

Louisiana State University

LSU Digital Commons

Sustainable Gardening for School and Home
Gardens

LSU AgCenter

11-2021

Sustainable Gardening for School and Home Gardens: Citrus

Johannah Frelief

Denyse Cummins

Carl Motsenbocker

Follow this and additional works at: <https://digitalcommons.lsu.edu/susgard>

SUSTAINABLE GARDENING

FOR SCHOOL AND HOME GARDENS

Citrus



QUICK FACTS

- Plant family: *Rutaceae* (Rue)
- Harvest Season: Fall/winter
- Life cycle: Perennial
- Plant to first harvest: 3-4 years



Create a Sustainable Garden by improving soil health, relying on locally available materials and resources, and practicing environmentally sound horticultural practices

History

Citrus trees are members of the *Rutaceae* family, also known as the Rue family, which includes mostly flowering woody trees and shrubs. Trees in this family produce citrus fruits, including popular crops for Louisiana, such as satsumas, oranges and kumquats (see Figure 1). Citrus trees cannot survive in areas that regularly freeze, so production is concentrated along the Gulf Coast, particularly in southern areas of Louisiana and Florida.

Sweet oranges are tropical and subtropical trees likely native to Asia (northeastern India and southern China) and transported throughout the Mediterranean by Italians and Portuguese from 1450 to 1500 (see Figure 2). Spanish explorers brought the orange tree to South America and Mexico in the 1500s and then to Florida in 1565 and probably New Orleans as well. In the 1700s citrus migrated westward to Arizona and California.

Grapefruits are considered a pummelo mutation and are likely native to the West Indies (see Figure 2). They were first recorded in 1750 in Barbados. In 1814 the name “grapefruit” was coined in Jamaica. Grapefruit trees were transported to Florida in the early 1800s.

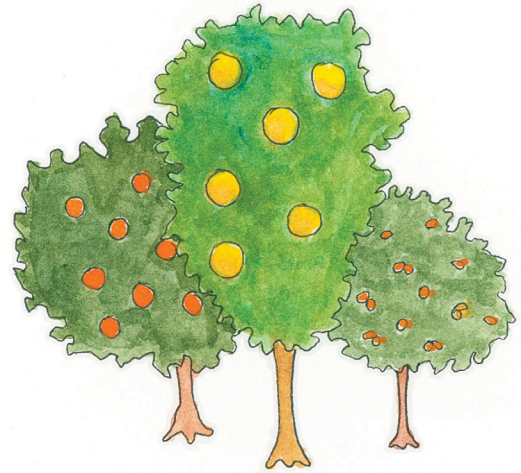


Figure 1. Citrus belongs to the *Rutaceae* plant family.

Satsumas are likely native to China but were first recorded in Japan more than 700 years ago (see Figure 2). Japan is still the largest producer of satsumas. These citrus trees were not reported in the U.S. until the late 1800s in Florida. Many satsuma trees were imported from Japan in the early 1900s and planted throughout the Gulf Coast.

