

Mango Growing in the Florida Home Landscape¹

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Scientific Name: *Mangifera indica* L.

Common Names: mango, mangga (Southeast Asia), mamuang (Thai), manguier (French)

Family: Anacardiaceae

Relatives: cashew, spondias, pistachio

Origin: Mangos originated in the Indo-Burma region and are indigenous to India and Southeast Asia.

Distribution: Mangos are grown in tropical and subtropical lowlands throughout the world. In Florida, mangos are grown commercially in Dade, Lee, and Palm Beach Counties and as dooryard trees in warm locations along the southeastern and southwestern coastal areas and along the southern shore of Lake Okeechobee.

History: Mangos have been cultivated in India for more than 4000 years. Beginning in the 16th century, mangos were gradually distributed around the world, reaching the Americas in the 18th century. The first recorded introduction into Florida was Cape Sable in 1833.

Importance: Mangos are universally considered one of the finest fruits and are one of the most important fruit crops in tropical and subtropical areas of the world. Increasing commercial acreage and improved handling methods and shipping throughout the world have increased the mango's popularity and availability in US markets. Major producers include India, Pakistan, Indonesia, Mexico, Brazil, and the Philippines. Other important producers are Australia, South Africa, Ecuador, Peru, Israel, and Egypt. In the United States, Florida, Puerto Rico, and Hawaii have small but locally important industries.



Figure 1. Selected mango cultivars.

Credit: Ian Maguire, UF/IFAS

Description

Tree

Left unpruned many mango varieties become medium to large (30 to 100 ft; 9.1 to 30.5 m) trees. Trees are evergreen, with a symmetrical, rounded canopy ranging from low and dense to upright and open. Tree vigor varies among varieties with some of low, moderate, and high vigor (Table 1). In general, tree size control of low to moderate vigor varieties are more easily managed to maintain a low stature (height and width) while maintaining good fruit production than more vigorous varieties.

Leaves

Leaves are alternately arranged, lanceolate, 6 to 16 inches in length (15 to 40.6 cm), and leathery. Pinkish, amber, or pale green when young, leaves become dark green at maturity. Leaves may live up to five years.

Inflorescence (Flowers)

The inflorescence is a many-branched panicle borne at the ends of shoots. Shoots are 2.5 to 16 inches long (6.4 to 40.6 cm) and possess from 550 to more than 4,000 flowers. Flowers are small and pinkish-white. The majority are staminate (male) and the remainder are perfect (bisexual).

Fruit

Classified as drupes, mangos vary in shape (nearly round, oval, ovoid-oblong), size, and color depending upon the variety. Mangos may be greenish, greenish-yellow, yellow, red, orange, or purple and weigh from a few ounces to more than 5 pounds (2.3 kg). The skin is smooth and leathery, surrounding the fleshy, pale-yellow to deep-orange edible portion. The fruits possess a single large, flattened, kidney-shaped seed that is enclosed in a woody husk.

Seed Types

Mango varieties produce either monoembryonic or polyembryonic seeds. Polyembryonic seeds contain more than one embryo, and most of the embryos are genetically identical to the mother tree.

Monoembryonic seeds contain one embryo, and this embryo possesses genes from both parents. A tree planted from a polyembryonic seed will be identical to its parent tree, whereas a tree planted from a monoembryonic seed will be a hybrid (mix of both parents).

Pollination

In Florida, mangos bloom from December to April depending upon climatic conditions and variety. Pollination is by various insects such as thrips, flies, and, to a small extent, honey bees.

Varieties

Indian Types typically have monoembryonic seeds and often highly colored fruit. The fruit tend to be more susceptible to anthracnose and internal breakdown. Many commercial Florida varieties are of this type.

Indochinese Types typically have polyembryonic seeds, and fruit often lack attractive coloration (i.e., they are green, light green, or yellow). The fruit tend to be relatively resistant to anthracnose. Florida varieties of this group are grown commercially on a small scale and some are appreciated in home plantings.

