



THE CULTURE OF
Camellias

THE STATE FLOWER OF *Alabama*





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Rediscover the camellia as a cherished evergreen shrub both beautiful and rugged. Learn about the camellia's ideal growing environment, how to plant and care for it, and how to solve common pest problems. Illustrated instructions for propagation and varieties are provided for the beginning grower.



Origin *and* History

Camellia japonica

Today's gardeners find the camellia to be an easy-to-grow evergreen flowering shrub with many uses, incredible ruggedness, and great beauty. With the availability of more flower forms, hybrids, seedlings, and hardy species, along with improved cultural techniques and devices, the outdoor growing areas of the American camellia belt extend farther north each year. Even in the coldest regions, the camellia has become a fixture in the home greenhouse.

The name camellia (pronounced as either *ca-mee-lia* or *ca-mell-ia*) was given to the genus by Swedish botanist Carl Linnaeus, developer of the binomial system of nomenclature used to classify plants. The natural home of the camellia is an area encompassing Southeast Asia, China, Japan, and various islands and countries extending from Vietnam to Burma.

More than 200 species of camellias have been identified, with most of them distributed throughout southern China. The most economically

important species of the genus is *Camellia sinensis*, the common tea plant. The most widely grown ornamental species is *Camellia japonica*. And another widely grown species is *Camellia sasanqua*. In addition, more than 20,000 varieties or cultivars of various species and hybrids have been described worldwide, grown largely by camellia hobbyists. The diversity of flower colors, shapes, and bloom sizes is remarkable. Seedlings of crosses with *Camellia reticulata* and other species have produced extensive variations in flower and leaf sizes and growth habits.

Classification of Cultivars or Varieties

Camellias vary in color, size, and form depending on the season, location, soil, plant nutrition, and aerial environment. The American Camellia Society has established the division and classification of the flower forms, colors, and sizes in the official nomenclature book, as follows:

- **Single.** One row of not over eight regular, irregular, or loose petals and conspicuous stamens ('Yuletide')
- **Semi-double.** Two or more rows of regular, irregular, or loose petals and conspicuous stamens ('Frank Houser')
- **Anemone.** One or more rows of large outer petals lying flat or undulating, the center a convex mass of intermingled petaloids and stamens ('Elegans')
- **Peony.** A deep, rounded flower of either a Loose Peony Form of loose petals, which may be irregular, and intermingled stamens, and sometimes intermingled petals, petaloids, and stamens in the center ('Vedrine') or a Full Peony Form consisting of a convex mass of mixed, irregular petals, petaloids, and stamens or irregular petals and petaloids never showing stamens ('Debutante')
- **Rose Form Double.** Imbricated (layered-like scales) petals, showing stamens in a concave center when fully opened ('Mathotiana')
- **Formal Double.** Fully imbricated, many rows of petals, never showing stamens ('Grace Albritton')



Yuletide



Frank Houser



Elegans



Debutante



Mathotiana



Grace Albritton

Blooming periods for the southeastern United States are identified, as follows:

- **E** (early), September to early November
- **E-M** (early to midseason), early November to mid-December
- **M** (midseason), mid-December to mid-February
- **L** (late), mid-February to mid-March, varying with the year

Some camellia varieties sport (mutate) freely, producing new color forms. This provides even more variability to the species and genus.



Cultivar/Variety	Camellia Species	Size	Shape	Color	Blooming Season	Growth Rate
'Alabama Beauty'	<i>C. sasanqua</i>	Small	Loose peony	Red	E	Vigorous
'Debutante'	<i>C. japonica</i>	Medium	Full peony	Light pink	E-M	Vigorous
'Frank Houser'	<i>Reticulata</i> hybrid	Very large	Semi-double	Red	E-M	Vigorous
'Governor Mouton'	<i>C. japonica</i>	Medium	Semi-double to loose peony	Oriental red	M	Vigorous
'Lady Clare'	<i>C. japonica</i>	Large	Semi-double	Deep pink w/ gold centers	E-M	Vigorous
'Magnoliaeflora'	<i>C. japonica</i>	Medium	Semi-double	Blush pink	M	Compact
'Mathotiana'	<i>C. japonica</i>	Medium-large	Rose-form double	Crimson	M-L	Vigorous
'Professor Charles S. Sargent'	<i>C. japonica</i>	Medium-large	Full peony	Dark red	M	Vigorous
'R.L. Wheeler'	<i>C. japonica</i>	Large	Semi-double	Red	M	Vigorous
'Ville de Nantes'	<i>C. japonica</i>	Medium-large	Semi-double	Red and white	M-L	Slow

Kenny Howard



LOCAL NOTE

In east central Alabama, several cultivars are named for Auburn people, places, and events, and are gathered in the "Auburn Collection." This collection is a product of the Auburn-Opelika Men's Camellia Club and includes the following cultivars: 'War Eagle', 'Aubie', 'Rollin' Toomer', 'One Second', 'Samford Park', 'Pebble Hill Peppermint', 'Tiger Eyes', 'Mary Corley', 'Rouse's Big Red', 'Kenny Howard', 'Auburn Sunrise', and 'Auburn Sunset', among others.

Varieties (Cultivars)

With more cold-hardy varieties becoming available, camellias are now being grown all over Alabama in addition to the southern United States and locations around the world.