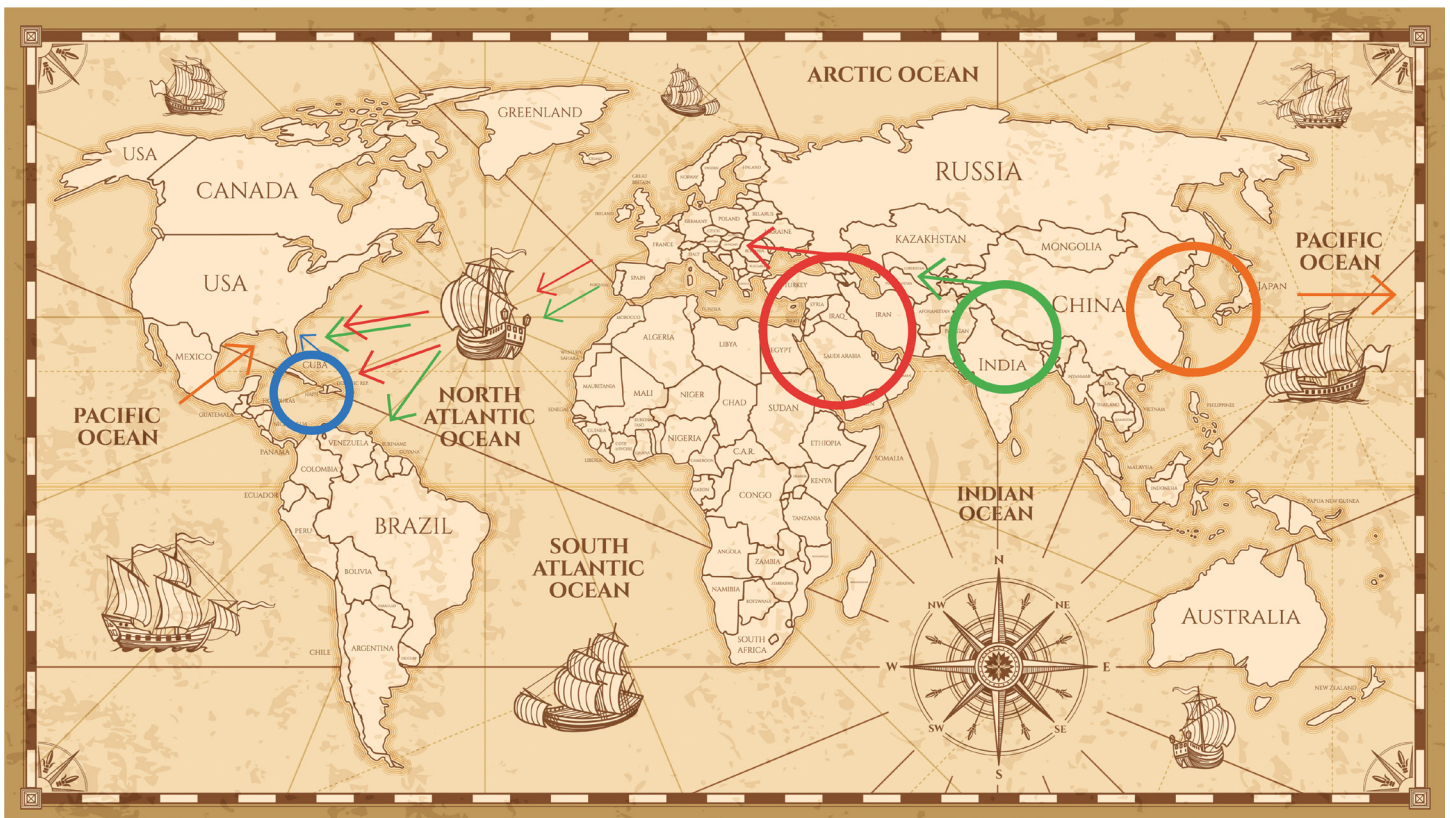


Figure 2. Map showing the origin and migration of sweet oranges (green), grapefruit (blue), satsumas (orange) and lemons (red) to the U.S.

Lemons are likely native to Asia, appearing in records from 200 A.D. in Italy and from 700 A.D. in Iraq and Egypt (see Figure 2). Lemons were then distributed throughout the Mediterranean region and brought to Hispaniola (modern day Haiti and Dominican Republic) by Columbus in 1493. These Spanish explorers brought lemons to Florida along with other

citrus, and expansion reached California by the mid-1700s.

Citrus trees are perennials and can be generally characterized as either sweet or acid. Trees that produce sweet citrus include satsumas, oranges, mandarins, tangerines, tangelos and grapefruit. Acid types of citrus include kumquats, calamondins, lemons and limes.

Growing

Varieties

There are many varieties of citrus trees that vary by fruit size and taste, harvest time and cold hardiness (see Figure 3). Citrus can be produced in Louisiana and trees are generally easy to grow, although optimal growing area is limited due to potential freezes.

It is important to select citrus types that are suitable to grow in the south, central or north region (see the three zones in Figure 4), based on risk of hard freezes.

In Zone A (south Louisiana), all citrus varieties can be grown since there is very low risk of hard freezes. Zone B (central Louisiana) has moderate risk for hard freezes. In this area, cold-hardy types like kumquats and satsumas should be selected, while moderately hardy types like sweet and navel oranges, mandarins and grapefruits may be planted if protected in freezing weather. Zone C (north Louisiana, or the top half of the state) has regular potential for hard freezes, and only cold-hardy types (kumquats and satsumas) should be planted and protected during hard freezes.



Figure 3. Cold hardiness of different types of citrus.