In many areas of the tropics, there are seedling mangos that do not clearly fit in either of these types. Some of these are 'Turpentine', 'Number 11', 'Madame Francis', and 'Kensington'.

There are many mango varieties available in south Florida and many are appropriate for small and large home landscapes. Some characteristics of the most important Florida varieties are summarized in Table 1.

Climate

Mango trees are adapted to tropical, subtropical, and warm temperate areas that typically do not experience freezing temperatures. Mango trees do not appear to acclimate to cold temperatures, and no significant difference in cold resistance among mango varieties or types has been observed in Florida.

In general, mangos in Florida should be planted in the warmest areas of the state, i.e., along the southeast and southwest coasts. However, mango trees are grown in protected locations as far north as Merritt Island and along the southeast and southwest shoreline of Lake Okeechobee.

Well adapted to the lowlands of the tropics and subtropics, mature trees can withstand air temperatures as low as 25°F (-3.9°C) for a few hours with injury to leaves and small branches. However, young trees may be killed at 29°F to 30°F (-1.7°C to -1.1°C). Flowers and small fruits may be damaged or killed if the temperature falls below 40°F (4.4°C) for a few hours.

Propagation

Mango trees may be propagated by seed and vegetatively. Vegetative propagation is necessary for monoembryonic seed types, whereas varieties with polyembryonic seeds come true from seed.

Seed

Polyembryonic mango varieties generally come true from seed, and this is a common method of propagation in many parts of the tropics. Monoembryonic varieties do not come true from seed and must be propagated vegetatively in order to obtain the same variety.

Vegetative

Veneer- and cleft-grafting and chip-budding are the most common and successful methods in Florida. Young, vigorously growing seedlings are used for rootstocks. Scionwood is selected from young, leafy terminals or mature terminals with swelling buds. Grafting can be done at any time of the year when suitable rootstocks are available but is most successful during warm weather.

Undesirable varieties can be changed by top-working. Scions of the desired variety are veneer-grafted directly on the trunk or limbs of the tree or on to new shoots that develop after the tree is cut back.

Air layering of some varieties ('Tommy Atkins') has been successful by applying a 2% naphthaleneacetic acid (NAA) in a lanolin mixture to the distal bark and girdled wood interface of the girdle. Adventitious roots form in about 10 to 12 weeks. However, this method has not been successful for other varieties and is not practiced on a commercial scale, and tree performance under conditions in the home landscape has not been tested.

Rootstocks

Most mango varieties are grafted onto polyembryonic rootstocks. Common polyembryonic rootstocks include 'Turpentine' and unnamed criollo-types. These rootstocks are tolerant of high pH soils and seedlings are vigorous and relatively uniform.

Production (Crop Yields)

The number of fruits that set and mature is very small in relation to the number of flowers produced by the tree. Most varieties in Florida produce an average of less than one fruit per panicle.

Grafted trees will begin to bear 3 to 5 years after planting. In Florida, average yields of 4 to 6 bushels (220 to 330 lb; 100 to 150 kg) can be expected from mature trees. Greater yields are possible with good management and favorable weather conditions. Fruits of most varieties mature from May to September (Table 1), with greatest production in June and July. The period of development from flowering to fruit maturity is 100 to 150 days.

Anthrachnose, powdery mildew, and low temperatures during bloom generally reduce fruit set and are the most limiting factors to mango production in Florida. Dry weather preceding and during the blooming period is considered optimal for good fruit production.

Mangos are picked by hand or by using a long picking pole that has at its distal end a canvas or nylon bag attached to a metal ring with a cutting blade; ladders are also used to reach fruit high in the tree canopy. However, pruning trees to limit their size enables most fruit to be easily harvested.

Spacing and Pruning

Vigorous mango varieties and mango trees where no pruning is likely to be practiced should be planted 25 to 30 feet or more (7.6 to 9.1 m) away from buildings, power lines, or other trees. This is because if trees are

left unpruned, they will become large to very large. In contrast, less vigorous or nonvigorous (sometimes called dwarf) mango varieties and mango trees where tree training and annual pruning will be practiced to limit tree size may be planted 12 to 15 feet (3.7 to 4.6 m) apart from other trees, buildings, and power lines.