The camellia selections in table 1 are especially suitable for beginning camellia enthusiasts in Alabama, although nurseries may not have all of them. Consult a local camellia grower or county Extension agent before paying for a variety unknown to you or a variety that is not listed in one of the tables in this publication. Start with some of the ten varieties in table 1; join a local camellia club and the American Camellia Society; and attend a camellia show to decide your next plants for purchase or grafting.



Environment for Growing Camellias

LOCATION

Camellia sasanqua can be grown in full sun. *Camellia japonica* grow and flower better in partial shade, where the blooms and foliage are protected from sunburn.

Camellias in dense shade often become spindly and produce fewer blooms. A site under pine trees is ideal because pines provide filtered light year-round for growth, offer winter protection, and provide natural mulch from the pine needles. Do not plant camellias where they must compete for nutrients and water with hardwood shade trees that have shallow root systems. Also avoid windy, exposed sites, since wind can be detrimental to camellias.

COLD HARDINESS

Varieties and the different flower forms vary in their resistance to cold. Generally, cold spells with temperatures below 20 degrees F reduce the size of the blooms, but it takes less cold to affect the blooms and bloom buds than it takes to affect the plant itself. Open blooms can be damaged by temperatures of 26 degrees F but may be untouched at 28 degrees F if partially shaded or recently wet by rain. Some varieties, double flowers in particular, often fail to produce typical or perfect blooms after the temperature has dropped below 20 degrees F. However, damage can occur between 20 and 30 degrees F if the drop occurs quickly after a period of warm weather.

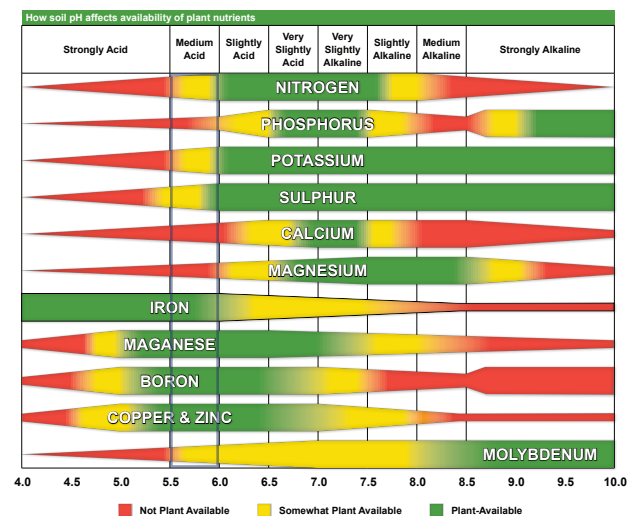
Unless otherwise protected from intense winter morning sun, camellias in a northern or western exposure will usually withstand more cold weather than those in an eastern or southern exposure. Therefore, only early- and late-flowering, single, semi-double, and peony-form camellia varieties should be planted outside in the northern half of Alabama. In the southern half of the state, camellias can be grown without too much concern; however, many camellia enthusiasts grow their prize camellias under protection in plastic or glass greenhouses.



SOIL

Camellias should be planted only in well-drained, acidic soils (pH less than 6.0) amended with pine bark, peat, or compost. They thrive in sandy loams and loams but can be grown in finer-textured clayey soils if the soils drain well after a rain. Anywhere pine trees grow well, camellias should do well. Avoid planting them in the alkaline soils of the Black Belt region; alternatively, plant them in a loose potting mixture in a raised bed. Root-rot diseases are a problem when camellias are planted too deeply or in a soil that stays wet after a rain. Avoid fertilizing at planting. After establishment, camellias respond to a high-nitrogen, slow-release fertilizer such as 18-4-8.

For more information about soils and testing, contact your county Extension agent or the Auburn University Soil Testing Lab at <https://aaes.auburn.edu/soil-forage-water-testing-lab/>, or visit www.aces.edu.



WATER

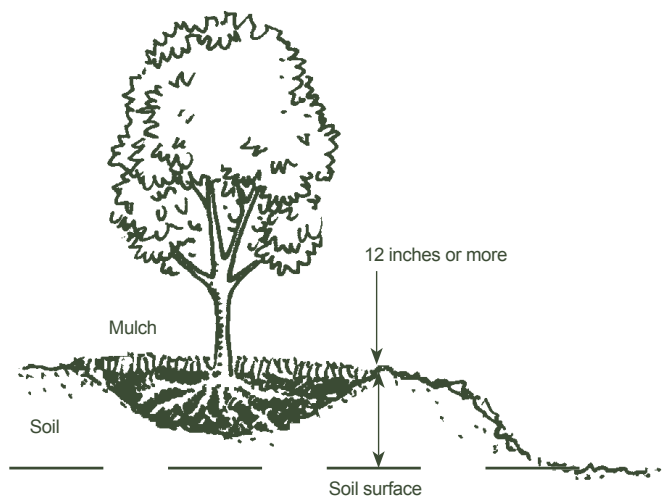
Young plants (less than 3 years old) in the landscape will need supplemental water during the short-term droughts that occur during every growing season. Water young plants thoroughly once a week when natural rainfall is less than 1 inch.

SOIL DRAINAGE

Camellias are native to high-rainfall areas and to sites providing good natural drainage. Because all camellias prefer a well-drained but moist soil, young plants should be planted higher in the prepared hole. This lets excess water drain away from the plant.

