



Common Gardenia

Kent D. Kobayashi and Andrew J. Kaufman
Department of Tropical Plant and Soil Sciences

The *Gardenia* genus includes over 200 species, with the two most important being *Gardenia jasminoides* Ellis (native to China), with its many cultivars, and *Gardenia thunbergia* L.f. (white gardenia, native to South Africa), which is typically grown as a rootstock. Former botanical names were *G. florida* L. and *G. augusta* (L.) Merr. The genus is in the Rubiaceae (coffee) family.

Several gardenia species are endemic to Hawai'i, found nowhere else: *Gardenia mannii*, *G. remyi*, and *G. brighamii*; these were formerly found in dry upland areas on all of the major Hawaiian islands except Kaua'i, but they are now rare or endangered.

Characteristics

Gardenia is an evergreen (perennial) shrub, 2–8 feet high, with a spread about the same, depending on the cultivar. Its growth rate is medium.

The thick, glossy, dark green leaves are opposite, oval or narrow, 3–5 inches long, and 1–1½ inches wide. Leaf arrangement is a whorl. The waxy, highly fragrant white flowers, 2–5 inches across, are commonly borne singly in the leaf axes. Depending on the cultivar, the flowers can be either single or double. The fleshy, ovoid fruit is an orange capsule about ½–1½ inches long, containing many seeds.



Gardenia jasminoides—common gardenia, Cape jasmine, (Hawaiian) kiele

Locations and uses

Locations

Plant gardenia in full sun in cooler areas for best flower production or in light, filtered shade in hot locations, preferably with minimum competition from tree roots. In heavy shade, the leaves are thin and weak, and flower production is reduced. Gardenia does best at elevations from 10 to 2500 feet.

Gardenia requires a rich, moist, acidic (pH 5.0–5.5), and well drained soil high in organic matter and free of nematodes. Organic matter levels can be increased with soil amendments

such as peat moss, ground bark, and compost. Proper soil pH is essential because it affects the availability of mineral elements. A soil pH above 6.0 increases the possibility of micronutrient deficiencies, particularly iron. Gardenia has poor to low salt tolerance and moderate wind resistance.

In most low-elevation areas in Hawai'i, gardenia flowers in late spring and early summer. The night temperature where the plant is grown influences flower production. Night temperature of 60–62°F results in almost continuous bloom if plants are in healthy condition and growing well. If night temperature is lower than this, growth is reduced and the foliage is likely to become yellow-green. Gardenia is frost-hardy to about 20°F.

Gardenia is difficult to transplant and does not toler-

ate root disturbance well. Mechanical injury to roots often occurs during transplanting, so care must be taken. Transplants should be planted higher than is normally done, so that the root ball is an inch or so above the soil level and not entirely covered with soil. Avoid crowding plants to prevent competition from other roots. Because the roots are sensitive to disturbance, do not cultivate around them; suppress weeds by mulching around the plants, and hand-pull weeds when the soil is moist.

Landscape uses

With their glossy, dark green foliage, gardenia plants make a great foundation in a landscape. It is effectively used as either focus or background in informal plantings and for tropical-theme landscape plantings. Gardenia can also be an accent plant around seating areas or near windows to take advantage of their extremely fragrant white flowers. Space plants 5–6 feet apart for use as an informal shrub planting. They do well in containers (2–5-gallon tubs) and, depending on the cultivar, are suitable as well for hedges, low screens, mass plantings, and groundcovers. There are many named cultivars, with various heights and growth habits.

Although it is best planted where people will notice the fragrance, care needs to be taken in placing gardenia in the landscape. Because its fragrance can be intense for some people, it should not be placed below bedroom windows. Plant it near a deck, walkway, or patio where the fragrance can be enjoyed throughout the whole garden or landscape.

Other uses

Gardenia is a popular cut flower for the florist for use in corsages and, in Hawai‘i, leis. The flowers float nicely in table-top glass or ceramic vessels. The fruit of some types is eaten in China.