Formative pruning (tree training) of young trees is advantageous because it increases the number of lateral branches and establishes a strong framework for subsequent fruit production. Selective removal of a few upper limbs back to their origin (crotches) each year will help prevent the loss of the lower tree canopy, reduce the work and time to spray and harvest the fruit and greatly reduce possible storm damage. Pruning should be done soon after harvest. Severe pruning (used to reduce canopy height or width of very large trees) does not injure mango trees, but reduces production for one to several seasons.

Once mango trees become 25 ft to 30 ft (7.6 to 9 m) or taller extreme caution should be used in pruning the trees. Climbing trees to prune them is dangerous and not recommended. Pruning of large mango trees should be done by a professional arborist who is licensed and insured.

Soils

Mangos are well adapted to many soil types. In Florida, trees growing in light sand and limestone soils produce satisfactory yields. Although mango trees are moderately tolerant of occasional flooding or excessively wet soil conditions, they will not perform well in poorly drained soils.

In the home landscape, select an area that does not flood. If there is a potential for flooding, plant the tree on a large hill or mound made up of native soil, 2 to 3 ft high (0.6 to 0.9 m) by 4 to 6 ft in diameter (1.2 to 1.8 m).

Planting a Mango Tree

Proper planting is one of the most important steps in successfully establishing and growing a strong, productive tree. The first step is to choose a healthy nursery tree. Commonly, nursery mango trees are grown in 3-gallon (11-liter) containers, and trees stand 2 to 4 ft (0.6–1.2 m) from the soil media. Large trees in smaller containers should be avoided because the root system may be "root bound." This means all the available space in the container has been filled with

roots to the point that the tap root is growing along the edge of the container in a circular fashion. Root bound root systems may not grow properly once planted in the ground.

Inspect the tree for insect pests and diseases and inspect the trunk of the tree for wounds and constrictions. Select a healthy tree and water it regularly in preparation for planting in the ground.

Site Selection

In general, mango trees should be planted in full sun for best growth and fruit production. Select a part of the landscape away from other trees, buildings and structures, and power lines. Remember, mango trees can become very large if not pruned to contain their size. Select the warmest area of the landscape that does not flood (or remain wet) after typical summer rains.

Planting in Sandy Soil

Many areas in Florida have sandy soil. Remove a 3 to 10 ft diameter (0.9 to 3.1 m) ring of grass sod. Dig a hole 3 to 4 times the diameter and 3 times as deep as the container the mango tree came in. Making a large hole loosens the soil next to the new tree, making it easy for the roots to expand into the adjacent soil. It is not necessary to apply fertilizer, topsoil, or compost to the hole. In fact, placing topsoil or compost in the hole first and then planting on top of it is not desirable. If you wish to add topsoil or compost to the native soil, mix it with the excavated soil in no more than a 50:50 ratio.

Backfill the hole with some of the excavated soil. Remove the tree from the container and place it in the hole so that the top of the soil media from the container is level with or slightly above the surrounding soil level. Fill soil in around the tree roots and tamp slightly to remove air pockets. Immediately water the soil around the tree and tree roots. Staking the tree with a wooden or bamboo stake is optional. However, do not use wire or nylon rope to tie the tree to the stake, because they may eventually damage the tree trunk as it grows. Use a cotton or natural fiber string that will degrade slowly.

Planting in Rockland Soil

Many areas in Miami-Dade County have a very shallow soil, and several inches below the soil surface is a hard, calcareous bedrock. Remove a 3 to 10 ft diameter (0.9 to 3.1 m) ring of grass sod. Make a hole 3 to 4 times the diameter and 3 times as deep as the container the mango tree came in. To dig a hole, use a pick and

digging bar to break up the rock, or contract with a company that has augering equipment or a backhoe. Plant as described in the section above.