Keep the plant well-watered for the first 3 years. Once established, camellias have a strong root system that can survive short-term droughts and require less-frequent watering, except under extreme drought stress.

Although poor aeration and drainage are common causes of root problems, factors such as drought, excessive fertilization, being set too deeply, and other undesirable cultural practices can reduce root efficiency and result in poor plant growth. High populations of root-infecting nematodes can reduce plant vigor by feeding on the roots and reducing the area of the root that actively supplies the plant with water and nutrients.



Raised plantings improve soil drainage



Planting *and* Caring for Camellias

PLANTING

The best time to plant camellias is in early fall or winter, when temperatures are above freezing. Container-grown plants can be transplanted or repotted at any time of the year.

Both planting and transplanting require meticulous care depending on the size and age of the plant. If possible, prepare the site and soil several weeks before planting. Most camellia enthusiasts recommend digging a hole in sandy and loamy soils twice the diameter and as deep as 1½ times the height of the plant's root ball. In tight (clay) soil, the planting hole should be even larger.

Build a mound of 1 part soil and 1 part fine pine bark mixed in the bottom center of the hole (figure 1a). Place the plant on the mound. If the plant is root-bound from being in a container, break up the root ball by cutting it open with a knife in three or four places so that the new roots will grow into the planting mix. Make sure the root ball is positioned 1 to 3 inches above the surrounding ground level, since the camellia will settle with subsequent watering and rainfall.

Fill the hole with your planting mix halfway to the top of the root ball (figure 1b). Soak thoroughly and finish filling the hole with soil mix. Water the plant again and mulch the watered surface of the soil with 2 to 4 inches of pine straw, pine bark, or leaves. Mulch holds moisture, reduces surface evaporation, keeps the soil

cooler, suppresses weeds, and eliminates the need for cultivation. Do not use peat moss or sawdust (unless old and well-rotted); they can form a crust when they dry, making it difficult to get water and air to the roots.

Do not overwater in any soil type. Spacing of plants depends on the natural habit and form of the camellia variety—6 to 8 feet apart should be adequate for most varieties.

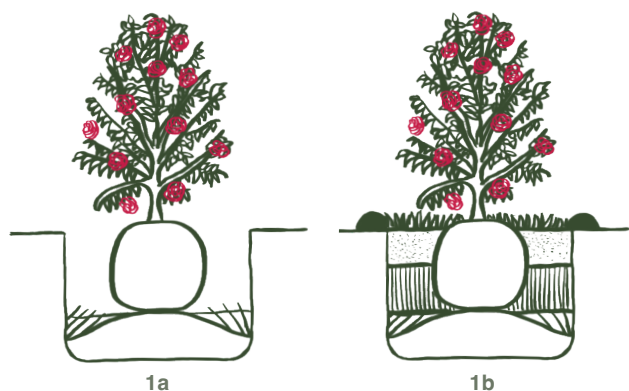


Figure 1a. Place the plant on a mound built in the bottom of the planting hole. The top of the root ball should be 1 to 3 inches above the surrounding ground.

Figure 1b. Backfill the hole with soil to a level about halfway to the top of the root ball. Water thoroughly, fill the remainder of the hole, water again, and add mulch to the top of the root ball.

FERTILIZING

Camellias generally are not fertilized the first year after planting, especially if the soil is high in organic matter. After the first year, apply fertilizer in the spring after blooming but before new growth starts. A soil test is the best way to determine the nutrient status of the soil.

With many fertilizers, small amounts applied at frequent intervals are better than heavy applications. For example, apply ¼ cup of 13-13-13 fertilizer or equivalent per plant in early spring, and increase that amount to ½ cup when the plant reaches 4 to 5 feet high.

Special camellia fertilizers as well as 8-8-8, 10-6-4, cottonseed meal, or cow manure are available at your local seed store. Some fertilizers have up to 70 percent of the nitrogen in a slow-release form, which is less likely to burn the roots.

Scatter the fertilizer evenly on top of the mulch and away from the main stem of the plant. Water the fertilizer into the soil. Make one application in early spring after blooming, followed by a second application in mid-June to early July. Do not fertilize after July so that the plants have a longer time to harden off and avoid freeze damage. Very large plants do not need heavy fertilization.



PRUNING

Camellias require little or no pruning. Prune to remove dead wood, to shape into compact plants, and to thin inside limbs to increase air movement. The best time to prune is after blooming and before new flower and vegetative buds form.



DISBUDDING

Disbudding is usually done to increase the size and quality of the blooms. This is attained by removing excess flower buds to one per terminal. Disbudding varies depending on the age, size, and variety of camellia and is usually done in late August and September.

GIBBING

Gibbing is application of the plant hormone gibberellic acid (GA) to a spot near the bloom bud to induce earlier than normal blooming for the variety. It also increases the size, texture, and keeping quality of the bloom, but it often changes the color. Gibbing is done in late summer (after Labor Day).

GA is available from online retailers and some specialty retailers. Premixed solutions (for example, Pro-Gibb-4) are recommended. To apply, break or twist out the vegetative bud at the base of a flower bud; use a small eye dropper to place one drop of GA in the small receptacle of the growth bud (figure 2). For more detailed directions, visit the American Camellia Society's website at www.americancamellias.com.

