

Kei Apple

Dovyalis caffra Warb.

Aberia caffra Harv. & Sond.

-
- [Description](#)
 - [Origin and Distribution](#)
 - [Climate](#)
 - [Soil](#)
 - [Propagation](#)
 - [Season](#)
 - [Food Uses](#)
 - [Food Value](#)
 - [Related Species](#)
-

The kei apple, *Dovyalis caffra* Warb. (syn. *Aberia caffra* Harv. & Sond.) is also known as *umkokolo* in Africa and this is abbreviated to *umkolo* in the Philippines. The generic name has been rendered *Doryalis* by many writers but botanists now agree that this form was not the original spelling.

Description

The shrub or small tree, growing to a height of 30 ft (9 m) with a spread of 25 ft (7.5 m), usually has many sharp spines 1 to 3 in (2.5-7.5 cm) long, though it is often entirely spineless if not trimmed. The leaves, often clustered on short spurs, are oblong-ovate, 1 to 3 in (2.5-7.5 cm) long, glossy and short-petioled. Pale-yellow male and female flowers are usually borne on separate trees. They are small, petalless, and clustered in the leaf axils. The aromatic fruit is oblate or nearly round, 1 to 1 1/2 in (2.5-4 cm) long, with bright-yellow, smooth but minutely downy, somewhat tough skin, and mealy, apricot-textured, juicy, highly acid flesh. There are 5 to 15 seeds arranged in double rings in the center. They are flat, pointed and surrounded by threadlike fibers. The tree is spectacular when its branches are laden with these showy fruits.



Fig. 88: The kei apple tree (*Dovyalis caffra*) is drought-tolerant, salt-resistant and strikingly fruitful, but the fruit is intensely acid.

Origin and Distribution

The kei apple is native to the Kei River area of southwest Africa and abundant in the wild around the eastern Cape, Kaffraria and Natal. It is cultivated in the Transvaal. In 1838, it was introduced into England and from there distributed to Egypt, Algeria, southern France and Italy, the Philippines, northwestern Australia, Jamaica, southern California and Florida. The United States Department of Agriculture obtained plants from Reasoner Bros., Oneco, Florida in 1901 (S.P.I. #6857); seeds from South Africa in 1901 (S.P.I. #7955 & #7956); seeds from the Cape Town Public Gardens in 1906 (S.P.I. #18667); seeds from the Middle Egypt Botanic Gardens in 1912 (S.P.I. #34250); and seeds from Hubert Buckley, St. Petersburg, Florida (S.P.I. #145592) and the resulting seedlings were being distributed from the Plant Introduction Garden, Coconut Grove, in 1942 and 1943. A few specimens were planted in experimental stations in Puerto Rico and St. Croix, and in private gardens in southern and central Florida, and the plant was adopted as a coastal, rough hedge in southern California. It has been grown as a hedge and for its fruit in some parts of Costa Rica. It was in the past extensively cultivated as a hedge around citrus groves in Israel, but the fruits were not liked, they accumulated on the ground and became breeding places for the Mediterranean fruit fly. Therefore, nearly all the plants were destroyed.

Climate

The kei apple is subtropical; does poorly at sea-level in the Philippines but thrives at and above 2,600 ft (800 m). Introductions have failed to survive in Malaya. In Florida, the plant has been grown in a small way as far north as Gainesville, enduring brief drops in temperature to 20° F (-6.67° C) but descents to 16° F (-8.80° C) have been lethal in this state and in California.

Soil

The kei apple does well in almost any soil that does not have a high water table. It is extremely drought-resistant and tolerates saline soil and salt spray and is accordingly valued as a coastal hedge in the Mediterranean region and in California.

Propagation

Propagation is ordinarily by seeds, though layering is successfully done in Australia. Seeds germinate readily when fresh and seedlings begin to bear in 4 or 5 years. For fruit production, Wilson Popenoe recommended a spacing of no less than 12 to 15 ft (3.5-4.5 m). Hedge plants can be set 3 to 5 ft (0.9-1.5 m) apart. According to Popenoe there should be 1 male for every 20 or 30 females. However, certain female trees have borne profusely in the absence of male pollinators. A kei apple hedge must be trimmed twice a year. If neglected and allowed to become leggy, it can be cut to the ground and given a new start. Weeding should not be a problem, for the kei apple exhibits allelopathy, that is, its roots excrete growth inhibitors which prevent the occurrence of other plants in its vicinity. Investigators in Egypt have demonstrated that the roots, stem and fruit, but not the leaves and branches, possess antibiotic properties.

Season

Generally, the plants bloom in spring and the fruits ripen from August to October. The thorns make harvesting difficult. The top may have to be thinned out in order to facilitate fruit-picking.