Culture

Watering

Watering during dry periods is necessary for healthy gardenias. The soil should be kept moist at all times with regular watering, but it should not be soggy. Poorly drained, wet soils or excessive watering excludes oxygen, thereby causing root injury. If the soil is allowed to dry, shrinking and cracking also will injure roots. Irrigating with drip systems keeps water off the foliage and flowers, which helps prevent leaf spots. To help main-

tain adequate soil moisture, use mulch and avoid cultivation around the base of the plant. Gardenia has moderate drought tolerance.

Watering is important because it affects the number of flower buds that remain to maturity on a plant. If water stress occurs in a heavily budded plant, some buds will fall before opening. Therefore, large variations in soil moisture should be avoided. Regular watering is necessary after blooming to keep plants in good condition.

Fertilizer

Proper fertilizer application is important for gardenia growth and flower production. A complete fertilizer with a ratio of 3:1:2 or 3:1:3 (for example, 15-5-10 or 15-5-15) of nitrogen (N), phosphorus (P_2O_5), and potassium (K_2O) is generally recommended. Apply the fertilizer two or three times per year. For continuous bloom, feed regularly with blood meal, fish emulsion, or a fertilizer formulated for “acid-loving” plants. Too much fertilizer builds up excessive levels of soluble salts in the soil, which can cause root dehydration. Therefore, it is important to follow the recommendations on the fertilizer product label. Frequently, due to a deficiency of one or more micronutrients, usually iron, gardenia leaves will become yellow (chlorotic). This deficiency can often be corrected by acidifying the soil.

Pruning

Prune to keep plants compact, in proper shape, and in scale with the landscape. To maintain plants at their optimum, prune out dead wood, straggling branches, and faded flowers. Young plants growing vigorously during their first year may be pinched back at the growing points to encourage heavy branching; this prevents scraggly growth and promotes a more compact plant. The best time to prune is after flowering, because pruning earlier removes flower buds. Follow pruning with an application of fertilizer.

Indoor culture

Gardenias do well in pots. Give the plant plenty of bright light, preferably direct sunshine for at least half a day in a sunny south or west window. Ample humidity is also important. The humidity around the plants can be increased by placing them on a pebble tray—a tray with clean pebbles, stones, or gravel partially filled with water. Set the pot on top of the pebbles, but do not let it sit

in water (caution: this can create a mosquito breeding hazard if not properly managed). Running a room humidifier is an alternative.

Gardenia plants prefer temperatures close to 60°F at night and 70–75°F during the day. Maintain uniform moisture and good drainage in the growth medium, and try not to allow it to become dry. Fertilize with an acidifying fertilizer to keep the soil slightly acid, following the product label. Because gardenia is susceptible to salt burn, too much fertilizer can lead to damaging salt accumulation. To avoid this, and especially where plants are not watered regularly, occasional leaching can help remove salts from the pot.

A plant purchased from a garden shop usually has been grown in a nursery and given fertilizer to maximize its growth under the nursery climate and irrigation practice (generally, frequent). When you take it home, its growing conditions change; for example, watering may be less frequent, causing salt accumulation from fertilizers in the medium, which harms the roots. Providers of indoor-plant services often routinely subject any plant they purchase to thorough leaching over a week or so to remove most fertilizer from the medium. Then, they switch the plant to the fertilizer type and schedule preferred for the conditions in which the plant will be placed.

Repotting is needed when roots start to grow out from the bottom of the pot. Repot with one of the commercially prepared mixes available at garden supply stores or plant nurseries. To avoid nematodes, use a soilless or sterilized medium. A slightly acid medium high in peat moss is a good choice; the pH should be near 6.0, or slightly less. Using an acidulating fertilizer helps maintain favorable pH for gardenia. Follow the fertilizer label directions for dilution and application frequency.