Most, but not all, varieties respond favorably to gibbing. Results can be noted in 4 to 8 weeks depending on the variety, location, and environment.



Figure 2. Remove the vegetative bud and apply one drop gibberellic acid (GA) solution.



Camellias can be propagated sexually (from seed) or asexually (by rooted cuttings, cleft and surrogate grafting, and air layering).

SEXUAL PROPAGATION (PROPAGATION BY SEED)

This is the easiest method for producing a large number of camellia plants. If you are collecting naturally occurring seeds, get them from vigorous-growing varieties that are known seed producers. If they grow into vigorous plants but have poor blooms, they can still be used for grafting understock.

Plants from seed vary in flower color and form and are usually unlike either parent. Most new varieties in the past originated from chance seedlings. Today, deliberate varietal and hybridizing crosses are originating many new varieties. If you make varietal crosses, keep accurate records and make reciprocal crosses of varieties with characteristics that you desire. If your crosses result in seed, great! Plant the seed—a new variety may have been developed.

Water, heat, and light are the three most important factors for rapid seed germination. Seed can be germinated in a greenhouse or home or stored until spring. They germinate quicker if planted immediately after harvest. If not planted at once, the seed coat of camellias hardens in storage. Growers sometimes crack hardened seeds with pliers or nick them with a file to allow moisture to enter more readily to swell and germinate the seed. Seeds of camellias ripen in the fall, usually in September and October.

A germinating medium composed of peat moss or two-thirds sphagnum moss and one-third perlite is recommended. Perlite is sterile, and the pH of peat moss is low enough to prevent bacterial growth. Perlite permits

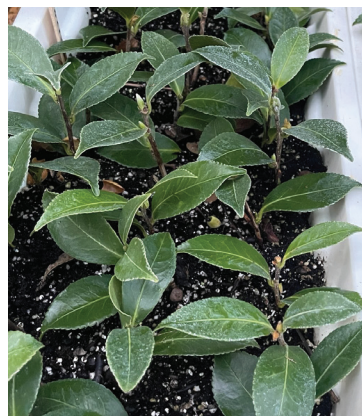


water to filter through freely while holding adequate moisture. Moisten the peat moss or sphagnum moss and squeeze dry before mixing with the perlite. Plant seeds with the eyes down, which is where the root will break out, and cover with a ¼-inch layer of peat moss or perlite.

Planting can be in a flat of individual containers (peat pots) or in flats in rows if the seed is of known origin. Use individually numbered stakes to identify each seed source. After planting seed, thoroughly water with a fine spray or mist. The time between waterings will depend on heat, light, and location of the flat or container. Excess water can cause seed rotting. If drainage of the medium is good and relatively sterile, the chances of rot are slim.

Many hobbyists put camellia seed in large-mouthed jars or plastic bags in thoroughly moistened peat moss and then keep them on top of a water heater or other warm place. Germinated seeds are removed when the taproot reaches 2 inches in length. The tip is pinched off before planting in 4-inch or larger pots.

It normally takes 3 to 5 years for camellia seedlings to bloom. During this time, the plants require pruning and good cultural treatment to develop good-quality plants.



ASEXUAL PROPAGATION

Asexual propagation provides a way to reproduce camellias that is certain to yield the variety desired. Asexual propagation methods include rooting cuttings, cleft and surrogate grafting, and air layering.

Propagation by Cuttings

Camellia cuttings can be rooted in almost any season, although the optimal time is July, after the new spring growth has hardened. A greenhouse, cold frame, or deep-rooting box is needed.

Take cuttings from 3 to 5 inches of terminal-hardened growth. Remove the bottom leaves from the cutting, leaving two or three leaves and the vegetative buds on the tip of the cutting. Remove flower buds, if present. Slice off the lower end with a sharp knife or razor at an acute angle. Dip the cut stem end into Rootone, Hormodin, or a similar root-stimulating compound to stimulate rooting before sticking into a nail hole in the lightly moistened medium to half the cutting's length. Firm the medium, and water the cutting.

The preferred rooting medium is 1 part perlite or peat moss mixed with 1 part sand. When rooting only a few cuttings, a 1-gallon plastic container of the medium is adequate. After sticking up to six cuttings in the container, place a 2- or 3-liter soft drink bottle with the bottom cut out over the cuttings; then place the container in the shade.

When rooting many cuttings, use a large, deep box or bin with openings for drainage in the bottom. Place 1 or 2 inches of good soil in the bottom to cover a layer of gravel before adding 4 to 6 inches of the rooting medium. Cover with clear plastic, such as dry-cleaning bags. The box must be deep enough to allow for 6 to 8 inches of cutting growth. Be sure the box is shaded. Both procedures require checking for moisture levels and high humidity, which are important for root development of the cuttings.

After 2 to 3 months, camellia cuttings should have developed a fibrous root system, varying with the variety planted and the growing environment. Rooted cuttings can be potted to large peat pots or directly into 1-gallon containers in a soil high in organic matter. Do not plant too deeply regardless of the container size; the health and vigor of the rooted cutting is what is important. The soil medium in the container should have a pH of 5.5 to 6.5. Keep the young plants in the shade and topdressed with low levels of a fertilizer such as 18-6-8 or 20-20-20.