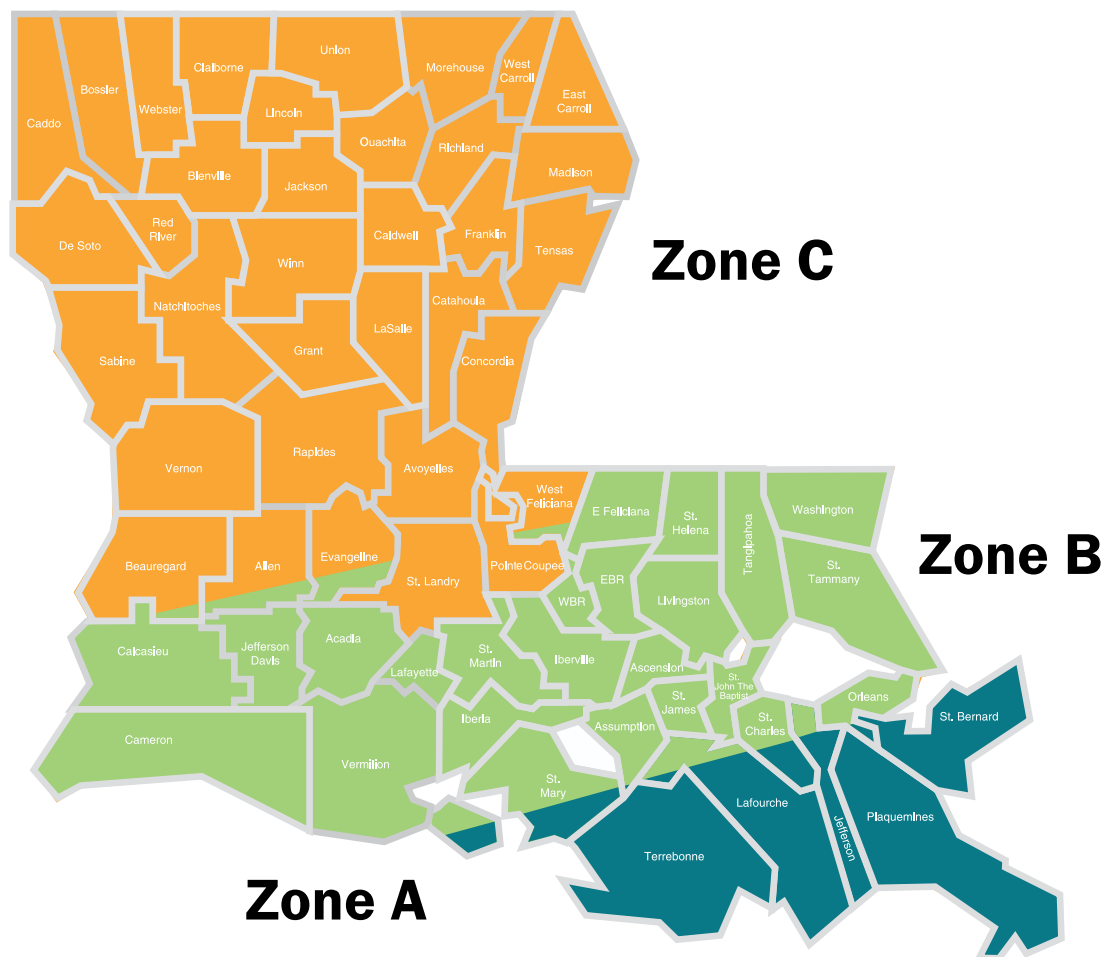


Figure 4. Zones of Louisiana based on risk of hard freezes for citrus production. Citrus is best adapted to Zone A. Selecting cold-hardy types and providing adequate cold protection, citrus can be successful in Zone B. In Zone C only a few types can be grown, with extensive cold protection measures in most years.

Kumquats are one of the most cold-hardy citrus types, tolerating temperatures as low as 15-17 degrees Fahrenheit. Kumquats are small, sweet or acidic, orange, seeded fruit about 1 inch in diameter (see Figure 5) that can be eaten fresh (consumed with the smooth rind) or used in making candies, marmalade or jellies. These vigorous, attractive, shrublike trees generally ripen from mid-October to February.

