UF IFAS Extension UNIVERSITY of FLORIDA

HS1054

White Sapote Growing in the Home Landscape[1]

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Scientific Name: *Casimiroa edulis* and *C. tetrameria* and hybrids

Common Names: white sapote and casimiroa (English), zapote blanco (Spanish), sapote blanc (French)

Family: Rutaceae

Relatives: Wooly leaf white sapote (*C. tetrameria*)

Origin: Highlands of central Mexico and Central America.

Distribution: Throughout tropical highland and subtropical areas of Latin America, the Caribbean, the Mediterranean region, India, Southeast Asia, New Zealand, South Africa, Australia, and New Zealand.

History: White sapote was introduced into the US circa 1810.

Importance: White sapote is generally harvested from seedling trees and sold in local markets. However, white sapote is grown on a small commercial scale in the US, Australia, and Mexico.

Figure 1. 'Densler' white sapote.
Credits: J. H. Crane, UF/IFAS

Description

Tree

Medium to large trees; 15 ft to 60 ft (4.6–18.3 m). Trees may have an upright to spreading growth habit.

Leaves

Leaves are palmately compound with 3 to 7 leaflets (usually 5). Leaflets are lanceolate, 3 to 5 inches long (7.6–12.7 cm) and 1 to 2 inches wide (2.54–5.0 cm).

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Inflorescence (Flowers)

Flowers are held in terminal or axillary panicles with 15 to 100 flowers or more. Flowers are small (3/8 inch [1 cm] in diameter]), pale green to cream colored, 5 sepals, petals, and stamens. Some varieties produce only functionally female flowers, whereas others produce hermaphroditic flowers.

Fruit

White sapote is a drupe with a thin, greenish-yellow to yellow to golden yellow peel, 2 ½ inches to 4 ½ inches (6-11 cm) or more in diameter, and weigh between 2.5–24.7 oz (70–700 g). The pulp is sweet, white to off-white and smooth. Some varieties or seedling fruit may have a slightly bitter aftertaste, especially the pulp near the peel. The number of seeds varies from 1 to 5, and they are poisonous.

Pollination

White sapote flowers are pollinated by insects. Some varieties may only produce functionally female flowers and thus require cross pollination for good fruit production.

Varieties

There are a numerous white sapote varieties, and a number of varieties are available in the U.S. and Florida (Table 1). Commonly available varieties include 'Reinikie', 'Dade', 'Pike', 'Suebelle', 'Smathers', 'Homestead', and 'Golden'.

Climate

White sapote trees are best adapted to subtropical climates with a distinct cool and or dry period. Trees do produce well in the dry tropics or those areas with a distinct dry period. A period of environmentally induced (i.e., cool temperatures and/or dry period) dormancy leads to flowering once warm temperatures and/or the rainy season commences.

White sapote trees are moderately tolerant of freezing temperatures with young trees damaged or killed at temperatures at or below 24°F (-4°C) and mature trees damaged or killed at temperatures at or below 26°F (-3°C).

Propagation

White sapote trees may be propagated by seed or vegetatively. Seeds should be planted within 3 weeks of harvesting from the fruit, and seedlings may begin to bear in 7 to 8 years. White sapote varieties do not come true to seed and therefore must be vegetatively propagated by grafting or budding onto seedling rootstock. Grafting and budding is most sucessful during the warm season when trees are actively growing.

Production (Crop Yields)

Although not extensively documented, white sapote trees are reported to be very productive. Trees generally flower from late fall to early summer. The harvest season varies with variety but generally is during the spring and summer.

Spacing

Although white sapote grows moderately slowly, trees that are not pruned eventually need a lot of space because they will develop a large canopy. White sapote trees in the home landscape should be planted 25 ft (7.6 m) or more feet away from the nearest tree and/or structure. Trees planted too close to other trees or structures may not grow normally or produce much fruit due to shading.

Soils

White sapote trees are well-adapted to most well-drained soils from sands, to clays, to limestone-based soils.

Planting a White Sapote 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 white sapote 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, white sapote 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, sapote 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 white sapote 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 removed. 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 white sapote 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 the tree as described for sandy soils.