Propagation

Cuttings

Gardenia will take 2–3 years to flower when grown from seed, but less than a year when grown from cuttings or air-layers. Cuttings can be rooted at most times of the year. Terminal leafy cuttings or midsection cuttings with wood 6–8 weeks old should be cut 4–6 inches long. Remove leaves from the lower half of the cutting, keeping two or three sets of leaves on the cutting. Dip the base of stem in a rooting hormone, following the directions for the hormone. Stick the base of the cutting about 1–2 inches deep into a moist rooting medium and firm

the medium around the base. A good rooting medium is a 1:1 mixture of peat moss and perlite or a 1:1 mixture of vermiculite and perlite. A 1:1 mixture of sand or fine cinder with peat moss can also be used. Do not use soil as a rooting medium. It limits drainage and aeration under wet conditions and can contain disease pathogens, such as root rot organisms, and nematodes.

Because cuttings have no root systems, high humidity must be maintained around them using misting or a closed-case propagating device. Do not let the propagation medium dry out. Clear plastic can be used for covering the cuttings (for example, with a plastic bag slipped over a pot), but keep this set-up out of direct sunlight. To keep the plastic from resting on the leaves, support it with wire loops or stakes. Check the cuttings occasionally by carefully removing a few from the media. When a cutting has roots at least an inch long (3–6 weeks), transplant it into a separate container or pot.

Grafting

Where root-knot nematodes are a problem, graft scions from a desired cultivar onto seedlings of a nematode resistant rootstock such as *Gardenia thunbergia*. *G. thunbergia* is grown principally as a rootstock and imparts vigor to species grafted on it. *G. thunbergia* can be started by seeds, cuttings, or air-layering. After soaking seeds in water for 24 hours, sow them ¼ inch deep into flats or pots containing a 1:1 mixture of peat moss and perlite or a 1:1 mixture of peat moss and sand. Seeds germinate slowly (3 months) and erratically. When seedling rootstocks are about 6 inches or taller and with a stem diameter about the thickness of a pencil, they are ready to be grafted.

Use a splice-graft or an inverted saddle graft for best results. After grafting, place the plant in a shaded spot and maintain high humidity to prevent wilting of the scion. To prevent wilting, mist the plants or place them inside a plastic enclosure in a shaded area. Grafts should begin to callus within 2 weeks and be established within a month.

Postharvest handling

Harvest gardenia by cutting, not pulling, the stem below the flower and calyx (the green, leafy base). Harvest buds in the morning and open flowers in the afternoon. Use a plastic bag or container to carry the buds and flowers from the picking area.

Pests and diseases

Problem	Description	Symptoms	Control
aphids	Small, pear-shaped insects; cluster on stems, leaves, buds, and flowers.	Aphids suck the sap, which deforms buds and discolors and curls foliage.	See the controls for scales.
caterpillars	Feed on leaves.	Leaves eaten.	Sevin® insecticide. <i>Bacillus thuringiensis</i> (Bt) insecticide.
mealybugs	White cottony masses found in the leaf axils, underside of leaves, and other protected areas.	Mealybugs suck plant juices, and heavy infestations will coat the leaves with sticky honeydew.	Malathion®, Sevin®, or imidacloprid (Merit®) insecticides. Remove with an alcohol-saturated cotton swab, or wash plants with soapy water and a soft brush or cloth, or pick off with tweezers or a toothpick.
scales	Sedentary insects that are usually green or brown hard shells attached to the stems or undersides and upper sides of leaves, often near the midrib.	Suck plant juices; appear as raised green or brown bumps that make stems or leaves look lumpy; can be scraped off with a fingernail.	Imidacloprid (Merit®) insecticide. Volck® Supreme horticultural oil. Remove with alcohol-saturated cotton swab, or wash plants with soapy water and a soft brush or cloth. Thoroughly wash undersides of leaves where pests may also reside. Scales still cling to the leaves or stems even after they die.
spider mites	These small pests feed primarily on the underside of the foliage.	Spider mites suck juices from leaves causing fine stipples on foliage and silvery webs; they cause colorless or whitish spots on foliage.	Kelthane® miticide. Ultra-fine oil. Insecticidal soap or neem may also be used. Wash foliage with a strong spray of cold water. Wash the plants with soapy water and a soft brush or cloth to remove insects.
thrips	Tiny black insects that feed on flowers and leaf undersides.	Browning of the flower petal margins; distortion of flowers or failure of buds to open.	Orthene insecticide, but it should be used while the flowers are still in bud, because it can burn the petals. Pyrethroid insecticides.
whiteflies	Sap-feeding insects that feed on underside of leaves.	White, cottony appearance of leaf undersides; accumulation of black sooty mold	Successive sprays of insecticidal soaps or oils, synthetic pyrethrum, or imidacloprid (Merit®) insecticide.
powdery mildew (<i>Erysiphe polygoni</i>)	A fungal disease of leaves, favored by relatively cool nights and warm days.	White, powdery spots on leaves.	Preventive or curative fungicides, weed control, and good soil drainage. Increase ventilation and airflow to aid in drying foliage.
root rots	Fungal diseases of gardenia roots, resulting in their malfunction and decay.	Wilting, dieback, stunting, chlorosis of foliage.	Avoid overwatering; avoid planting in heavy soils; use of approved fungicides.

