

Tea Growing in the Florida Home Landscape¹

Jonathan H. Crane and Carlos F. Balerdi²

Scientific Name: *Camellia sinensis* var. *sinensis* and *C. sinensis* var. *assamica*

Common Names: tea

Family: Camelliaceae

Origin: Slopes of the Himalayas and adjoining plains in southern China.

Distribution: Throughout tropical areas of the world.

History: *Camellia sinensis* var. *sinensis* has been cultivated since ancient times in China and Japan and was first exported to Russia. Europeans first encountered tea when explorers first reached China, and eventually tea became popular in Europe. The *C. sinensis* var. *assamica* tea was being used by indigenous people in India, and during the 1800s was grown along with imported *C. sinensis* var. *sinensis*. The hybrids from these are commonly used in tea-growing areas outside China and Japan. Today, tea production and drinking has spread throughout the world. *Camellia sinensis* var. *sinensis* is commonly called China type tea and *C. sinensis* var. *assamica* is commonly called Assam type tea.

Importance: Tea is grown in 45 countries on more than 2.5 million acres worldwide and is worth in excess of \$5 billion to the world's economy annually.

Description

Plant

Tea is an evergreen shrub or small tree. The China type tea is dwarf, with small, dark green, narrow, serrated leaves. The Assam type tea is a larger plant, with green, less serrated leaves.

Leaves

China type – small, dark green, serrated leaves. Assam type – larger, green, less serrated leaves. The terminal 2 to 3 leaves plus terminal bud are used to make tea.

Inflorescence (Flowers)

Flowers arise from leaf axils and may be held singly or in clusters. Flower are up to 1 1/2 inches (3.8 cm) in diameter and have white or pink-tinged petals.

1. This document is HS1058, one of a series of the Horticultural Sciences Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date November 2005. Revised November 2005. Reviewed November 2009. Visit the EDIS Web Site at <http://edis.ifas.ufl.edu>.

2. J. H. Crane, Professor and Tropical Fruit Crops Extension Specialist, Tropical Research and Education Center, Homestead, FL; C.F. Balerdi, Professor and Multi-County Fruit Crops Extension Agent IV, Miami-Dade County, Homestead, FL; Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

Fruit

A 3-lobed fruit with brownish-green walls. Fruits take up to 12 months to develop and contain 1 to 2, light brown, spherical seeds.

Pollination

Flowers are insect pollinated, and cross pollination among 2 different tea varieties results in more vigorous plants than self-pollinated seed.

Roots

Seedlings form a tap root, whereas plants propagated by cuttings may have up to 5 main roots. Lateral roots form a fibrous mat, they are the primary roots involved in water and nutrient uptake.

Varieties

Numerous varieties of tea exist but are not readily available in the west. There are 2 main types of tea plants, China types and Assam types. China tea types are grown in China, Japan, and neighboring countries to produce green (non-fermented) tea. Some hybrids of Assam type tea are also used as a green tea. Assam types are grown in most other tea-growing regions of the world.

Climate

Tea plants are adapted to high altitudes in tropical areas and lowland areas of the subtropics.

Temperature. The optimum temperature for tea growth ranges from 65 to 86°F while growth stops below 55°F (13°C) and above 95°F (35°C). The time for growth of an individual shoot (flush) from initiation to harvest of the leaves decreases as temperature generally increases up to the optimum. Optimum soil temperatures for root growth are 65 to 72°F (18-22°C). Tea plants generally survive freezing to slightly below freezing temperatures, however the leaves may be damaged or killed.

Light Levels. Tea may be grown in full sun or light shade. Generally the Assam tea types benefit from shade more than China tea types. Full-sun tea production may decrease in low altitude areas with high levels of radiation (sun light). This may be

ameliorated to some extent by planting under the canopy of a large tree and/or near structures which provide some light shade.

Flooding. Tea plants are not tolerant of excessively wet or flooded soils conditions.

Wind. Tea plants and leaves are sensitive to wind, which slows leaf growth and may cause marginal browning and/or leaf distortion.

Propagation

Tea may be propagated by seed; however, seed lose viability shortly after collection. Fresh seed should be pre-germinated. Place seed between two sheets of black plastic and keep moist by frequent watering. As soon as the seed cracks, plant in a container filled with clean, well-drained soil media and place in moderate shade. As the plants grow, they should be exposed to greater levels of light until they can withstand full sun. As the plant increases in size, the plant should be re-potted into increasingly larger containers.

Tea may also be propagated by cuttings with 1 to 3 leaves. The cuttings may be dipped in rooting hormone and placed into a container filled with moist, clean, well-drained media. A clear plastic bag should then be placed over the cutting and secured to the plastic container and the container placed under moderate shade. The plastic is opened gradually as new growth develops. As the plants grow, they should be exposed to greater levels of light until they can withstand full sun.

Tea may also be propagated by budding and grafting but this practice is not commonly used.

Production (Crop Yields)

A small amount (about 1/2 lb; 227 g) of tea may be produced from a single tea bush.

Spacing and Pruning

Tea plants should be planted 10 to 15 ft (3.0-4.6 m) away from trees and other plants and structures. Commonly, the shoots of tea are headed back repeatedly to form a flat-topped bush of no more than 3 to 5 ft (0.9-1.5 m). In addition, the bush is

periodically cut back to induce new growth. The terminal 2 to 3 leaves are harvested to make tea.

Once the tea bush has reached 5 to 6 feet (1.5-1.8 m) it should be cut back to 2 to 4 feet (0.6-1.2 m), to rejuvenate the bush and to maintain it at a manageable level.

Soils

Tea is adapted to well-drained soils of acid to neutral pH. Tea plants are reported not to be well adapted to high-pH soils. Amending these soils with compost and top soil may improve the high- pH soil conditions.

