

# Caimito (Star Apple) Growing in the Florida Home Landscape<sup>1</sup>

Jonathan H. Crane and Carlos F. Balerdi<sup>2</sup>

**Scientific Name:** *Chrysophyllum cainito*

**Common Names:** star apple, golden-leaf tree (English), caimito, estrella, caimo morado, caimito maduraverde, (Spanish), cainito, ajara (Portuguese), caimite, caimitier (French).

**Family:** Sapotaceae

**Relatives of Caimito:** mamey sapote, green sapote, abiu, and canistel.

**Origin:** West Indies and Central America.

**Distribution:** Caimito is found throughout the Caribbean Region, Central America, northern South America, Australia, and some countries of Southeast Asia and Africa.

**History:** Caimito was observed growing by Spanish explorers in Peru during the 1500s. Seeds were introduced into Hawaii in 1901 and into Florida around 1887. During the 20<sup>th</sup> century it was distributed to parts of Asia and Africa.

**Importance:** Caimito is not grown commercially on a large scale but is mostly appreciated as a fruit tree in home landscapes and along roadsides. A small commercial industry exists in south Florida.

## Description

### Tree

Caimito trees are medium to large trees, 25 to 100 ft tall (7.9 to 30.5 m) with a round to oval canopy. Branches have a weeping growth habit.

### Leaves

The leaves are alternate, elliptic, 2 to 6 inches long (5-15 cm), slightly leathery, shiny green on the upper surface and golden-brown on the lower surface.

### Inflorescence (Flowers)

The flowers are generally held in clusters, arising from the leaf axils. Flowers are very small, greenish-yellow to purplish-white, tubular (5-lobed corolla), with 5–6 sepals.

### Fruit

Fruit may be round to oblate to ellipsoid and 2 to 4 inches in diameter (5-10 cm). The peel may be red-purple, dark-purple, or pale-green. It is smooth, glossy, and leathery. In purple fruits, the inner rind is dark purple, and in green fruits, white. The pulp is white, soft, and milky surrounding 6 to 11 seeds. The seeds are contained in rubbery seed cells, and each seed is surrounded by a gelatinous pulp. When the fruit is cut transversely, the seed cells are seen to radiate

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2. J.H. Crane, Professor, Tropical Fruit Crop Specialist, Univ. of Fla., IFAS, Tropical Research and Education Center, Homestead; C.F. Balerdi, Professor, Multicounty Tropical Fruit Crops Extension Agent, Miami-Dade County Cooperative Extension Service, Homestead; University of Florida Cooperative Extension Service, IFAS, Gainesville, FL 32611.

outwardly from a central core, producing a star-shaped pattern.

## Pollination

Some seedlings and cultivars (e.g., ‘Haitian Star’ and ‘Blanco Star’) do not need cross pollination to set fruit. However, some seedlings require cross pollination in order to set fruit.

## Varieties

Two distinct color types exist; purple and greenish yellow peel. A few varieties of caimito are in south Florida including ‘Haitian Star’, a purple peel type, and ‘Blanco Star’, a green peel type.

## Climate

Caimito is best adapted to hot, lowland tropical climates but will grow in warm, protected locations in south Florida. Trees exposed to air temperatures of about 40°F (4°C) accompanied by strong winds may defoliate. Young trees have limited cold tolerance and are damaged or killed at 31 to 32°F (-0.6 to 0°C). On mature trees, leaf and twig damage may occur at 28 to 29°F (-1.6 to -2.2°C), and large branches and trunk damage may occur at 26°F (-3.3°C). Mature trees may be killed when exposed to temperatures in the low 20s°F (-4 to -6°C).

## Propagation

Caimito may be propagated by seed, grafting, budding, and air-layering. Seedling trees bear in 5 to 10 years, whereas vegetatively propagated trees may begin fruit production in 1 to 2 years. Grafting caimito onto satin leaf (*C. oliviforme*) is reported to produce slow-growing, dwarf trees.

## Production (Crop Yields)

Caimito bloom from August to October in Florida, and fruit are generally harvested from February to May. Fruit production figures for caimito do not exist. However, large mature trees have been reported to bear up to 150 lbs (68 kg) of fruit.