Problem	Description	Symptoms	Control
root-knot nematode	Microscopic, parasitic round-worms (<i>Meloidogyne</i> sp.) that live in and feed on gardenia roots; damages roots and prevents normal uptake of water and nutrients.	Poor growth, stunted, chlorotic (yellow) foliage; premature wilting, low vigor, thin canopy, and leaf and/or bloom loss under relatively mild stress; swollen, knotted, gnarled areas on the roots.	Soil fumigation prior to planting. Graft onto nematode-resistant rootstock, <i>G. thunbergia</i> . Incorporate wood shavings or organic matter in the soil mass to depress nematode population.
sooty mold	Sooty mold is caused by a group of related fungi that grow upon sugary exudates, or honeydew, secreted by sucking insects such as aphids, scales, mealybugs, and whiteflies.	Sooty mold causes black, thin layers of the fungus to form over the upper surface of the leaves.	Control sucking insects. Sooty mold usually weathers away following control of the insect infestation. Once the insects are controlled, wash the sooty mold off the leaves with soap and water.
bud drop	Causes include root injury, insect damage (thrips and aphids), and unfavorable weather conditions (excessively hot, dry weather).	Flower buds abort and drop off just before they open.	Maintain adequate soil moisture but avoid over-watering; avoid insufficient light; avoid planting in locations where nighttime temperatures commonly exceed 55–60°F; control parasitic insects.
chlorosis	A lack of normal green pigmentation in foliage, generally due to deficiency of one or more micro-nutrients (usually iron), root rot, or root-knot nematodes; some leaf yellowing on older leaves is normal.	Pale green leaves with dark green veins; yellowing of foliage.	Acidify the soil with aluminum sulfate, iron sulfate, or wettable sulfur. Iron chelate may be used on the soil or foliage. An acidulating houseplant fertilizer can be used to lower soil pH. Allow the soil to remain evenly moist but not saturated.

The pesticides mentioned are provided for guidance in selecting suitable controls, and their mention is not a recommendation. The pesticide label is the law. Read it before purchasing a pesticide to ensure it is registered for the intended use. Read the entire label before use, observe its precautions, and follow its instructions.

Cultivars (varieties)

