

Coffee Growing in the Florida Home Landscape¹

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Scientific Name: *Coffea arabica* var. *arabica*, *C. arabica* var. *bourbon*, and *C. canephora* and hybrids.

Common Names: Coffee derived from *C. arabica* types are commonly called arabica coffee, while *C. canephora* types are commonly called robusta coffee.

Family: Rubiaceae

Relatives: *Ixora*, gardenia, portlandia, pentas

Origin: Highlands of southeast Ethiopia (*C. arabica*) and rainforest areas of the Congo River basin, at higher altitudes (5,000 ft) in Uganda around Lake Victoria, and in the coastal rainforest from the Congo area to Côte d'Ivoire (*C. canephora*).

Distribution: Grown in the upper altitudes throughout the tropics and subtropical areas of the world.

History: Coffee was first discovered and used by the Arabs and distributed throughout the Middle East prior to the 10th century. From Arabia, coffee was taken to Java and sometime during the 16th century was taken to Amsterdam and then distributed to the Caribbean and South and Central America.

Later during the 19th century, coffee was introduced into India and Ceylon.

Importance: Grown commercially in at least 80 countries, coffee is one of the major horticultural crops grown and traded throughout the world.

Description

Tree

A small to medium sized tree up to 50 ft (15 m), but usually restricted to 4 to 6 ft (1.2-1.8 m) with pruning.

Leaves

Coffee leaves are dark green and shiny, with well-marked veins. There are two opposite leaves at each node on a stem.

Stems

Small, horizontal stems 1 to 4 feet (0.3-1.2 m) long bear the leaves, flowers, and fruit.

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Inflorescence (Flowers)

Flowers are small, fragrant, and held in clusters in leaf axils. Flowers have 5 white petals and a single ovary. Flowers open during the morning and wither in about 2 days.

Roots

Seedling trees form a short tap root, and in deep soils lateral roots may grow as deep as 9 ft (2.7 m). Shallow, fibrous roots radiate outward for 3 to 4 ft (0.9-1.2 m).

Fruit and Seeds

The fruit is a drupe and called a cherry. Fruit have 2 seeds. Seeds are 5/16 to 1/2 inches (8-13 mm) long with grooved, flat surfaces facing each other; the other surface is convex. Fruit usually have a red peel, although yellow types exist.

Pollination

Arabic coffee flowers are self-fertile and do not need cross pollination to set fruit. In contrast, robusta coffee flowers are self-infertile and need cross pollination.

Varieties

There are numerous varieties of coffee, some derived solely from arabica and others from robusta genes; others are hybrids. Varietal names include 'Blue Mountain', 'Laurina', 'Maragogipe', 'Sao Bernardo', 'San Ramon', 'Caturra', and 'Cera'. These and other varieties may be difficult to find in the nursery, trade and coffee plants offered for sale may just be sold under the general terms of arabica or robusta.

Climate

Coffee is usually grown under shaded conditions but may be grown in full sun. Optimum growing conditions include temperatures from 59 to 75°F (15-24°C), high humidity, and protection from windy conditions. Temperatures above 77°F (25°C) slow growth, and leaves are damaged at temperatures above 86°F (30°C). Constant, large fluctuations in daily temperatures, and constant

temperatures at or below 41°F (5°C) may cause leaf drop and tree decline. Coffee plants may be damaged or killed by freezing temperatures.

In the tropics or warm subtropics, coffee is grown at high altitudes (up to about 3,500 ft; 1,100 m) where temperatures are moderate and never freezing.

Propagation

Arabica coffee flowers are self-fertile, and varieties come true to type from seed, but robusta coffee and hybrids must be vegetatively propagated. Coffee may also be propagated by stem cuttings from stems 3/16 to 5/16 inches (5 to 8 mm) in diameter, removing 1 of the 2 leaves and cutting in half the remaining leaf, and then dipping the basal end in a rooting hormone for 15 second. Then put the cutting immediately into a small container with clean moist soil media. The containerized cutting should be covered with a polyethylene tent and placed in moderate shade. As the cutting roots and begins to grow, the tent should be opened in stages and then removed. As the plant increases in size, it should be repotted into larger containers.

Coffee may be cleft grafted, but some incompatibility with various rootstocks makes this method more difficult.

Production (Crop Yields)

Small coffee plants (at or less than 6 ft [1.8 m] tall) may produce 2 to 10 lbs (454-908 g) of dried beans per year.

Spacing and Pruning

Coffee plants that will be pruned periodically to limit their height may be planted 5 to 15 ft (1.5-4.6 m) from much larger trees or buildings. Pruning is necessary for optimum fruit production and maintaining a small tree.

Formation Pruning. In order to stimulate branching, the main stem should be pruned back one or more times to induce the small lateral stems that bear the coffee. After small lateral stems become 2 years old, they will flower and produce fruit, while the part which has already flowered will drop its

leaves and not flower. Thus, the part of the branch that bears fruit, moves further and further from the main stem. After 3 to 5 years, these small branches may die and drop off. As the primary stem continues to grow and reaches about 6 ft, the new small lateral stems formed flower and fruit, thus the fruit production moves upward.

Rejuvenation and Maintenance Pruning.

Once the lower fruiting stems have died, the main stem off the plant should be cut back to 15 to 20 inches (38-51 cm) off the ground, and only one vigorous stem should be allowed to grow. As before, cut back to induce new small lateral stems. In addition to the formation and rejuvenation pruning, some of the small lateral stems should be removed to open the canopy up to air movement and light, and to improve the flowering and fruiting of the remaining stems.