## Spacing

Caimito trees should be planted at least 25 ft (7.6 m) from nearby trees and structures because mature trees not regularly pruned may become quite large.

## Soils

Caimito trees are adapted to fertile, well-drained soils, including the low and high-pH sandy soils and the high-pH, rocky, calcareous soils found in south Florida.

## Planting a Caimito Tree in the Home Landscape

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 caimito trees are grown in 3-gallon (11-liter) containers and trees stand 2 to 4 ft (0.6 to 1.2 m) from the surface of 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, caimito 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, caimito trees can become 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 (0.9-3.1 m) diameter ring of grass sod. Dig a hole 3 to 4 times the diameter and 3 times as deep as the container the caimito 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 1:1 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 hard, calcareous bedrock. Remove a 3- to 10-ft-diameter ring of grass sod (0.9- to 3.1-m). Make a hole 3 to 4 times the diameter and 3 times as deep as the container the caimito 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 auguring equipment or a backhoe. Plant the tree as described for sandy soils.

## 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 rainfall events. To improve plant survival, consider planting fruit trees on a 2- to 3-ft-high by 4- to 10-ft-diameter mound of native soil (0.6 to 0.9 m by 1.2-3.1 m). After the mound is made, dig a hole 3 to 4 times the diameter and 3 times as deep as the container the 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 Caimito Trees in the Home Landscape

A calendar outlining the month-to-month cultural practices for caimito is shown in.

### Fertilizer

In Florida, young trees should be fertilized every 1 to 2 months during the first year, beginning with 1/4 lb (114 g) of fertilizer and increasing to 1 lb (455 g) per tree (Table 2). Thereafter, 3 or 4 applications per year in amounts proportionate to the increasing size of the tree are sufficient but, not to exceed 20 lbs per tree per year.

Fertilizer mixtures containing 6 to 10% nitrogen (N), 6 to 10% available phosphate ( $P_2O_5$ ), 6 to 10% potash ( $K_2O$ ), and 4 to 6% magnesium (Mg) give satisfactory results with young trees. For bearing trees, 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 ( $P_2O_5$ )-6 ( $K_2O$ )-2 (Mg)] and 8-3-9-2 [8 (N)-3 ( $P_2O_5$ )-6 ( $K_2O$ )-3 (Mg)].

From spring through summer, trees should receive 3 to 4 annual nutritional sprays of copper, zinc, manganese, and boron for the first 4 to 5 years. Caimito trees are susceptible to iron deficiency under alkaline and high-pH soil conditions. Iron deficiency can be prevented or corrected by periodic soil applications of iron chelates formulated for alkaline and high soil pH conditions. Periodic applications of ferrous (iron) sulfate may be made to trees growing in low-pH soils.

### Irrigation (Watering)

Newly planted caimito 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 caimito trees (first 3 years) should be well watered twice a week. Once the rainy season arrives, irrigation frequency may be reduced or stopped.

Once caimito trees are 4 or more years old, irrigation will be beneficial to plant growth and crop yields during prolonged dry periods. The specific water requirements for mature trees have not been determined. However, as with other tree crops, the period from bloom and through fruit development is important, and drought stress should be avoided at this time with periodic watering.

### Caimito Trees and Lawn Care

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

## Pruning

Young caimito trees should be trained to form 3 to 5 main scaffold limbs during the first 2 to 3 years after planting. Mature trees should be maintained at 8 to 12 ft (2.4-3.7 m) by annual selective removal of poorly placed and upright limbs.

## Mulching

Mulching caimito 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 to 30 cm) from the trunk.

## Insect Pests and Diseases

In general, caimito trees have few insect pest problems. However, trees should be inspected regularly and treated for insect problems when they occur. Please contact your local county cooperative extension agent for current control recommendations.

The foliage, stems, and limbs may be attacked by red algae (*Cephaleuros virescens*), causing stem and limb dieback. Leaves may also be attacked by various fungi (*Phomopsis* sp. and *Phyllosticta* sp.). Fruit may also be attacked, causing it to dry-rot (mummify) and be held on the tree. Please contact your local county cooperative extension agent for current control recommendations.