<i>Cultivar</i>	<i>Flower color</i>	<i>Flower type</i>	<i>Comments</i>
<i>Aimee Yoshioka</i>	White	Large double flowers 3–5 inches in diameter	Brilliant dark green foliage. Produces an abundance of flowers.
<i>August Beauty</i>	Velvety white	Medium to large double flowers with sweet fragrance	Flowers heavily. Grows 4–6 feet high, 3 feet wide. Dense foliage.
<i>Belmont (Hadley)</i>	White-cream	Large, double flowers 4–5 inches across turning deep ivory with age	Well balanced, bushy shrub with large dark green magnolia-like leaves 4 to 6 inches long.
<i>Chuck Hayes</i>	Ivory white	Semi-double flowers	Grows to 4 feet high.
<i>Coral Gables</i>	White	Large flowers 3–5 inches across	Dark green foliage on compact plants. Produces many blooms.
<i>Daisy</i>	White	Flat faced single fragrant flowers	Grows to 4–6 feet high.
<i>First Love</i>	Creamy white	Very large and fragrant double blooms 4–5 inches across	Larger than 'August Beauty'. 5–6 feet high, 3–6 feet wide.
<i>Fortuneiana</i>	Ivory white	Double, carnation-like flowers up to 4 inches in diameter	Lustrous dark green leaves. Moderate growth rate.
<i>Glazerii</i>	White	Flower flat, 3–5 inches in diameter	Compact grower. Medium green foliage. Bloom ideal for corsage.
<i>Golden Magic</i>	White/yellow	Double flowers	A patented variety from Armstrong Nursery. Flowers open pure white, turn golden yellow. This mutation was discovered on a branch of 'Mystery' that was growing in Hawaii. Grows about 3 feet tall and 2 feet across.
<i>Kleim's Hardy</i>	Ivory white	Medium star-like single flowers with intense fragrance	Grows to 3 feet tall. Low mounding form.
<i>Kuchinashi</i>	White	Open, 5-petaled, single-style blooms	Compact size 2–3 feet high. Bloom profusely.
<i>Miami Supreme</i>	White	Large flowers 4–6 inches in diameter	Medium to dark green foliage.
<i>Mystery</i>	Pure white	Double flowers 4–5 inches across	A well-known, upright growing cultivar growing 4–8 feet high. Needs to be pruned to keep neat.
<i>Radicans</i>	White	Double flowers 1–2 inches across	A dense, spreading shrub to 12 inches high and 2–3 feet wide. It has rooting branches and narrow, dark green leaves often streaked with white, 2–3 inches long. Excellent container plant or ground cover spaced 12–18 inches apart.
<i>Veitchii</i>	Pure white, yellow center	Extra double flowers, 2–3 inches in diameter	Dense, compact, upright bushy plant 3–4-1/2 feet high, 3 feet wide with smaller shiny green leaves. A prolific bloomer with sweetly fragrant flowers. Can be grown well in a container. Excellent for cut flowers.
<i>White Gem</i>	Ivory	Medium-fragrant, star-shaped, single flowers	Dwarf, compact plant 1–2 feet high. Great in containers.

Gardenia flowers have a vase life of 2 days. Flowers that will be used for lei making can be stored in a refrigerator at 40°F for up to 1 day, and 3 days for buds. Spray with water to clean the flowers or buds, and place them on a wet paper towel in a bowl before refrigerating.



A gardenia hedge.

Acknowledgement

Special thanks to Scot C. Nelson and Edwin F. Mersino.

References

- Bradshaw, J. 2003. Gardenias. Florida Cooperative Extension Service, University of Florida. CIR1098.
- Gowdy, M.A. 2002. Home propagation of houseplants. University of Missouri Extension, University of Missouri–Columbia. G 6560.
- Growing plants for Hawaiian lei: 85 plants for gardens, conservation, and business. 2002. College of Tropical Agriculture and Human Resources, University of Hawai‘i at Mānoa. p. 82–83.
- Mersino, E.F. 2002. Mites on ornamentals. Cooperative Extension Service, College of Tropical Agriculture and Human Resources, University of Hawai‘i at Mānoa. Miscellaneous Pests MP-2.
- Neal, M.C. 1965. In gardens of Hawaii. Bishop Museum Press, Honolulu.
- Rauch, F.D. 1996. Tropical landscape plants. 3rd edition. Hawaii Floriculture, Battle Ground, Wash.
- Staples, G. 2005. A tropical garden flora: plants cultivated in the Hawaiian Islands and other tropical places. Bishop Museum Press, Honolulu.
- Trinklein, D.H., and R.R. Rothenberger. 1998. Care of flowering potted plants. University of Missouri Extension, University of Missouri–Columbia. G 6511.
- Wilkins, H.F. 1986. *Gardenia jasminoides*. In: A.H. Halevy (ed.), CRC handbook of flowering, p. 127–131. CRC Press, Inc., Boca Raton, Florida.

Mention of a trademark, company, or proprietary name does not constitute an endorsement, guarantee, or warranty by the University of Hawaii Cooperative Extension Service or its employees and does not imply recommendation to the exclusion of other suitable products or companies.