Satsumas are very popular and successfully grown in south Louisiana. Trees produce easy-to-peel fruit ranging in size from small to large (by variety) and maturing throughout the fall. Satsumas tolerate colder temperatures, require less cold protection and produce a more consistent crop than other types of sweet citrus. Satsuma fruit turn from green to yellow as they ripen and finally to orange at full maturity (see Figure 5). They can be consumed starting when fruit turn yellow, extending the harvest season. Satsumas are within the citrus group

called mandarins along with mandarins, tangerines and tangerine hybrids.

Sweet and navel oranges are moderately cold hardy and are also very popular in south Louisiana, although hard freezes (20 F and lower) can severely damage trees. Some varieties may be planted in the central region if protected from the cold. Sweet orange trees produce round, sweet and flavorful orange fruits with varieties that vary from seedless to those having many seeds (see Figure 5). Sweet oranges ripen from October to June, depending on variety. Navel oranges have a navel-like secondary fruit formed within the end of the fruit and are generally larger than other sweet orange varieties.

Grapefruit are also moderately cold hardy and may be grown successfully in south Louisiana and in the Central region with cold protection. Grapefruit trees produce medium to large round fruit with a tart flavor and few seeds. The skin can be yellow to orange in color, with

yellow, pink or red flesh (see Figure 5). Generally, grapefruit is ready to harvest from November to May, depending on the variety.

Other citrus, like mandarins, tangerines, tangelos and calamondins, are only recommended for south Louisiana, as they are fairly tender. Mandarin trees produce medium to large fruit with a deep orange skin and honey flavor. Tangerine trees produce medium to large, slightly flattened fruit with an orange-red, flavorful flesh. A tangelo is a hybrid between a grapefruit and a tangerine, producing a medium, deep orange fruit that is very juicy and flavorful. Fruit for these citrus varieties generally mature from November to February. Calamondin is a small, round fruit that looks similar to a tangerine with very acid pulp and a high pectin content

(great for marmalade). Fruits are yellow to orange and are used as a substitute for limes and lemons. Calamondin has good cold hardiness and is attractive as an indoor or container plant. See Figure 5.

Lemons and limes are the most tender citrus varieties, with only a few varieties recommended for south Louisiana, and then only in containers or in protected areas and protected from freezing temperatures. The Meyer lemon, a cross between a pomelo and a mandarin, is the most cold hardy of the lemon/lime group, surviving to mid-20 F. Producing tart yellow (lemon) or green (lime) fruit, these trees set fruit starting in October and often continue to produce throughout the year. See Figure 5.



Figure 5. Some types of citrus fruits (from left to right): grapefruit, navel orange, mandarin, lemon, lime and kumquat.

See the recommended citrus varieties for Louisiana in Table 1.

Table 1. Recommended Citrus Varieties for Louisiana

Variety Name	Description	Tree Habit	Harvest Time	Zones
Kumquat				
Meiwa	Round, vibrant orange fruit; sweet flesh; few seeds; cold hardy	Small and vigorous; round, bushlike habit	October to March	A, B, C
Nagami Sour	Oblong, deep orange fruit; smooth and sweet skin; tart and acid flesh; few seeds; cold hardy	Small but vigorous; round, bushlike	October to March	A, B, C
Satsuma				
Armstrong Early	Large fruit with light orange skin; early maturing; fruit must be harvested promptly to avoid splitting or becoming puffy	Dwarf and upright	September to October	A, B
Brown's Select	Medium, seedless fruit; sweet and juicy; clustered; cold hardy	Large, dense and spreading	October to December	A, B
Early St. Ann	Medium fruit; low risk of puffiness in fruit; seedless and juicy; thin skin	Medium sized tree; spreading	Late September to mid-October	A, B
Kimbrough	Large fruit; very productive; cold hardy	Large, strong, spreading habit; vigorous	November	A, B
Louisiana Early	Small to medium fruit; seedless; thin skin; low risk of puffiness in fruit	Medium sized tree; spreading	Late September to mid-October	A, B
Owari	Medium, orange-red fruit; seedless; high quality fruit; very sweet flavor; productive; drought tolerant and cold hardy	Medium, spreading, vigorous tree	October to December	A, B, C
Orange				
Hamlin Sweet	Medium, round fruit; seedless; sweet and juicy; productive; cold tolerant	Medium-large; moderately vigorous	November to January	A
Louisiana Sweet	Medium to large, round fruit; flavorful; many seeds; cold hardy	Large, rounded, bushlike; vigorous	December	A, B
Moro Blood Orange	Medium-large, round fruit with crimson and orange-colored flesh and skin; sweet and juicy with few seeds	Moderately vigorous; rounded, spreading shape	Late December to February	A
Pineapple Sweet	Medium, light orange fruit; pineapple flavor; juicy; many seeds	Medium-large; frost sensitive; moderately vigorous	November to January	A
Valencia	Medium-large fruit; few seeds; excellent flavor; juicy; most popular variety worldwide	Vigorous, upright habit; prolific	April to June	A
Washington Navel	Large, deep orange, round fruit with distinctive navel; seedless; thin skin; sweet and juicy; productive; cold tolerant	Large, rounded and spreading	October to December	A, B