Planting on a Mound

Many areas in Florida are within 7 ft (2.1 m) or so of the water table and experience occasional flooding after heavy rains. To improve plant survival, consider planting fruit trees on a 2 to 3 ft high (0.6 to 0.9 m) by 4 to 10 ft diameter mound of native soil.

After the mound is made, dig a hole 3 to 4 times the diameter and 3 times as deep as the container the mango tree came in. In areas where the bedrock nearly comes to the surface (rockland soil), follow the recommendations for the previous section. In areas with sandy soil, follow the recommendations from the section on planting in sandy soil.

Care of Mango Trees in the Home Landscape

To promote growth and regular fruiting, mature mango trees should be periodically fertilized and watered only during severe drought conditions. Insects and diseases should be controlled only as needed (Table 2).

Fertilizer

In Florida, young trees should receive fertilizer applications every two to three months during the first year, beginning with ¼ lb (114 g) and gradually increasing to one pound (455 g). Thereafter, 2 to 3 applications per year in amounts proportionate to the increasing size of the tree are sufficient (Table 3).

Fertilizer mixtures containing 2% to 6% nitrogen, 6% to 10% available phosphoric acid, 6% to 12% potash, and 4% to 6% magnesium give satisfactory results with young trees. For bearing trees, nitrogen should be drastically reduced or eliminated, and potash should be increased to 9% to 15%, and available phosphoric acid reduced to 2% to 4%. Examples of commonly available fertilizer mixes include 6-6-6-2 [6 (N)-6 (P₂O₅)-6 (K₂O)-2 (Mg)], 6-3-16 and 0-0-22. Little to no nitrogen is needed for mature healthy trees; in contrast emphasize potash and minor element nutrition.

Mango trees growing in the calcareous soils of south Miami-Dade County should receive annual foliar sprays of copper, zinc, manganese, and boron. Boron should only be applied at very low rates (1/300th of the nitrogen rate) because it is toxic to plants at moderate to high

rates. Mixes containing copper, zinc, manganese, magnesium, and boron are available from many garden centers and through the internet; follow label directions. Iron should be applied in chelated form for high pH soils (FeEDDHA compounds are the best) as a soil drench 2 to 3 times per year.

Mango trees growing in neutral and acidic soils should also receive annual foliar sprays or may be fertilized with soil-applied dry materials of iron, zinc, boron, magnesium and manganese either separately or in mixes. Iron may be applied in non-chelated form (i.e., iron sulfate, ferrous sulfate) as a dry material that is watered in 2 to 3 times per year.

Irrigation (Watering)

Newly planted mango trees should be watered at planting and every other day for the first week or so, and then 1 to 2 times a week for the first couple of months. During prolonged dry periods (e.g., 5 or more days of little to no rainfall) newly planted and young mango trees (first 3 years) should be watered once a week. Once the rainy season arrives, irrigation frequency may be reduced or stopped.

Once mango trees are 4 or more years old, irrigation will be beneficial to plant growth and crop yields only during very prolonged dry periods during spring and summer. Mature mango trees do not need frequent watering, and overwatering may cause poor quality fruit and/or trees to decline or be unthrifty. Little to no irrigation is generally necessary during the fall and winter.

Insect pests

Many insect pests attack mangos, but they seldom limit fruit production significantly. Insect infestations are not predictable and control measures are justified only when large infestations occur. Currently, the most important insect pests in Florida are:

- **bud mites** (*Eriophyes mangiferae*)
- **red-banded thrips** (*Selenothrips rubrocinctus*)
- **false oleander scale** (*Pseudaulacaspis cockerelli*)
- **pyriform scale** (*Protopulvinaria pyriformis*)
- **dictyospermum scale** (*Chrysomphalus dictyospermi*)
- **Florida red scale** (*C. aoaidum*)
- **mites** (e.g., *Paratetranychus yothersii*)
- **Florida thrips** (e.g., *Frankliniella bispinosa*)
- **ambrosia beetles** (*Xylosandrus* spp.).