## Harvest, Ripening, and Storage

Fruit do not fall when ripe and therefore must be harvested by hand when fully mature. Fruit should be clipped from the stem because pulling the fruit off by hand may damage the peel next to the fruit stem (peduncle), which may lead to fruit rot. Fruit are fully mature when the skin color turns a dull color (purple or green) and is slightly wrinkled and soft. Immature fruit will be astringent and inedible due to the gummy latex found in the flesh. The peel and rind of ripe caimito are inedible. Cutting the fruit transversely and then gently separating the two halves is an easy way to open the fruit. The pulp then may be spooned out, leaving the inedible rubbery seed-cells, seeds, and core.

Once mature fruit are picked, they may be allowed to fully ripen at room temperature. Once ripe, fruit may be stored in a plastic bag in the refrigerator until consumed.

## Uses and Nutritional Value

Generally the fruit is eaten fresh, although it may be an ingredient in fruit salads and sorbets. Caimito is nutritious, containing moderate amounts of calcium, phosphorus, ascorbic acid (vitamin C), and a good source of anti-oxidants (Table 3).

Table 1. Cultural calendar for mature caimito trees in Florida.

Operation	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
General <sup>1</sup>	Apply NPK		Apply NPK		Apply NPK		Apply NPK				Apply NPK	
Nutritional sprays <sup>2</sup>				Foliar applications during the warm season are more effective than during cool periods.								
Iron applications			Dry soil applications of ferrous (iron) sulfate to neutral and low-pH soils and liquid soil drench applications to high-pH soils are more effective during the warm season.									
Watering	Water trees during prolonged dry periods.								Reduce watering to slow or stop plant growth and enhance flowering.			
Insect control	Monitor for leaf and fruit diseases. Contact your local county extension agent for current control recommendations for more information.											
Disease control	Monitor for leaf and fruit diseases. Contact your local county extension agent for current control recommendations for more information.											
Pruning				Selectively prune trees after the harvest season.					Follow-up pruning			
<sup>1</sup> NPK, nitrogen-phosphorus-potassium; apply granular fertilizer 3-4 times per year. Reduce the amount of NPK application during late summer, early fall to slow plant growth in preparation for flowering in the late fall. <sup>2</sup> Foliar nutritional spray materials should contain magnesium, manganese, zinc and possibly other micronutrients.												

Table 2. Fertilizer program for caimito trees in the home landscape.

Year	Times per year	Amount/tree/ application (lbs) <sup>1</sup>	Total amount/ tree/ year (lbs)	Nutritional sprays (times/ year)	Iron chelate drenches (oz/tree/ year) <sup>3</sup>
1	4-6	0.25-0.5	1.5-3.0	4-6	0.25-0.50
2	4-6	0.5-0.75	2.0-3.0	4-6	0.5-0.75
3	4-6	0.75-1.0	3.0-6.0	4-6	0.5-0.75
4	3-4	1.5-1.75	4.5-7.0	2-3	0.75-1.0
5	3-4	1.75-2.0	5.25-8.0	2-3	0.75-1.0
6	3-4	2.0-3.0	6.0-12.0	2-3	1.0-1.5
7	3-4	3.0-3.5	9.0-14.0	2-3	1.0-1.5
8+	2-3	4.5-5.0	9.0-15.0	2-3	1.5-2.0
<sup>1</sup> Use 6-6-6-2, 8-3-9-3, or a similar material. <sup>2</sup> The nutritional spray should contain zinc, manganese, boron, molybdenum; they may also contain iron. Foliar sprays are more effective from April to September. <sup>3</sup> Iron chelated soil drenches (iron plus water) will prevent iron deficiency in high-pH, calcareous soils; foliar iron sprays are generally not effective. Apply soil drenches from April through September.					

Table 3.

<b>Constituent</b>	<b>Value</b>	<b>Constituent</b>	<b>Value</b>
Water	78-86%	Calcium	7-17 mg
Calories	67 kcal	Phosphorus	16-22 mg
Protein	0.7-2.3 g	Iron	0.3-0.7 mg
Carbohydrates	14.7 g	Ascorbic acid	3-15 mg

<sup>2</sup>Morton, J.F. 1987. The star apple. In: Fruits of warm climates. J.F. Morton Publ., Miami, Fla. P. 408-410.