Propagation by Cleft Grafting

The cleft graft is a widely used method of propagating camellias. Any vigorous camellia can be used for rootstock. *C. sasanqua* is widely used because of its vigor, disease resistance, and ability to withstand varying soil conditions. However, vigorous-growing *C. japonica* and seedlings with poor blooms may be superior, as they are more cold resistant and compatible.

Grafting outdoors is usually done in mid-to-late February and early March. It can be done in a greenhouse in December. The understock may vary in diameter from $\frac{3}{4}$ to $1\frac{1}{2}$ inches and should be cut or sawed off smoothly about 2 to 3 inches above the ground or first lateral root (figure 3a). Use a knife to split the stem of the understock (figure 3b). Select the scion from healthy plants and from the mature growth of the past season.

Scions should be terminal tips 3 to 5 inches long (figure 4a). Use a sharp knife or razor to fashion a long, bilateral wedge at the base of the scion. The slit in the understock can be opened and managed with an ice pick or screwdriver while you secure the scion wedges in place. It is critical that the cambium layer of the stock and the scion line up (figure 4b). The cambium layer is the thin green line within the bark area. It is exposed on both sides of the scion wedge.

On a $\frac{3}{4}$ -inch or larger understock, insert two scions, one on each side of the understock (figure 4c). After the scions are placed in the split understock, it is important to keep them humid to permit callusing. The split stock usually holds the scions firm; if not, they may be wrapped with string, rubber ties, or $\frac{3}{8}$ -inch electrician's tape. The graft may be covered with moist, sterile sand.

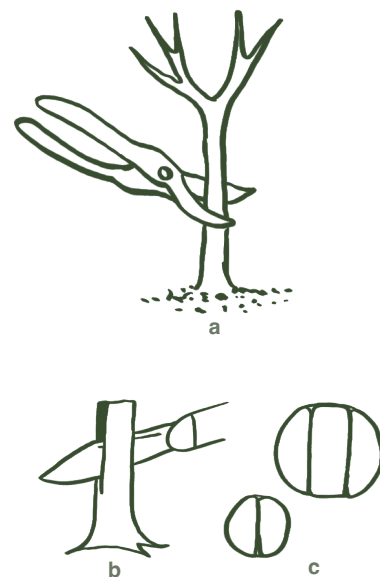


Figure 3. Prepare the understock for grafting: (a) choose healthy understock; cut straight across about 3 inches aboveground; (b) cut down through the center about $1\frac{1}{2}$ inches. (Large understock may be split twice.)

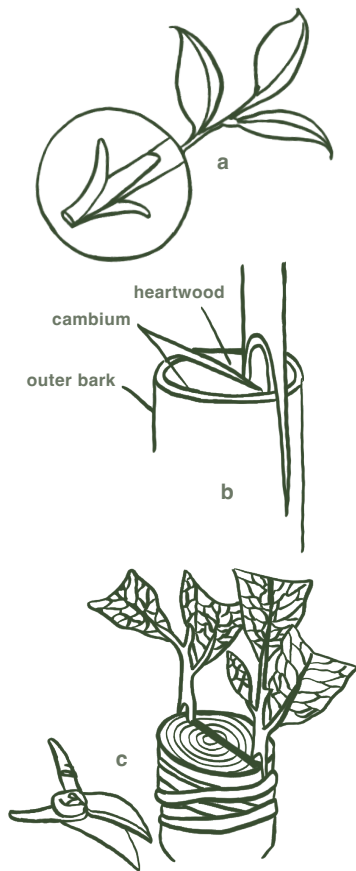


Figure 4. Procedure for cleft grafting: (a) select strong tip cutting, leaving enough stem to trim to a 1½-inch wedge; (b) pry open split in understock and insert scion wedge (be sure to align green inner bark); (c) insert two scions, one on each side of the understock.

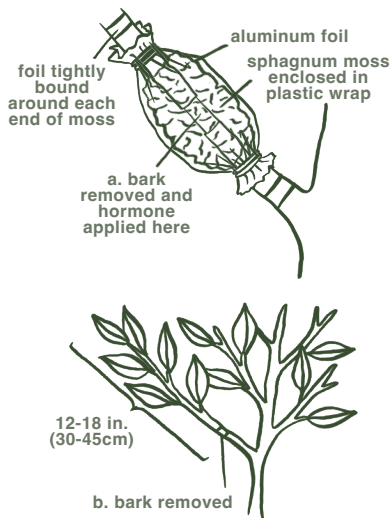


Figure 5. Air layering a camellia

To maintain the humidity around the scions, cover the graft with a 1-gallon or larger bleach bottle or other opaque container with the bottom cut out or with a large-mouthed brown jar. Burlap or a brown paper bag will be needed to cover a 1-gallon milk jug (bottom cut out) or a large-mouthed jar to protect the graft from sun and excessive heat buildup. Label the graft, or you will have to wait until the camellia blooms to identify it.

The time for callus formation and bud break varies with the variety and season. It is important to have good callus formation uniting the cambiums of the scions and stock before uncovering the graft.

It is best to lower the humidity under the bottle or jar in stages. Removing the lid of the bottle or milk jug or raising the jar an inch lowers the humidity and allows some light to enter at the same time. When the bottle lid is removed, the light may cause the shoot to grow out through the lid area. Do not permit the young plant to wilt before it becomes acclimated to light and lowered humidity. Knowing when to remove the cover over the graft is a matter of experience.