Homeowners should contact their local UF/IFAS Extension office for recommended control measures.

Diseases

Disease control for mango trees in the home landscape is usually not warranted or should not be intensive. The easiest method for avoiding disease problems is to grow anthracnose-resistant varieties; to plant trees in full sun where the flowers, leaves, and fruit dry off quickly after rainfall; not to apply irrigation water to the foliage, flowers, and fruit; and to monitor the tree for disease problems during the flowering and fruiting season.

The two major disease problems for mango trees in the home landscape are powdery mildew and anthracnose. Both these fungal pathogens attack newly emerging panicles, flowers, and young fruit. One to two early spring applications of sulfur and copper timed to begin when the panicle is 1/4 full size and then 10 to 21 days later will greatly improve the chances for fruit set and production. Usually, protecting the panicles of flowers during development and fruit set results in good fruit production in the home landscape.

Successful chemical control of diseases caused by fungi requires that all susceptible parts of the plant be thoroughly coated with the fungicide before infection occurs. Sprays applied after infection (which occurs several days to months before the disease is evident) have no effect on disease development. Sprays must be reapplied as new tissues become exposed by growth and as spray residues are reduced by weathering. A successful program depends on:

- Use of the right amount of a recommended fungicide and adjuvant, if required.
 - Timely applications before infection is most likely to occur.
 - Thorough coverage of susceptible parts.
- Homeowners should contact their local UF/IFAS Extension office for recommended control recommendations for the diseases discussed below.

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Anthracnose (*Colletotrichum gloeosporioides*): The most important disease of mango in Florida, the anthracnose fungus attacks flowers, young fruits, leaves, and twigs. It also appears as a storage disease of mature fruits.

Symptoms appear as black, slightly sunken lesions of irregular shape, which gradually enlarge and cause blossom blight, leaf spotting, fruit staining, and fruit rot. Disease development is encouraged by rains or heavy dews. Prevention can be accomplished by maintaining a coating of fungicide on susceptible parts starting when bloom buds begin to expand and ending at harvest.

Mango Scab (*Elsinoe mangiferae*): The fungus attacks leaves, flowers, fruits, and twigs. In early stages, mango scab infection resembles anthracnose. Lesions on fruit usually become covered with corky brown tissue and leaf distortion. Mango scab is usually not important because the anthracnose spray program also controls scab.

Powdery Mildew (*Oidium* spp.): The fungus attacks leaves, flowers and young fruits during the dry spring weather. Infected tissues are covered with whitish powdery growth of the fungus. Lesions develop along the midribs or undersides of leaves and become dark brown and greasy-looking as leaves mature. Severe infections destroy flowering panicles and cause failure of fruit set and defoliation of trees. If mildew occurs, applications of sulfur will prevent spread of infection to new growth.

Verticillium Wilt (*Verticillium albo-atrum*): Verticillium wilt may occur in the limestone soils of Miami-Dade County and is usually observed in new trees planted on land previously used for vegetable production (especially tomatoes). This fungus attacks the tree roots and vascular (water-conducting) system, decreasing and blocking water movement into the tree. Symptoms of infection include leaf wilting, desiccation and browning, stem and limb dieback, and browning of the vascular tissues. Occasionally verticillium will kill young trees. Control consists of removing affected tree limbs by pruning.

Alga Spot (*Cephaleuros* spp.): This parasitic alga attacks leaves and stems. Symptoms begin as circular green-gray spots which then turn rust red, indicating sporulation. Stem infection appears similar but can lead to bark cankers and thickening and stem death. This organism is normally not a problem where copper fungicides are periodically applied during the summer months.

Disorders

Mango Decline: Research to date suggests that mango decline is caused by deficiencies of manganese and iron. These deficiencies may predispose trees to infection by fungal pathogens (*Botryosphaeria ribis* and *Phyalospora* spp.), which attack shoots, or by root-feeding nematodes (*Hemicriconemoides mangiferae*). Leaf symptoms include interveinal chlorosis, stunting, terminal and marginal necrosis, and retention of dead leaves that gradually drop. Dieback of young stems and limbs is common and even tree death may occur. Increased applications of iron, manganese, and zinc micronutrients have been observed to reduce or ameliorate this problem.