Variety Name	Description	Tree Habit	Harvest Time	Zones
Grapefruit				
Marsh	Large fruit; light yellow peel and flesh; sweet and slightly acid; seedless; cold tolerant	Large tree	December to May	A, B
Rio Red	Large fruit; seedless; light yellow peel and deep red flesh; sweet and juicy with few seeds	Hardy and vigorous	November to May	A, B
Ruby Red	Large fruit; few seeds; yellow peel and red flesh; sweet and juicy	Vigorous; shiny, green foliage	November to May	A, B
Star Ruby	Large fruit; yellow-orange peel and deep red flesh; thin skin; tart and juicy	Semidwarf or standard size	October to May	A
Mandarin				
Ponkan	Medium, deep orange fruit; tangy honey flavor; few seeds and easy to peel; may become puffy when left on the tree; cold hardy to 30 F	Moderately vigorous; upright, weak limbs; dark green, shiny leaves	Mid-December to mid-January	A
Tangerine				
Clementine	Medium, dark orange-red fruit; seedless; easy to peel; sweet and juicy; cold tolerant	Small tree; requires cross-pollination with another tangerine, tangelo or orange	October to December	A, B
Dancy	Medium, deep orange fruit; slightly flattened; may dry out when left on the tree; easy to peel	Brittle wood; weak limbs; tendency to overbear; large and vigorous; upright; densely foliated	Mid-December to February	A
Robinson	Hybrid between Clementine mandarin and Orlando tangelo; medium-large, deep orange fruit; peels easily; rich, sweet flavor	Brittle wood; weak limbs; requires cross-pollination with another tangerine, tangelo or orange	Mid-October to December	A
Sunburst	Hybrid between Robinson and Osceola tangerines; medium, red-orange fruit; easy to peel; high quality and flavorful; sweet and juicy	Vigorous; upright; requires cross-pollination with another tangerine or tangelo	Late November to December	A
Tangelo				
Minneola	Medium, orange-red fruit; bell-shaped; few seeds; sweet	Vigorous; requires cross-pollination with another tangelo or tangerine	December to January	A
Orlando	Hybrid between Duncan grapefruit and Dancy tangerine; medium, light orange fruit; sweet, juicy, easy to peel; many seeds; cold tolerant to 20 F	Moderately vigorous; requires cross-pollination with another tangelo or tangerine	November to January	A, B
Lemon				

Variety Name	Description	Tree Habit	Harvest Time	Zones
Meyer	Large, lemon yellow fruit; somewhat cold hardy; sweet; few seeds	Medium; everbearing; adaptable	October to December	A, B
Lime				
Mexican	Medium, green-yellow fruit; few seeds; productive; sweet-tart with thin skin	Thorny and thornless types; small; very cold sensitive	January to December	A
Persian	Medium, green-yellow fruit; few seeds; thin, smooth skin	Medium; very cold sensitive	January to December	A

Notes: Table reproduces recommendations from LSU AgCenter. Variety descriptions compiled from LSU AgCenter, Star Nursery, Citrus.com and Just Fruits and Exotics.

Other citrus varieties recommended for Louisiana: Ambersweet orange, Marrs Early orange, Henderson/Ray grapefruit, Changsha tangerine, Ponderosa lemon, Eureka lemon.

When and How to Plant

It is recommended to start with young containerized citrus trees, which are available year-round. Trees are usually grafted, and it is important to obtain healthy plants from a reputable nursery and look for a certificate indicating that the tree has been inspected and is free of disease. It is recommended to select a 2-4-foot-tall tree with 3-4 evenly distributed, well-developed upward growing branches.