Protect the young graft from mechanical damage the first year. Mulch with pine straw and remove sucker sprouts of the understock as they develop. Surrogate, bark, nurse-seed, and wedge grafts have also been used with camellias. Consult camellia literature or experts for one of these. Cleft grafting is easy once you have observed it being done properly by an experienced propagator.

Propagation by Air Layering

Camellias can be air layered in the spring after the new growth begins to harden. Select a healthy branch 1 to 2 feet in length from tip to base. The stem is usually between 3⁄8 and 5⁄8 inches in diameter near the base.

Various methods of wounding are practiced. One method is to circle-cut the bark with a sharp knife near the base of the branch in two places about 2 to 2½ inches apart. Girdle the stem and remove the bark between the circular cuts (figure 5a). Dust the girdled section of the branch with rooting compound and wrap it with moist sphagnum moss in the shape of a small football; tie it in place. Wrap the sphagnum with a layer of clear plastic wrap followed by a wrap of aluminum foil. Tightly secure the foil with string above and below the sphagnum to keep air out of the ball (figure 5b). The air-layered plant can be severed below the ball in approximately 4 to 6 months and then potted in 2-gallon containers and given protection for the first winter.

Only vigorous-growing camellias should be air layered, since most slow-growing camellias are usually cleft grafted to vigorous understock to improve their relative rate of growth

CONTAINER-GROWN PLANTS

Camellias are adaptable to growing in 1-to-5-gallon plastic containers with drainage holes. The potting medium should also provide good drainage. A mixture of one-third soil, one-third sand, and one-third organic matter (perlite or fine pine bark) is excellent for growing camellias. Other media compositions that have been used are: (1) 80 percent fine pine bark and 20 percent river sand plus dolomitic limestone, cow manure, and trace elements; (2) 3 parts fine pine bark and 1 part perlite and sandy top soil; (3) 2 parts forest humus and 1 part sandy loam; (4) 3 parts fine pine bark, 1 part sand, 1/2 part soil, and 1/2 part loose peat moss; and (5) 50 percent peat moss and 50 percent sandy loam. Do not plant rooted cuttings or germinated seedlings too deeply. Firm the medium to reduce air pockets.

Watering is essential during the active growing season and is required frequently during drought conditions. However, watering increases the loss of nutrients from the medium. Containers with sand and pine bark mulch can be fertilized with a weak solution of fish emulsion (5-2-2 or 5-1-1) applied weekly without fear of burning the young plants. Slow-release fertilizers are widely used for container plants as are cottonseed meal and other organic fertilizers. Slow-release fertilizers can be mixed with any medium before planting. Liquid fertilizers are also recommended.

Light fertilizer applications biweekly during the growing season are preferred to heavy, less frequent applications. Reduce fertilization in late summer and fall as camellias go into the dormant winter season. Soil pH is important in container-grown plants and is kept in the 5.5 to 6.5 pH range for camellias.

After a few years, container plants become root-bound and require repotting with the same type of fresh medium. If the roots are concentrated on the outside of the ball, repotting to larger containers is advisable. Wash the soil from the roots and prune the root ball. Using the same soil mixture, firm and thoroughly water.

Repotting is best in early spring before new growth starts. Container plants require winter protection to avoid damage from freezing temperatures. In mild climates, container-grown camellias can be protected by large quantities of mulch in an area sheltered from the wind. In colder regions, plants require the protection of a sun porch or a cool greenhouse.





Table 2. Established Varieties that Do Well in Central Alabama

Early to Midseason Bloomers	
White	'Alba Plena', 'Charlie Bettes', 'Emmett Barnes', 'Joshua Youtz', 'King Cotton', 'Moonlight Bay', 'Nuccio's Gem', 'Victory White', 'White Empress'
Pink	Berenice Boddy', 'Debutante', 'Dr. Tinsley', 'Early Autumn', Elizabeth Le Bey', 'High Hat', 'Kick Off', 'Lady Clare', 'Marie Bracey', 'Pink Perfection'
Red	'Daikagura Red', 'Laura Walker', 'Reg Ragland', 'Terry Gilley', 'Tomorrow', 'Vulcan'
Variegated	'Carter's Sunburst' (and sports), 'Daikagura' variegated, 'La Peppermint', 'Magic City', 'Margaret Davis', 'Mona Jury'
Mid-to-Late-Season Bloomers	
White	'Leucantha', 'Man Size', 'Onetia Holland', 'Sea Foam', 'Snowman', 'Sweetie Pie', 'White by the Gate'
Pink	'Betty Sheffield' (and sports), 'C.M. Wilson', 'Diddy Mealing' (and sports), 'Emily Wilson', 'Fashionata', 'Magnoliaeflora' (almost white), 'Marguerite Sears', 'Miss America', 'Moonlight Sonata', 'Omega', 'Rev. John Drayton', 'Show Time', 'Spring Sonnet', 'Tiffany', 'Tomorrow' (and sports)
Red	'Flame', 'Glenn 40', 'Governor Mouton', 'Kramer's Supreme', 'Mathotiana', 'Mrs. Charles Cobb', 'Professor Sargent', 'R.L. Wheeler'
Variegated	'Charlotte Bradford', 'Donckelarii', 'Gigantea', 'Herme', 'Iwane', 'Lady Kay', 'Lady Van Sittart', 'Lindsay Neill', 'Katie' (and sports), 'McVey's Guilio Nuccio', 'Miss Charleston', 'Sweet Auburn', 'Ville de Nantes'