Internal Breakdown: This is a fruit problem of unknown cause, which is also called jelly seed and soft nose. Generally, it is less of a problem on the calcareous (limestone) soils found in south Miami-Dade County and more common on acid sandy soils with low calcium content. The degree of severity may vary from one season to another. Several symptoms may appear including (1) a softening (break-down) and water soaking of the fruit flesh at the distal end while the flesh around the shoulders remains unripe, (2) an open cavity in the pulp at the stem end, (3) over-ripe flesh next to the seed surrounded by relatively firm flesh, or (4) areas of varying size in the flesh appearing spongy with a grayish-black color. This disorder is aggravated by overfertilization with nitrogen. If fruit have this problem, reduce the rate of nitrogen. In sandy and low-pH soils, increased calcium fertilization may help alleviate this problem. Fruits harvested mature-green are less affected than those allowed to ripen on the tree.

Mango Malformation: This disorder is caused by *Fusarium mangiferae* Britz, a fungus. Symptoms include the drastic shortening of panicles, giving them a clustered appearance and/or a shortening of shoot internodes. Affected panicles do not set fruit and eventually dry up and turn black. This disorder is not common in Florida, but homeowners should watch for it and immediately prune off affected flower panicles and shoots and destroy them.

Mango Trees and Lawn Care

Mango trees in the home landscape are susceptible to trunk injury caused by lawn mowers and weed eaters. Maintain a grass-free area 2 to 5 or more feet (0.6–1.5 m) away from the trunk of the tree. Never hit the tree trunk

with lawn mowing equipment and never use a weed eater near the tree trunk. Mechanical damage to the trunk of the tree will weaken the tree and, if severe enough, can cause dieback or kill the tree.

Roots of mature mango trees spread beyond the drip-line of the tree canopy, and heavy fertilization of the lawn next to mango trees is not recommended because it may reduce fruiting and or fruit quality. The use of lawn sprinkler systems on a timer may result in overwatering and cause mango trees to decline. This is because too much water too often applied causes root rot.

Mulch

Mulching mango trees in the home landscape helps retain soil moisture, reduces weed problems next to the tree trunk, and improves the soil near the surface.

Mulch with a 2-to-6-inch (5 to 15 cm) layer of bark, wood chips, or similar mulch material. Keep mulch 8 to 12 inches (20–30 cm) from the trunk.

Harvest, Ripening, and Storage

Mango fruits will ripen on the tree, but they are usually picked when firm and mature (Table 1). Table 1 may be used as a guide to when picking your fruit may begin. However, slight year-to-year variations occur in when maturity begins. The crop is considered mature when the shoulders and the nose (the end of the fruit away from the stem) of the fruit broaden (fill out). Varieties that have color when ripe may have a slight blush of color development, or they may have begun to change color from green to yellow. Prior to this peel color break, the fruit is considered mature when the flesh near the seed changes color from white to yellow. Generally, mature fruit are available from May to September in Florida.

The fruit from mango trees do not all have to be harvested at the same time. This feature allows you to leave the fruit on the tree and pick fruit only when you want to eat it. Remember, it takes several days or more (depending upon how mature the fruit is) for the fruit to ripen once it is picked. As the season of harvest for any given variety passes, the fruit continue to mature (and later ripen), and there is an increased chance the fruit will begin to fall from the tree.

The best temperatures for ripening mangos are from 70°F to 75°F (21°C to 24°C). Fruits ripened at higher temperatures often shrivel and develop off flavors. Mature fruits ripen 3 to 8 days after harvest. After the fruit has ripened you may store it in the refrigerator. Placing the fruit in the refrigerator before it is ripe may lead to chilling injury. Chilling injury symptoms may not become evident until fruit is exposed to higher temperatures. Symptoms may include brown or gray discoloration of the skin, surface pitting, uneven flesh ripening, and off flavors.