Food Uses

Most people consider the fruit too acid for eating out-of-hand even when fully ripe. It is best cut in half, peeled, seeded, sprinkled with sugar and allowed to stand for a few hours before serving as dessert or in fruit salads. The halves can stand only a few minutes of cooking before they turn into sauce. Simmered briefly in sirup, they make excellent shortcake. Kei apples are customarily made into jam and jelly, and, when underripe, pickles.

Food Value

Fresh ripe fruits contain 83 mg ascorbic acid per 100 g and 3.7% pectin. Scientists in Egypt have reported 15 amino acids: alanine, 0.41%; arginine, 0.36%; aspartic acid, 0.96%; glutamic acid, 2.00%; glycine, 0.39%; histidine, 0.10%; isoleucine, 0.25%; leucine, 0.75%; lysine, 0.36%; methionine + valine, 0.28%; phenylalanine, 0.40%; proline, trace; serine, 0.48%; threonine, 0.34%.

Related Species

In the family Flacourtiaceae, there are several species of *Flacourtia* that have been distributed as fruit producers. None has any great merit, and four shall be treated as minor subjects here.

The **louvi**, *F. inermis* Roxb., is called *rukam masam*, *rokam masam*, *lovi-lovi*, *lobeh-lobeh*, *tomi* and thornless *rukam* in Malaya. The tree is short-trunked, bushy, to 25 or 30 ft (7.6-9 in) tall, and thornless. The evergreen, alternate leaves, bright-red when young, are glossy on the upper surface, dull beneath; 3 1/2 to 10 in (9-25 cm) long and 2 to 5 in (5-12.5 cm) wide. Unlike other species, the tree has bisexual flowers. They are petalless with green sepals and many yellow stamens and borne in small clusters along the branches. The fruit is round but slightly flattened at the apex, 3/4 to 1 in (2-2.5 cm) wide, smooth, bright-red, thin-skinned. The flesh is whitish tinged with pink, astringent, acid or occasionally sweet. There are 4 to 14 hard, sharp, irregular seeds under 1/4 in (6 mm) wide. The tree is of unknown origin; cultivated in Ceylon, Malaya and Indonesia. Its lifespan is said to be about 20 years. It is propagated by seed in Malaya, by air-layering or budding in Java. Flowering occurs several times a year. Yield from dooryard trees varies from 81 to 241 lbs (36.8-109.5 kg) a year. Those given good cultural attention may bear a total of 374-576 lbs (170-261.8 kg). The fruits are not favored raw but are seeded and cooked with apples to add color, or are made into pie, jam, jelly, sirup, chutney and pickles.

The **paniala**, *F. jangomas* Raeusch. (syn. *F. cataphracta* Roxb.) is also called *puneala*, *puneala* plum, *jaggam*, Chinese plum, Indian plum; in Malaya, *kerkup*, *kerkup besar*, *kerkup bakoh*; in Thailand, *ta-khop-thai*; in Vietnam, *mu cuon*, *mung quan*, *bo quan*, and *prunier malgache*. The shrub or erect, low-branched tree, 20 to 40 ft (6-12 in) high, has flaking bark and sharp spines on the trunk. The leaves are alternate, deciduous, pale pink when young, spirally arranged, oval-lanceolate, long-pointed, toothed, very thin, glossy on both surfaces; 2 to 4 in (5-10 cm) long, 1/2 to 2 in (1.25-5 cm) wide. Male and female flowers are on separate trees. They are greenish, heavily fragrant, borne in small clusters on new branchlets. The fruits are round or slightly oval, 3/4 to 1 in (2-2.5 cm) long, dark-maroon to nearly black; the flesh greenish to white or amber, varying from acid to sweet, and containing 7 to 12 flat, hard, pale-yellow seeds.



Fig. 89: The paniala (*Flacourtia jangomas*) of southern Asia and the Philippines, has wine-red, plumlike fruits, unfortunately very astringent.

The tree is native to North Bengal, East Bengal and Chittagong in India; commonly cultivated throughout Southeast Asia, eastern Malaya, and also in the Philippines. It has been planted in a very limited way in Surinam, Trinidad, Puerto Rico and southern Florida. The seeds are slow to germinate, therefore propagation is usually by inarching or budding onto self-seedlings.

For eating out-of-hand, the fruit is rolled between the hands to reduce astringency, and is better-liked than that of other species. It is stewed as dessert, made into juice, sirup, jam, marmalade and pickles and also used in chutneys. When slightly underripe, it is used to make jelly. The acid young shoots are eaten in Indonesia.

Philippine analyses show: moisture, 78.28%; protein, 0.03%; fat, 0.39%; sugar, 4.86%; ash, 0.94%; acidity, 1.16%. The fruit is fairly rich in pectin; contains 9.9% tannin on a dry-weight basis.

The wood, red or scarlet, is close-grained, hard, brittle, durable and polishes well. It is used for agricultural implements.

