

## MANGO

### *Mangifera indica* L.

Plant Symbol = MAIN3

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Forest & Kim Starr (USGS)  
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#### Alternate Names

Kangit, idele, mago, mangot, manako, mango, mangah saipan, manko, meneke, mangko, mangou, manga, mangga, manja, mangoro, manguier, mangue, manguiera, paho, mempalam, te mangko, asai, damangko, mago, edel, kanit, kehngid, tumi vi.

**Caution:** The mango skin and sap can be allergic to some people and should be eaten with caution as they can produce the same type of allergic reactions as poison ivy/oak/sumac, including skin lesions or the more serious swollen lips and tongue.

#### Uses

**Human Food:** The fruit is used in jams, preserves, pies, chutney, ice cream, jellies, canned fruits, and in frozen or dried fruits. However, fresh consumption is

the most important and widest use of the fruit. The fruit is a good source of vitamins A and C. Green mangoes are often cooked and eaten like vegetables or made into a delicious chutney or dried and ground into a powder called "amchoor" and used to impart a sour flavor to food.

The kernels can be boiled and eaten with greens or ground and eaten roasted, dried, or pickled; but are generally eaten in times of famine or by the poorest.

**Livestock Food:** Mango leaves are occasionally fed to cattle, but large quantities can cause death.

The fruits are relished by both cattle and pigs; however, the kernels are fairly rich in tannins, which progressively lead to reduced growth rates and less efficient feed utilization when included as a major component in diets for pigs and poultry.

Mangoes that are not fully mature are sliced and ensiled in pits 1.5 m<sup>3</sup> dug in the ground and lined with large leaves. One percent salt should be added. The pits are tightly covered with leaves and soil. This silage can be used for off-season pig feeding.

**Ethnobotanic:** Dried mango flowers, containing 15% tannin, serve as astringents in cases of diarrhea, chronic dysentery, catarrh of the bladder and chronic urethritis. The bark was used against rheumatism and diphtheria. The resinous gum from the trunk was applied to cracks in the skin of the feet and on scabies. Mango kernel decoction and powder were used as vermifuges and as astringents in treatment for diarrhea, hemorrhages and bleeding hemorrhoids. Leaf decoction was taken as a remedy for fever, chest pains, diarrhea, diabetes, and hypertension. Extracts of bark, leaves, stems, and unripe fruits were used as antibiotics for many ills.

When mango trees are in bloom, it is not uncommon for people to suffer itching around the eyes, facial swelling and respiratory difficulty, even though there is no airborne pollen. The few pollen grains are large and they tend to adhere to each other even in dry weather. The stigma is small and not designed to catch windborne pollen. The irritant is probably the vaporized essential oil of the flowers which contains the sesquiterpene alcohol, mangiferol, and the ketone, mangiferone.

The twigs and leaves, used to clean the teeth, are said to be beneficial to the gums, while the bark is said to

be useful for toothaches. The astringent stomachic bark is also used for internal hemorrhages, bronchitis, and catarrh. The resin is used for cracked feet, ringworm, and other fungi, syphilis, and to induce sweating. Smoke from the burning leaves is believed to cure various throat disorders, from asthma to hiccups. Dried mango flowers, containing 15% tannin, serve as astringents in cases of diarrhea, chronic dysentery, catarrh of the bladder and chronic urethritis resulting from gonorrhea.

Green fruits are considered anticholeric (baked and mixed with sugar and taken internally and also rubbed over the body), antidysmenorrheic, antiscorbutic, astringent, and diaphoretic. Roasted green fruits are dissolved in sugar water and taken internally to prevent sunstroke. Ripe fruits are considered diuretic, laxative, and unguent. A gruel made of the seeds is taken internally for bleeding piles. The wood is favored for making shovels.

The bark contains mangiferine and is astringent and employed against rheumatism and diphtheria in India. The resinous gum from the trunk is applied on cracks in the skin of the feet and on scabies, and is believed helpful in cases of syphilis.

Mango kernel decoction and powder (not tannin-free) are used as vermifuges and as astringents in diarrhea, hemorrhages and bleeding hemorrhoids. The fat is administered in cases of stomatitis. Extracts of unripe fruits and of bark, stems and leaves have shown antibiotic activity. In some of the islands of the Caribbean, the leaf decoction is taken as a remedy for diarrhea, fever, chest complaints, diabetes, hypertension and other ills. A combined decoction of mango and other leaves is taken after childbirth.

Seed fat: Having high stearic acid content, the fat is desirable for soap-making. The seed residue after fat extraction is usable for cattle feed and soil enrichment.