Uses and Nutritional Value

Mango is one of the most highly esteemed fruits of the tropics. The fruit is used in many ways, with fresh consumption being the most important. It can also be frozen, dried, canned, or cooked in jams, jellies, preserves, pies, chutney and ice cream. The fruit is a fair source of phosphorus and potassium, and a good source of vitamins A, C, B-6, and E (Table 4).

Tables

Table 1. Some characteristics of Florida mango varieties recommended for the home landscape.

Variety	Tree vigor rating ¹	Fruit maturity ²	Fruit weight (oz)	Fruit color ³	Fruit prod. ⁴	Anthraco nose rating ⁵	Seed type ⁶
Rosigold	L	Ma Ap	9–11	Y R	F	S	P
Angie	L	Ap M	13–14	Y O Pi	G	MR	M
Florigon	H	M J JI	10–16	Y	G	MR	P
Saigon	M–H	M J JI	6–12	G Y	G	R	P
Zill	H	M J JI	8–12	R Y	G	S	M
Edward	M–H	M J JI	16–20	Y Pi R	P	MR	M
Vallenato	H	J	7–12	Y R	F–G	MR	M
Cogshall	L–M	J JI	10–16	Y R	G	S	M
Glenn	M	J JI	12–18	Y Pi R	G–P	MS	M
Nam Doc Mai*	M–H	J JI	12–20	Y Pi	G	MS	P
Haden	H	J JI	16–24	R Y	F	S	M
Irwin	M	J JI	12–16	R	G	VS	M
Carrie	H	J JI	10–12	G Y	G–P	MR	M
Julie	L	J JI	9–16	G Pi Y	P	S	M
Van Dyke	M	J JI	10–16	R Y	G	MR	M
Tommy Atkins	H	J JI	16–24	R Y	G	MR	M
Lippens	M–H	J JI	14–20	Pi Y	G	S	M
Mallika	M–L	J JI	10–16	Y Pi	F–G	S	M
Phimsen Mun*	L–M	JI	14–15	Y	F–G	MS	P
Graham	M	J A	20–29	Y Pi	F–G	S	M
Dot	M	J A	9–16	Y Pi	G	S	M
Van Dyke	M	J A	9–19	Y R	G	MR	M
Parvin	H	JI A	16–25	RG	G	MR	M
Duncan	M–H	JI A	16–24	Y	G	MR	M
Ruby	M	JI A	6–8	R	G	S	M
Kent	H	JI A	16–30	G R Y	G	VS	M
Palmer	H	JI A	20–30	R Y	G	S	M
Valencia Pride	H	JI A	21–32	Y Pi R	G	S	M
Sensation	H	JI A	10–12	P R	G	S	M
Rapoza	M	JI A	14–28	Y R	G	MR	M
Carabao*	H	J JI	10–15	G Y	G	MS	P
Fairchild	L	J JI	8–10	G Y	G	MR	M
Vallenato	H	J JI	11–12	Y	G	MR	M
Kyo Savoy*	H	J JI	8–12	G Y	G	MR	P
Ice Cream	L	J JI	8–9	G Y	F	S	M
Keitt*	M–H	A S	20–40	G Pi Y	G	MR	M
Neelum	L–M	S O	8–11	Y	F–G	MS	M

¹ Tree vigor rating: L, low; M, moderate and H, high. Trees of L to M vigor are more easily managed as small trees through annual pruning than H vigor trees.

² Fruit maturity: Ma, March; Ap, April; M, May; J, June; Jl, July; A, August; S, September, O, October.

³ Fruit color: G, green; P, purple; Pi, pink; R, red; Y, yellow.

⁴ Fruit production: G, good; F, fair; P, poor.

⁵ Anthracnose susceptibility: MR, moderately resistant; MS, moderately susceptible; S, susceptible; VS, very susceptible.

⁶ Seed type: M, monoembryonic; P, polyembryonic; Earlygold, majority of fruit seedless.

*Also may be eaten at the green-firm stage (similar to texture of apples).