Table 3. Varieties from *C. reticulata* × *C. japonica* Crosses (mature height can be 25 feet)

'Dr. Clifford Parks' : Midseason, red with orange cast, semi-double to anemone to loose to full peony form
'Frank Houser' : Early to midseason, red, semi-double to peony form
'Terrell Weaver' : Midseason, flame to dark red, semi-double to loose peony form, unusual variegation
'Valentine Day' : Midseason, salmon pink, formal double with rosebud center

A close-up photograph of two camellia flowers. The flower on the left is healthy, with light pink petals and yellow stamens. The flower on the right is diseased, with brown and orange spots on its petals, indicating a fungal infection. The background is a soft-focus green.

Diseases *and* Insects

FLOWER BLIGHTS

Camellia flower blight or petal blight is one of the biggest threats to camellia growth. Caused by the fungus *Ciborinia camelliae*, formerly *Sclerotinia camelliae*, it infects only the flower tissue of camellias, does not spread from flower to flower, and is characterized by brown spots on the petals that spread rapidly to engulf the whole bloom. Infected blooms fall to the ground and, in time, produce a hard black fungal resting structure, called a sclerotium, at the base of the infected blooms. These sclerotia are the source of survival of the fungus until the following year.

Sclerotia may lie dormant in the soil up to 4 years. When warm and humid conditions occur, small, dime-sized, brownish-gray mushrooms, known as apothecia, are produced from the sclerotia to release the spores that are the infective stage. This produces another cycle of petal blight. A community effort is needed to control the disease, since the spores can be carried by wind for ½ a mile or more. It is prevalent and most active in humid areas when temperatures range between 45 and 70 degrees F during the mid-to-late-season flowering period. Camellia petal blight does not infect the leaves, stems, or roots of camellias.

Some control can be obtained by sanitation measures when all blooms are picked up, including

petals and blooms lodged in branches. These must be destroyed by burning or bagging and placing them in the trash. Fungicides recommended for *Ciborinia camelliae* include mancozeb or captan. Apply these as soil drenches around the plant every 2 weeks from late December through January. This may help with reducing the disease.

Botrytis flower blight (gray mold) usually infects inside blooms that have been damaged by frost, water dripping from above, water sprays, high humidity, or high temperatures. Lack of good air circulation is also a contributor. Botrytis symptoms are very similar to petal blight in the bloom, except that Botrytis does not engulf the bloom rapidly. Botrytis-infected blooms do not have the slimy texture associated with petal blight. Frequently, a gray, powdery fungal growth appears on the flowers, particularly on the stamens or at the base of the blooms.

Botrytis produces spores that spread the fungus from bloom to bloom, damaging each one it touches. It is not a serious problem unless ignored or neglected. Sanitation is the best prevention. Also be sure your plants have good air circulation. Fungicide applications targeting flowers with active ingredients such as captan, chlorothalonil, or copper will control Botrytis.



Canker on camellia stem caused by *Glomerella cingulata*. (*Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc.), Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org



Phytophthora root rot caused by poorly drained planting site



Camellia leaf gall before the spores mature (*Exobasidium camelliae* Shirai)



Camellia yellow mottled virus

ROOT ROT

Root rot can be caused by one of two fungi. *Phytophthora cinnamomi* attacks *C. japonica* and *C. reticulata* when camellias are planted too deeply, placed in poorly drained soil, or kept too wet. Infected plants must be destroyed. The fungus does not attack *C. sasanqua* and *C. oleifera*. Root rot caused by *Cylindrocladium crotalariae* often results from adding sand or silt contaminated with the fungus. A clean soil mix will prevent the problem. The fungus rarely attacks mature and established plants.

CAMELLIA CANKER AND DIEBACK

The fungus *Glomerella cingulata* causes camellia canker and dieback. Symptoms are the sudden wilting of a twig or the development of cankers on a limb or trunk. Control the fungus by cutting off infected, wilted areas down to healthy wood. Infected wood is brown with an orange cast. Sterilize the pruners with isopropyl alcohol between cuts. Dieback is spread when contaminated water splashes on new growth or a plant wound, such as a fresh leaf scar. *C. sasanqua* is more susceptible to dieback than is *C. japonica*. It is more prevalent in humid areas.

LEAF GALL

This disease is caused by the fungus *Exobasidium camelliae* and is most common on *C. sasanqua*. Infected leaves thicken and enlarge with the first flush of growth in the spring. Usually only a few leaves and twigs

are infected on each plant. Control by removing the thickened leaves when they first appear and destroying them before the fungus sporulates and infects the plants for next year's growth.

YELLOW LEAF VIRUSES

Some virus-like variegation in camellia flowers and leaves is genetic. Yellow leaf viruses, however, which are transmitted by grafting, cause mottle and other flower and leaf variegation. The degree of variegation in both flowers and leaves varies from year to year on the same plant. This is caused by the uneven distribution of the virus in the plant and the varying environmental conditions of each season. Leaves with yellow leaf mottle infection are less cold hardy and tend to sunburn more easily than healthy plant foliage.