Planting a Tea Tree

Proper planting is one of the most important steps in successfully establishing and growing a strong, productive tea plant. The first step is to choose a healthy nursery plant. Nursery tea plants may be grown in 1- to 3- gallon (4-to -11-1 liter) containers and may stand 2 to 3 ft (0.6-0.9 m) from the soil media. Large plants 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 plant for insect pests and diseases, and inspect the trunk of the plant for wounds and constrictions. Select a healthy plant and water it regularly in preparation for planting in the ground.

Site Selection

Tea plants may be planted in full sun or light shade for best growth and fruit production. Select a part of the landscape slightly away from other trees, buildings and structures, and power lines. Remember, tea plants can become small trees or large bushes 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 tea plant came in. Making a large hole loosens the soil next to the new plant, 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 plant roots and tamp slightly to remove air pockets. Immediately water the soil around the plant and plant 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) ring of grass sod. Make a hole 3 to 4 times the diameter and 3 times as deep as the container the 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 tea plant 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 rains. To improve plant survival, consider planting the tea plant on a 3- to 4- ft -high by 4- to 10-ft-diameter (0.9- to 1.2- m by 1.2- to 3.2-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 plant 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 Tea Plant in the Home Landscape

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

Fertilizer

Tea plants benefit from frequent applications of small amounts of fertilizer. Tea should be fertilized with a complete dry fertilizer mix including nitrogen, phosphate, potash, and magnesium. Young plants should be fertilized with 1/8th to 1/4 lb (60-118 g) every other month increasing the amount to 1 to 2 lbs (454-908 g) as the bushes grow. Fertilizer mixtures containing 6 to 10% nitrogen (N), 6 to 10% available phosphoric acid (P₂O₅), 6 to 10% potash (K₂O), 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)

Tea plants should be watered frequently during dry periods. The frequency of watering may be decreased during the cool fall and winter period.

Tea Plants and Lawn Care

Tea 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 (0.6-1.5 m) 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 plant will

weaken the plant and, if severe enough can cause dieback or kill the plant.

Roots of mature tea plants spread beyond the drip-line of the tree canopy and heavy fertilization of the lawn next to tea plants 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 tea plants to decline. This is because too much water too often applied causes root rot.

Mulch

Mulching tea 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 and Disease Pests

Numerous insect species have been reported to attack tea plants including mites, thrips, scales, aphids, and caterpillars. Similarly numerous disease, causing organisms have been reported to attack tea plants such as blister blight (*Exobasidium vexans*), net blister blight (*E. reticulum*), anthracnose (*Colletotrichum thea-sinensis*), and red rust (*Cephaleuros parasiticus*). Contact your local County Cooperative Extension Agent for current control recommendations.

Harvest, Ripening, and Storage

The terminal 2 to 3 leaves plus terminal bud are plucked to make tea. There are 3 types of tea. They vary according to the length of time the leaves are fermented.

- Green tea, in which the leaves are not fermented at all.
- Oolong tea, in which the leaves are fermented for a short duration.
- Black tea, in which the leaves are fermented until they turn black.

Green Tea. Only China type tea leaves are used to produce green tea because Assam type tea leaves produce a bitter flavor. The leaves may be steam or pan heated. The process of pan heating of the leaves (called pan-fired tea) includes heating the leaves in a pan at 480 to 570°F (249-299°C) for 10 to 15 minutes while continuously agitating the pan to prevent burning. Subsequently, the leaves are placed in a dryer at 212 to 302°F (100-150°C) for 10 to 15 minutes, then allowed to cool, then placed in a sealable container, which may be stored in a cool, dark area.

Oolong Tea. The fermenting process for producing oolong tea includes wilting freshly harvested leaves plus stems (shoots) in the sun for 30 to 60 minutes and then continuing to dry them in the shade for an additional 8-10 hours (stirring once an hour). Finally, the shoots are heated in a pan at 121-149°F (250-300°C) for 15 minutes, then rolled and allowed to dry.

Black Tea. The best black tea is made from the only the upper two leaves plus the terminal bud. The process of making black tea includes drying the leaves to about 55-70% moisture (this take several hours), cutting and rolling the leaves into small pieces, then the allowing the still moist leaf pieces to ferment. Finally, the leaves are dried, sorted to remove foreign matter, and packaged.

Uses

Tea is used as a hot and cold beverage. Tea contains caffeine, potassium, and a small amount of theobromine (Table 2).

Table 1. Cultural calendar for tea production of bearing plants 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		Apply NPK		Apply NPK	
Nutritional sprays ²			Apply 3 to 4 micronutrient foliar sprays during the summer, early fall months.									
Iron soil applications			Apply 3 to 4 iron applications during the summer, early fall months.									
Watering	Water regularly during dry periods.			Water if insufficient rainfall occurs.						Water regularly during dry periods.		
Insect and disease control	Monitor plants for insect and disease pests. Contact your local county extension service for current control recommendations.											
Pruning			Prune to induce new growth.				Prune to induce new growth.					
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 tea (1 cup; 8 oz; 235 ml).^z

Constituent	Value	Constituent	Value
Calories	2 kcal	Calcium	0 mg
Protein	0.0 g	Magnesium	7 mg
Fat	0.0 g	Phosphorus	2 mg
Caffeine	47 mg	Potassium	88 mg
Carbohydrate	0.71	Sodium	7 mg
^z Data taken from the USDA National Nutrient Database for Standard Reference, Release 18 (2005). Brewed tea with tap water. [website: http://www.nal.usda.gov/fnic/foodcomp/search/] [Accessed, 20 November 2005].			