Bark: The bark possesses 16% to 20% tannin and has been employed for tanning hides. It yields a yellow dye, or, with turmeric and lime, a bright rose-pink.

*Wood:* Kiln-dried and preservative treatment wood is used to make window frames, rafters, joists, plywood, shoe heels, boxes, boats, and canoes.

*Wildlife:* Mango fruit and leaves are eaten by deer.

### **Status**

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's

current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

### **Description**

General: The cashew family (Anacardiaceae), of which mango is a member, includes a number of species which can cause severe skin irritation in humans. Poison ivy (*Rhus toxicodendron*), found in North America, is one particularly notable example. For most people, mango has no such effect, but in sensitive individuals ingestion of the fruit, or skin contact with its juice, may cause a poison ivy-like rash.

Mango is a large evergreen tree that can reach 15 to 30 m tall. They are fast growing erect trees with slender to broad and rounded upright canopy that can be used for landscape and shade. The trees are long-lived with some still producing fruit at 300 years old. The tree is anchored by a long unbranched taproot can descend to a depth of 6-8 m plus a mass of feeder roots. The feeder roots send down anchor roots which penetrate the soil to a depth of 1.2 m and spread lateral as far as 7.5 m.

The leaves are alternate, simple, leathery, oblong-lanceolate, 29-30 cm long X 3-5 cm wide on flowering branches, up to 50 cm on sterile branches. The young leaves are red, aging to shiny dark green above, lighter below, with yellow or white venation.

The inflorescence is a much-branched panicle bearing many very small (4 mm) greenish white or pinkish flowers. Both male and bisexual flowers are borne on the same tree. The flowers are radially symmetrical, and usually have 5 petals, streaked with red. There is usually only 1 fertile stamen per flower; the 4 other stamens are sterile. The flower has a conspicuous 5-lobed disk between the petals and stamens.

The fruit is an irregularly egg-shaped and slightly compressed fleshy drupe, 8-12 (-30) cm long, attached at the broadest end on a pendulous stalk. The skin is smooth greenish-yellow, sometimes tinged with red. The underlying yellow-orange flesh varies in quality from soft, sweet, juicy and fiber-free in high-quality selected (clonal) varieties to turpentine-flavored and fibrous in unselected (wild) seedlings. The single, compressed-ovoid seed is encased in the white fibrous inner layer of the fruit.

Mangoes can be round, oval, heart-shaped, or kidney-shaped; and can weigh as little as a few ounces or as much as five pounds. Their highly aromatic flesh surrounds a very large inedible flat seed. At its best,

it has a pleasant resinous quality, but at its worst can smell like kerosene. The soft pulp is juicy and sweet, although it can sometimes has an acid overtone. Some mangoes have fibrous flesh, while others are buttery all the way through.

The round or oval fruit is somewhat flattened and can weigh up to 0.5 kg. The flesh of good fruit has a pleasant aromatic flavor, but inferior varieties have a turpentine flavor and can be rather fibrous. In the centre is the large fibrous flat seed containing a kernel.

*Distribution and Habitat:* The mango is native to southern Asia, especially Burma and eastern India. It spread early on to Malaya, eastern Asia and eastern Africa.

Mangoes are grown throughout the tropics, from the Caribbean to Africa, South-East Asia, Australia, as well as India, where the history of the fruit goes back over 6,000 years and closely connected to the Hindu religion. As long ago as the 16th century, mangoes had been distributed via cultivation throughout the Indian subcontinent, and eventually to all tropical regions of the world.

It performs best at elevations from 0-1200 m. with a pronounced rainy season for vegetative growth, a dry season for flowering and fruiting, and on well-drained soils ranging in pH between 5.5 to 7.5. It was not until the 19th century that traders introduced the fruit to the West Indies, Africa, South America, Mexico, Florida, and Hawaii. Mangoes were introduced to California (Santa Barbara) in 1880.

For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

### **Establishment**

Extensive information on propagation and establishment, particularly through grafting for the Pacific Basin Islands can be found in Bally (2006). This document is available on the Web at [www.traditionaltree.org](http://www.traditionaltree.org).

In deep sandy type soil the tap root will descend to 20 feet with the feeder roots growing in descending order. The mango requires full sun and perfect air drainage in winter.