Avoid viruses by grafting to nonvariegated understock of *C. sasanqua* and *C. japonica*. Also, do not collect scion wood for grafting from camellias with mottled or variegated leaves. The flower striping as seen in camellias 'Herme', 'Elizabeth', and 'Lady Van Sittart' is genetic and is desirably transmitted by grafting.



Environmental (Physiological) Problems



Fertilizer burn

OEDEMA

Camellia oedema is not a fungal disease. Oedema refers to several types of damage to plant leaves—black spot, white spot, angular spot, concentric spot, corky excrescence, scurf, and sasanqua spot. Oedema is the result of improper water relations in the plant and too much hot sun. The unsightly condition of the foliage is greater than the actual damage to the camellia. To prevent oedema, plant camellias in well-drained soil in semi-shaded locations. Water during dry periods in spring, summer, fall, and winter.

SUNBURN

This condition, which is the yellowing or bronzing of leaves exposed to the hot sun, is a common problem. Causes include moving plants from shaded to more exposed sites, removing overhanging branches, underwatering of new transplants, or setting out plants with inadequate root systems relative to the aboveground plant.

FERTILIZER BURN

This problem results from overfertilization or inadequate mulching before fertilizing and from underwatering.



Lichen

LICHENS

Lichens are gray-green to green mossy growths on the stems of old, neglected camellias. The lichen is a combination of a fungus and an alga that grows symbiotically. They are not parasitic to the camellia.

Affected plants are usually under stress and need fertilizing, watering, or mulching to improve growing conditions.

BUD DROP OF CAMELLIAS

Bud drop is a fairly common problem that causes concern among camellia growers at all levels of expertise. Because camellias bloom during the winter months, they are susceptible to wide swings of temperature that are part of the “normal” winter weather in the Southeast. Freezing temperatures can cause buds to drop before opening, especially with young plants and some varieties that are cold sensitive, such as hybrids of *C. reticulata*. Long periods of hot weather in the early fall can cause buds to drop off in late fall. In the spring, late-blooming varieties may drop their buds before opening as the temperatures begin to rise and initiate shoot growth. Avoid planting varieties that have blooms coinciding with new growth or use gibberellic acid to stimulate flowers earlier in the season. Wide fluctuations in moisture can also cause dropping of flower buds. Camellias do best when soil moisture is consistent, especially during periods of bloom and new growth. Bud drop can be caused by soil that is either too wet or too dry.

Neglect of any cultural factor—soil, nutrition, water, drainage, shade—can cause bud drop. Any type of stress on the plant can result in bud drop. If this condition occurs year after year, it may be a varietal problem, which can be resolved by grafting to another rootstock or transplanting the plant to another location.

Camellia bud mite can also cause bud drop. Early blooming varieties or gibbing for earlier blooms can prevent mite damage. If mites are detected, spray horticultural oil in winter or spring when temperatures are predicted between 45 and 85 degrees F for the next 48 hours and rain is not predicted. Spray the flower buds thoroughly so the oil spray drips or runs off.



Camellia flower blight (*Ciborinia camelliae*) Rebekah D. Wallace, University of Georgia, Bugwood.org



Insects

Tea scale (*Fiorinia theae* Green). Upper leaf surface shows yellow stippling from insect feeding. The lower surface shows scale insects and webbing.

SCALE INSECTS

Scale insects are the most important pests of camellias. They have sucking mouthparts and feed by piercing the leaves and twigs and utilizing the plant juices for food. This stunts and weakens the camellia and hurts the appearance of the foliage.

Tea scale (*Fiorinia theae*) is the most damaging scale insect. Yellow splotches appear on the upper side of the leaves, while the underside is covered with a cottony mass. The adult males have a white, waxy covering and are more conspicuous than the dark brown, oval-shaped females, which are about 1/20 of an inch long. The female lays her eggs under the scale covering. The eggs hatch in 1 to 2 weeks. The newly hatched scale, known as a crawler, moves about the plant, and after a week inserts its mouthparts into succulent new plant tissue. The adult stage is usually attained in 5 to 11 weeks after egg hatch, so there are several generations produced each year.

Cottony camellia scale (*Pulvinaria floccifera*) is the other common scale pest of camellias. Proper culture and the use of insecticidal sprays can control scale insects.

Horticultural oil and insecticidal soap sprays kill insects on contact and have a short residual time, which helps conserve beneficial insects. These sprays

are only effective on the crawler stage. Monitor for their emergence with sticky cards or double-sided tape wrapped around a branch. Due to the insect life cycle, a second spray may be required 10 days later or when new crawlers emerge. Apply these late afternoon (dusk) to increase effectiveness and reduce contact with other insects.

Systemic insecticides, such as dinotefuran, can be applied to control scale. These kill sap sucking insects, but are also toxic to other insects visiting the flowers. These are used as a last resort when oil and soap sprays may be ineffective.

Always read and follow all instructions and precautions on the insecticide label.

Cottony camellia scale (*Pulvinaria floccifera* (Westwood)), Brian Kunkel, University of Delaware, Bugwood.org



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'Nuccio's Gem'



'Roll-in Toomer'



'Pebble Hill Peppermint'



'Roosevelt Blues'



'Betty Sheffield Supreme'



'Rouse's Big Red'



'Professor Sargent'



'Mona Jury'



'Veiled Beauty'

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