Planting on a Mound

Many areas in Florida are within 7 ft 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 by 4- to 10-ft-diameter (0.6- to 0.9-m by 1.2- to 3.1-m) 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 tree has come 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 White Sapote Trees in the Home Landscape

A calendar outlining the month-to-month cultural practices for white sapote is shown in Table 2.

Fertilizer

White sapote does not appear to be demanding in its fertilizer requirements. After planting, when new growth begins, apply 1/4 lb (113 g) of a young tree fertilizer such as a 6-6-6-2 (%nitrogen-% phosphate-% potash-% magnesium) with minor elements with 20 to 30% of the nitrogen from organic sources. Repeat this every 6 to 8 weeks for the first year, then gradually increase the amount of fertilizer to 0.5, 0.75, 1.0 lb (227 g, 341 g, 454 g) as the tree grows. Use 4 to 6 minor element (nutritional) foliar sprays per year from April to September.

White sapote trees generally do not develop iron deficiency, even when grown in the rocky, calcareous, high-pH soils of Miami-Dade County. If iron deficiency symptoms appear (chlorotic leaves with green veins) apply iron. For trees in acid to neutral soils, apply dry iron sulfate at 0.25 to 1 oz per tree (7–28 g) to the soil 2 to 4 timers per year; water the iron into the ground. In alkaline soils with a high-pH, drench the soil adjacent to the tree trunk with iron chelate 1 to 2 times per year from June through September. Table 2 summarizes the fertilizer recommendations for white sapote.

For mature trees, 2.5 to 5.0 lbs (1.1–2.3 kg) of fertilizer per application 2 to 3 times per year is recommended. The fertilizer mix should also include phosphate (P_2O_5) and potash (K_2O); use a 6-6-6, 8-3-9 or similar material. Use 2 to 3 minor element (nutritional) foliar sprays per year from April to September. Table 2 summarizes the fertilizer recommendations for white sapote.

Irrigation (Watering)

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

Once white sapote trees are 4 or more years old, watering will be beneficial to plant growth and crop yields only during very prolonged dry periods during the year. Mature

white sapote trees do not need frequent watering, and over watering may cause trees to decline or be unthrifty.

White Sapote Trees and Lawn Care

White sapote 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 white sapote trees spread beyond the drip-line of the tree canopy, and heavy fertilization of the lawn next to white sapote 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 over watering and cause white sapote trees to decline. This is because too much water too often applied causes root rot.

Mulch

Mulching white sapote 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.

Insect Pests

There are few insect problems, although some varieties may be susceptible to fruit fly attack. Scales occasionally attack leaves. Contact your local UF/IFAS Extension agent for current control recommendations.

Diseases

Some varieties are susceptible to scab, which causes irregularly-shape brown corky areas on the peel surface that usually split. Contact your local UF/IFAS Extension agent for current control recommendations.

Pruning

Formative pruning during the first 2 years may be desirable to encourage lateral branching and growth. After several years of production, it is desirable to cut back the tops of the trees to 10 to 15 feet (3.1 to 4.6 m). Selectively removing a few upper limbs back to their origins (crotches) each year will help prevent the loss of the lower tree canopy due to shading by the upper canopy. In addition, maintaining a smaller tree facilitates tree care and fruit harvest, makes it easier to spray the tree, and greatly reduces possible storm damage. Do not remove lower tree branches.

Pruning should be done soon after harvest. Annual or biannual selective pruning can control the spread and limit tree height to 10- to 15-ft. Once white sapote trees become 30 ft (9.1 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 white sapote trees should be done by a professional arborist that is licensed and insured.

Harvest, Ripening, and Storage

Mature fruits may be picked several days before natural fruit drop occurs and should be clipped, leaving a small piece of stem attached. When the fruit becomes ripe, the stem falls off. Fruit should be handled very carefully because the peel is very thin and susceptible to damage, and the pulp below bruises generally becomes bitter. Harvested fruit should be ripened at room temperature (26-28°C). Once ripe it may be stored for 7 to 10 days in the refrigerator.

Uses

White sapote is commonly eaten fresh but may be an ingredient in milk shakes and desserts.