Mangos will grow in almost any well-drained sandy, loam or clay soil but does not grow well in heavy wet soils. Soil pH must be between 5.5 and 7.5. They are somewhat tolerant of alkalinity. Plantings

established during the dry season will require rainfall or irrigation everyday. The amount of irrigation required will depend on soil type, amount of rainfall, and temperature. Light sandy soils will require almost continuous watering until the fruit is harvested. Irrigation should be discontinued when rainfall is sufficient enough to keep the soil moist. Young seedlings require applications of nitrogen fertilizer to promote healthy growth and flower production. However, care must be taken not to create fertilizer burn.

*Propagation by seed:* Remove the husk and plant the seed with the hump at soil level. Seed will normally germinate in two to four weeks. Seedlings developed from seed will bloom and bear in three to six years.

*Propagation by grafting:* Small plants with a diameter about the size of a pencil graft well with the common whip graft. Crown groove graft allows several scions to be put on at once. Fully grown trees may be top-worked by crown groove bark graft or prune hard and whip graft sprouts later. Plastic bagging with a few drops of moisture will improve the graft's chances of being successful. Grafts are most successful if the leaves are allowed to remain below the graft, but removed suckers. When top working, do not dehorn the entire tree, leave several branches fully leafed.

### **Management**

Extensive information on the management of mango in Hawaii and the Pacific Basin Islands can be found in Bally (2006). This document is available on the Web at [www.traditionaltree.org](http://www.traditionaltree.org).

Mango trees managed for commercial fruit production should be irrigated once weekly in coastal areas and almost continuously in dry areas until the fruit is harvested. After harvest, irrigation should be reduced to a level that prevents wilt. This process should continue for about two months before increasing irrigation to initiate new bloom and growth cycle. While irrigation is important for tree establishment and survival, it must be part of an overall management plan that includes fertilization. These trees require a feeding program similar to the one used for citrus. This feeding program must include nitrogen and the micronutrient especially iron.

Once plantings are established pruning can be used to stimulate new growth, provide for uniform annual fruit bearing, and control size. Pruning should be performed in late winter and early spring to avoid loss of fruit. When pruning or removing litter avoid

getting the sap on unprotected skin, because the sap can cause severe dermatitis. Pruned material and other mango litter should not be burned to avoid breathing affected air.

### **Pests and Potential Problems**

In the Pacific Basin, the mango fly (*Bactrocera frauenfeldi* Schiner) is quite widespread (Pest Management in the Pacific Project 2007). Also, the mango shoot caterpillar (*Penicillaria jocosatrix* Guenee) affects mango throughout the area (Nafus 2005).

Major insect pests are: mites [avocado red mite (*Oligonychus yothersii* McG.), tumid mite (*Tetranychus tumidus* Banks), and broad mite (*Polyphagotarsonemus latus* Banks)]; scales [lesser snow scale (*Pinnaspis strachani* Cooley); soft scales: pyriform scale (*Protospulvinaria*) *p. pyriformis* Ckll., mango shield scale (*P. mangiferae* Green), acuminate scale (*Kilifia acuminata* Sign.), Florida wax scale (*Ceroplastes floridensis* Comst.); armored scales: Florida red scale (*Chrysomphalus ficus* L.), and dictyospermum scale (*C. dictyospermi* Morg.); and thrips [red-banded thrips (*Selenothrips rubrocinctus* Giard.), and Florida flower thrips (*Frankliniella cephalica* D.L. Crawford)]. Mango trees are also affected by mango decline, a problem associated with micronutrient deficiency. Diseases include: anthracnose (*Colletotrichum gloeosporioides* Penz.), which affects fruits, inflorescences and foliage; powdery mildew (*Oidium* sp.) on inflorescences; and mango scab (*Elsinoe mangiferae*, Bitanc & Jenk.). Internal breakdown of the fruit is an important problem, the cause of which has not yet been determined. Alga spot (*Cephaleuros* sp) attacks flowers, young fruit, twigs and leaves.

### **Cultivars, Improved, and Selected Materials (and area of origin)**

Popular varieties in Hawai'i include 'Haden', 'Ah Ping', 'Gouviea', 'Momi K', 'Fairchild', 'Pope', 'Rapoza', and 'Harders'. In the Solomon Islands and Fiji, the Australian variety 'Kensington Pride' has been introduced and grown successfully. In Samoa, the mango varieties 'Momi K', 'Fiji', 'Mapulehu', 'White Pirie', 'Rapoza', 'Jara', and 'Kensington Pride' are common. In Tahiti, 'Kopu Reva' is a popular variety (Bally 2006). Bally provides an extensive discussion of recommended varieties for Hawaii and the Pacific Basin Islands on the Web at <[www.traditionaltree.org](http://www.traditionaltree.org)>.

Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under

"United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

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