extensively used in India and the Orient as fresh fruit, in beverages, for preserving and in medicine. The fruits were used in Europe during the Middle Ages. Tamarinds are common in Florida, the West Indies and some Gulf States.

Minor Tropical Fruits

[Bilimbi and Carambola](#) <Photos>

Bilimbi, *Averrhoa bilimbi*, and **Carambola**, *Averrhoa carambola*, are indigenous in Southeastern Asia but are grown in the tropics worldwide. The small fruits are acid so they are cooked with sugar before eating.

[Otaheite or Star Gooseberry](#) <Photos>

Phyllanthus acidus, has yellow cherrylike fruits that are excellent when eaten with sugar. The small tree is ornamental but has developed wild in Florida and the West Indies.

[Governor's or Madagascar Plum](#) <Photos>

Flacourtia indica is an Asiatic species with excellent fruits.

[Natal Plum](#) <Photos>

Carissa grandiflora and other species of South Africa is a spiny ornamental that is often used as a hedge plant in subtropical areas. The small scarlet fruits are consumed raw or cooked or used for jellies and preserves.

[Barbados Cherry](#) <Photos>

Malpighia glabra of the West Indies is commonly grown from Texas to Northern South America. It has juicy red cherrylike fruits that are usually cooked or used for beverages.

[Ceriman or Pine Tree Fruit](#) <Photos>

Monstera deliciosa is an ornamental aroid often planted in greenhouses. It has long conelike fruits with a pleasant pineapple-like flavor when ripe.

[White Sapote](#) <Photos>

Casimioa edulis is indigenous to the highlands of Mexico and Central America. It was introduced into California, the southern United States and the West Indies. The apple like fruits have a soft, yellow, sweet, custard like pulp.

[Tree Tomato](#) <Photos>

Cyphomandra betacea, is native to Peru but it is extensively cultivated throughout the Andean region. It was introduced into Puerto Rico and Southeastern Asia. The oval, reddish-orange fruits are consumed raw or cooked.

[Naranjilla or Lulu](#) <Photos>

Solanum quitoense is a robust herb with very large leaves and orange fruits that are produced in abundance throughout the year. It is common in the high Andes from Peru to Colombia. The fruit has a very delicious and refreshing juice that is rich in protein and minerals.