Soils

Coffee grows best in well drained, slightly acid to neutral-pH soils with a high organic matter content. However, coffee will withstand well drained, high pH soils.

Planting a Coffee Plant

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 coffee plants are grown in 1- to 3-gallon (3.8- to 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

The natural habitat of coffee is as an understory plant, i.e., a small tree or bush grown under the canopy of much larger trees; however, coffee may be grown in light shade or full sun. Coffee plants grown in full sun have the potential to produce more coffee than those grown in shade but require more fertilizer and watering than those grown in light shade.

Because coffee plants tolerate shade, they are useful for those areas of the landscape with light to moderate shade. Select a part of the landscape near (8 ft or more [2.4 m or more]) an overarching tree, near buildings or structures but away from power lines. Remember, coffee plants can become moderately large if not pruned to contain their size (see the section on Tree under Description). Select the warmest area of the landscape (i.e., south, southwest facing) that does not flood (or remain wet) after typical summer rainfall.

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 coffee plant 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 plant 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 plant 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) diameter ring of grass sod. Make a hole 3 to 4 times the diameter and 3 times as deep as the container the coffee plant 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 (2.1 m) or so of the water table and experience occasional flooding after heavy rainfall events. To improve plant survival, consider planting coffee 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 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 Coffee Plants in the Home Landscape

A calendar outlining the suggested month-to-month cultural practices for coffee is shown in Table 1.

Fertilizer

Coffee should be fertilized with a complete dry fertilizer mix including nitrogen, phosphate, potash, and magnesium. Young plants should be fertilized with 1/8 to 1/4 lb (59-118 g) every other month, increasing the amount to 1 to 2 lbs (474-948 g) as the trees grow and begin to bear.

Fertilizer mixtures containing 6 to 10% nitrogen (N), 6 to 10% available phosphoric acid (P_2O_5), 6 to 10% potash (K_2O), and 2 to 6% magnesium (Mg) give satisfactory results. Foliar nutritional applications should be applied 3 to 4 times during the

warmer parts of the year. Dry ferrous (iron) sulfate may be applied to the soil of plants growing in acid-to neutral-pH soils, and chelated soil drenches (iron plus water) may be applied to plants growing in high-pH soils. Three to 4 iron applications should be made during the warmer parts of the year.

Irrigation (Watering)

Newly planted and young plants should be watered regularly to stimulate strong, healthy growth. Once the plant is large enough to flower, watering should be controlled. Vegetative growth and flowering are controlled by soil moisture. Watering should be reduced or eliminated during the late winter (January-February) and re-initiated during the spring (March-April) to induce flowering and fruit production.

Coffee Plants and Lawn Care

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

Mulch

Mulching coffee plants 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

Various insects, including stem borers, leaf miners, mealybugs, scales, and mites, have been reported to attack coffee leaves, stems, flowers, and fruit. Contact your local county extension agent for current control recommendations.

Diseases

A number of fungi attack coffee leaves, stems, roots, and fruit. At present, coffee diseases do not appear to be a major problem. This may be due to the fact that so little coffee is grown and that plants are usually grown as a part of a diverse number of plant species in the home landscape, and not as a monoculture. Contact your local county extension agent for assistance with any disease symptoms on your coffee plants and for current control recommendations.

Harvest, Ripening, and Storage

Coffee is generally harvested when the berry turns from green to red. The berries should be picked, then washed in clean water (good berries sink), and then the outer pulp, should be removed. The cleaned beans should then be placed a container filled with water and allowed to ferment for 24 hours and then washed clean and dried. Drying can be done by spreading the beans out on paper and placing them in the sun. Once dry, the outer bean layer, called a hull, may be removed by rubbing.

Finally, the dried, cleaned beans may be lightly roasted (turning them often). Properly roasting the beans is considered an art. Roasting develops the ultimate flavor, aroma, and quality of the coffee produced. After cooling, dried beans may be stored for weeks in a cool, dry storage area or the refrigerator.

Uses and Nutritional Value

Coffee is typically consumed as a hot drink but may also be used as an ingredient in various drinks and desserts. Coffee is low in calories but high in caffeine (Table 2).

Table 1. Cultural calendar for coffee production of bearing plants in the home landscape.

Operation	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
General NPK¹			Apply NPK		Apply NPK		Apply NPK		Apply NPK			
Nutritional sprays²				Nutritional sprays are most effective during the warmer part of the year.								
Iron applications			Apply iron 3 to 4 times during the warmer part of the year.									
Watering	Reduce watering until flowering starts, then water regularly.			Water during dry periods.						Reduce or stop watering during the cool, dry winter.		
Insect and disease control	Monitor for insects and diseases. Contact your local county extension agent for current control recommendations.											
Pruning			If plant rejuvenation is necessary do this during the warm part of the year so that plants regrow rapidly.				Selectively prune plants to open the canopy to light and air movement.					
¹ NPK, nitrogen-phosphate-potash. Many dry fertilizer mixtures also contain magnesium. ² Nutritional sprays should include manganese, zinc, and other micronutrients. Follow label directions for dilution rates.												

Table 2. Nutritional content of coffee (1 cup; 8 oz; 235 ml).^z

Constituent	Value	Constituent	Value
Calories	2 kcal	Calcium	5 mg
Protein	0.28 g	Magnesium	7 mg
Fat	0.05 g	Phosphorus	7 mg
Caffeine	95 mg	Potassium	116 mg
Carbohydrate	0.0	Sodium	5 mg
^z Data taken from the USDA National Nutrient Database for Standard Reference, Release 18 (2005). (website: http://www.nal.usda.gov/fnic/foodcomp/search/) (Accessed, 19 November 2005).			