The fruits are eaten to overcome biliousness, nausea and diarrhea. The leaf decoction is taken to halt diarrhea. Powdered, dried leaves are employed to relieve bronchitis and coughs. The leaves and bark are applied on bleeding gums and aching teeth, and the bark infusion is gargled to alleviate hoarseness. Pulverized roots are poulticed on sores and skin eruptions and held in the mouth to soothe toothache.

The **ramontchi** is *F. ramontchi* L'Her. *F. indica* has been frequently recorded as a synonym but Indian botanists disagree and treat *F. indica* Merr. as a distinct species. The common name for the ramontchi in India is governor's plum; in Malaya, it is *kerkup kechil* or lesser *kerkup*; in Thailand, *ta-khop-pa*; in the Philippines, *bitongol*, *bolong*, or *palutan*; in Africa, it is called *kokowi*, Madagascar plum or Indian plum.



Fig. 90: The ramontchi, or governor's plum (*F. ramontchi*), closely resembles the paniala. The fruit is sweet but astringent and slightly bitter. The leaves are useful as fodder.

The tree is bushy and spreading but may reach 50 ft (15 m) and usually has sharp spines on the trunk and on main branches which tend to arch and droop at the tips. The evergreen, alternate leaves, red when young, are obovate to oblong-obovate, 1 to 2 in (2.5-5 cm) long and finely toothed. Male and female flowers are borne on separate trees. They are white, about 3/16 in (5 mm) wide, and appear singly or paired in the leaf axils. The fruit is round, 1/2 to 1 in (1.25-2.5 cm) thick, smooth, glossy, dark red-purple, with light-brown, acid to sweet, astringent, slightly bitter, flesh and 6 to 10 small, flat seeds.

The ramontchi is native to tropical Africa, Madagascar, India, parts of Malaya and Southeast Asia, and much of Malaysia including the Philippines. It has been planted in Florida, Puerto Rico, Trinidad, Guatemala, Honduras and Venezuela and advocated as a source of fruit. It has never become popular anywhere, but jelly can be made from it by not squeezing the jelly bag and thus avoiding excessive astringency. The fruit is usually infested by fruit flies. Analyses made in the Philippines show: moisture, 66.42%; protein, 0.69%; fat, 1.67%; sugar, 7.68%; ash, 1.09%; acidity, 1.78%.

In Florida, birds scatter the seeds and volunteers invade natural areas. In Puerto Rico, the tree is considered useful as a tall barrier hedge or windbreak. Farmers in India lop the branches for fodder. The wood is used only for fuel.

The leaves and roots are believed to be effective against snakebite and the pulverized bark, mixed with sesame oil, is applied on rheumatic parts. Filipinos use the bark infusion as a gargle. A root infusion is taken in cases of pneumonia. The leaf juice is given as a febrifuge and remedy for coughs, dysentery and diarrhea. The dried leaves are regarded as carminative, expectorant, tonic and astringent.

The **rukam**, *F. rukam* Zoll. & Mor., also called *rukam manis*, *rukam gajah* and Indian prune in Malaya; *khropdong* in Thailand, is a much-branched, crooked tree to 40 or even 65 ft (12-20 m), sometimes thornless in cultivation but usually heavily armed with forked, woody spines on the trunk and old branches. The leaves are evergreen, spiralled, red when young, elliptic-oblong, 3 to 6 in (7.5-15 cm) long, 1 1/4 to 2 1/2 in (3.2-6.25 cm) wide, coarsely toothed, slightly shiny. Flowers are in small clusters in the leaf axils. Male and female are usually on separate trees; occasionally both occur on the same plant. There are no petals; the male have many stamens.

The fruits, borne on old branches or on the trunk, are nearly round, slightly flattened at the apex, 1/2 to 1 in (1.25-2.5 cm) wide, dark purple-red, smooth, with whitish, juicy, acid flesh. There are 4 to 7 flat seeds.

The tree is native to India, Southeast Asia, Malaysia and Oceania; cultivated in southern Malaya and Indonesia. It is adapted to elevations up to 5,200 ft (1,600 m). Seeds came to the USDA from Bangkok in 1920 (S.P.I. #51772). A few specimens have been grown in Florida.

The fruits are eaten raw, especially after rolling them between the palms to reduce astringency. They are also cooked, made into pie, jam and chutney. The young shoots are marketed and eaten raw in Java.

Analyses made in the Philippines show: calories 82.80 per 100 g; moisture, 76.93%; protein, 1.72%; fat, 1.26%; reducing sugars, 4.32%; fiber, 3.71%; other carbohydrates, 11.29%; ash, 0.771%; acidity, 1.29%.

The heavy, strong wood is made into rice pounders in Java; pestles in the Philippines; and clubs in Samoa.

The juice of immature fruit is taken to halt diarrhea and dysentery. Leaf juice is applied on inflamed eyelids, and dried, pulverized leaves are spread on wounds. The root decoction is given to women after childbirth. The inner bark is used against filariasis in Samoa.