Table 2. Cultural calendar for mango production of mature (bearing) trees in the home landscape.

Operati on	Jan.	Feb.	Marc h	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
General fertilizer			The period from March through August is generally the best time to apply granular mixes containing nitrogen-phosphate-potash-magnesium (N-P-K-Mg).									
Nutrition al sprays			Apply 2 to 4 nutritional sprays to leaves any time from March through September. Nutritional sprays should contain magnesium, manganese, zinc, boron, and molybdenum.									
Iron soil drenche s				The period from April through September is generally the best time to apply 2 to 4 soil drenches of chelated iron material to calcareous soils and 2 to 4 applications of iron sulfite to low-pH sandy soil.								
Waterin g	In general, mature mango trees do not require watering unless exposed to intense, prolonged drought. Overwatering may lead to unthrifty trees. If flowers or fruit are present and watering is necessary, avoid getting flowers and fruit wet. This will help reduce fungal diseases of the flowers and fruit.											
Insect control	Monitor for red mites, scales, flower thrips	Monitor for red mites, scales, flower thrips	Monit or for scale s	Monit or for scale s	Monit or for scale s	Monitor for scales, mealybu gs	Monitor for scales, mealybu gs	Monitor for scales, mealybu gs	Monit or for scale s	Monit or for red mites , scale s	Monitor for red mites, scales, flower thrips	Monitor for red mites, scales, flower thrips
Disease control	If warrant ed apply fungicid e to bloom	If warrant ed apply fungicid e to bloom			Monit or for alga spot	Monitor for alga spot	Monitor for alga spot	Monitor for alga spot	Monit or for alga spot		If warrant ed apply fungicid e to bloom	If warrant ed apply fungicid e to bloom
Pruning	Prune late varieties during March/April after damage of freezing temperatures.					Prune after harvest for early and mid-season varieties.				Prune late varieties during March/April after damage of freezing temperatures.		

Table 3. Fertilizer program for mango trees in the home landscape.

Year	Times per year	Amount/tree/application (lb) ¹	Total amount/tree/year (lb) ¹	Minor element sprays (times/year) ²	Iron chelate drenches (oz/tree/year) ³
1	6	0.25–0.5	1.5–3.0	6	0.5–0.75
2	6	0.5–1.0	3.0–6.0	6	0.75–1.0
3	6	1.0–1.5	6.0–9.0	6	1.0–1.5
4	4	1.5–2.5	9.0–10.0	6	1.5–2.0
5	4	2.5–3.5	10.0–14.0	4	2–4
6	4	3.5–4.0	14.0–16.0	4	2–4
7	4	3.5–4.0	14.0–16.0	4	2–4
8	4	3.5–4.0	14.0–16.0	4	2–4

¹ For young trees, use an NPK Mg mix of 6-6-6-2, 8-3-9-2, or a young-tree or slow-release fertilizer. For mature trees, use an NPKMg mix of 6-6-6-2, 8-3-9-2, or similar material.

² The foliar spray should contain zinc, manganese, boron, molybdenum; it may also contain magnesium and iron.

³ Iron chelate soil drenches (iron plus water) will prevent iron deficiency; foliar sprays of iron materials are generally not effective.

Table 4. Nutrient value of mango fruit (3.5 oz or 100 g of fruit).¹

Constituent	Approximate value	Constituent	Approximate value	Constituent	Approximate value
Water content	82%	Carbohydrate	17.0 g	Phosphorus	11 mg
Calories	65 kcal	Total dietary fiber	1.8 g	Potassium	156 mg
Protein	0.51 g	Calcium	10 mg	Sodium	2 mg
Fat	0.27 g	Iron	0.13 mg	Vitamin C	27.7 mg
Cholesterol	0.066 g	Magnesium	9 mg	Vitamin A	3894 IU
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¹ Data from the USDA National Nutrient Database for Standard Reference, <http://www.nal.usda.gov/fnic/foodcomp/search/> [Accessed Dec., 2005].

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