Table 1. White sapote varieties in Florida.[1]

Variety	Origin	Fruit weight (oz/grams)	Peel color	Pulp color	Comments
Blumenthal	California	5–6/148–160	pale yellow	creamy white	fair-good
Dade	Florida	6–7/180–215	golden-yellow tinged with green	creamy white	Good flavor, non-bitter flavor
Denzler	California	11–13/375–390	yellow	yellow	good flavor
Golden (Max Golden)	California	4–5/118–148	yellow-green	creamy white	strong flavor, some bitterness
Homestead	Florida	6–7/200g	yellow-green	creamy white	Good flavor, non-bitter flavor
McDill	Calfornia	12–16/355–454	greenish-yellow	creamy white	good flavor
Pike	California	8–9/250–270	light green	white to yellow	rich, non-bitter flavor
Reinekie (Reineke Commerical)	California	7–8/200–235	golden yellow	yellow	good flavor
Smathers	Florida	8–9/250–275	greenish-yellow	yellow	fair flavor
Suebelle	California	small	green to yellowish-green	white	excellent flavor, sweet
Yellow	California	9–10/275–290	bright yellow	pale yellow	good flavor

[1] Some varieties may be difficult to find in the nursery trade in Florida; try California nurseries.

Table 2. Cultural calendar for mature white sapote trees in the home landscape.

Operation	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
General NPK[1]				Apply NPK		Apply NPK			Apply NPK			
Nutritional sprays[2]				Apply 2 to 3 foliar nutritional sprays during the warm period of the year.								
Iron applications[3]				Apply iron during the warm period of the year.								
Watering	Water only during prolonged dry periods.									Water only during prolonged dry periods.		
Insect control	Monitor for insect infestations. Contact your local UF/IFAS Extension agent for current control recommendations.											
Disease control	Monitor for disease infestations. Contact your local UF/IFAS Extension agent for current control recommendations.											
Pruning			Selectively prune to limit tree size and open the canopy to wind movement.									

[1] NPK, nitrogen-phosphate-potash. Many formulations also contain magnesium (Mg).
[2] Nutritional sprays should contain manganese, zinc, and other micronutrients.
[3] Dry ferrous (iron) sulfate may be applied to trees growing in low-pH soils; use chelated iron soil drenches for trees growing in high-pH soils.

Table 3. Suggested fertilizer recommendations for white sapote in Florida.

Year	Times per year	Amount/tree/ application (lbs)[1]	Total amount/tree/ year (lbs)	Minor element sprays (times/ year)[2]	Iron chelate drenches (oz/ tree/year)[3]
1	4–6	0.25–0.5	1.0–3.0	4-6	0.5–0.75
2	4–6	0.5–1.0	2.0–6.0	4-6	0.75–1.0
3	4–6	1.0–1.5	4.0–9.0	4-6	1.0–1.5
4	2–3	2.0–2.5	4.0–7.5	2-3	1.5–2
5	2–3	2.5–3.0	5.0–9.0	2-3	2-4
6	2–3	3.0–4.0	6.0–12.0	2-3	2–4
7+	2–3	4.0–4.5	8.0–13.5	2-3	2–4

[1] Use 6-6-6, 8-3-9, or a young-tree or slow-release fertilizer.
[2] The spray should contain zinc, manganese, boron, molybdenum; it may also contain iron. Foliar sprays are most effecient from April to September.
[3] Iron chelate soil drenches (iron plus water) will prevent iron deficiency; foliar sprays are generally not effective. Apply soil drenches from June to September.

Table 4. Nutrient value of white sapote fruit (3.5 oz or 100 g of fruit).[z]

Constituent	Amount
Moisture	78.3 g
Protein	0.143 g
Fat	0.03 g
Fiber	0.9g
Ash	0.48g
Calcium	9.9 mg
Phosphorus	20.4 mg
Iron	0.33 mg
Carotene	0.053 mg
Thiamine	0.042 mg
Riboflavin	0.043 mg
Niacin	0.472 mg
Ascorbic acid	30.3 mg

[z] Morton, J. 1987. *Fruits of Warm Climates*. J. Morton Publ. p. 191–196.