Grafting is a horticultural technique used to propagate fruit trees using asexual reproduction to ensure that desired characteristics (e.g., dwarfing, cold hardiness, tolerance to wet soils) are maintained. The top part (scion) is cut from the cultivar of interest (or parent tree) and placed on a compatible rootstock. The grafted plant has the vascular tissues from the selected cultivar and the rootstock growing together. See Figure 6 for an example of a citrus graft: The top part is the variety of interest, such as a Brown's Select satsuma, grafted onto *Poncirus trifoliata* (called trifoliolate orange) rootstock. Trifoliolate orange provides added tolerance to adverse soil conditions and cold temperatures.

Transplanting can be done at any time of the year, although late winter to early spring, after danger of freezing temperatures, is ideal. Refer to the Citrus Planting Guide (Table 2) for the recommended months to plant young trees, along with details on spacing. Different types of citrus have different recommended spacings based on the size of the tree at maturity.

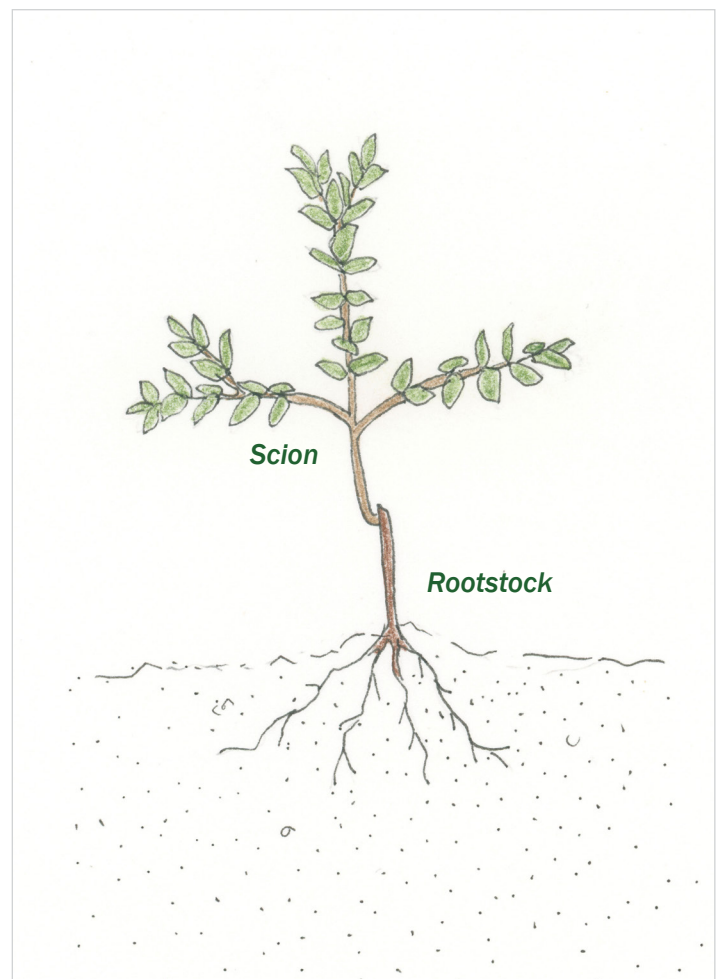


Figure 6. A grafted citrus plant with the scion and rootstock labeled.

Table 2. Citrus Planting Guide

Transplant Outside Dates	Plant Spacing (feet)		Years to Harvest*	Annual Yield Per Mature Tree
January-March	Orange, Grapefruit	30-40	3-4 years	200-350 lbs.
	Satsuma, Tangerine, Mandarin, Tangelo	20-30		250 lbs.
	Kumquat, Lemon, Lime	15-20		40-100 lbs.

*Transplant to first harvest

Note: Table adapted from LSU AgCenter Home Citrus Production.

It is recommended to remove about an inch of growing medium around the root ball before transplanting for better establishment and growth. The outer roots will be exposed, which will allow them to grow quickly into the soil. At the recommended spacing, dig a hole that is deep enough so citrus trees can be set at the same depth as they were in the pot and twice as wide as the root ball. Fill in the hole around the plant with the native soil dug from the hole, firm the soil around the plant and water thoroughly (see Figure 7).

After transplanting, it is recommended to remove any grass or weed cover extending out about 3-5 feet. Cover with a thick layer (3-6 inches) of organic mulch and prune some of the low, small branches up to 18 inches from the soil level.

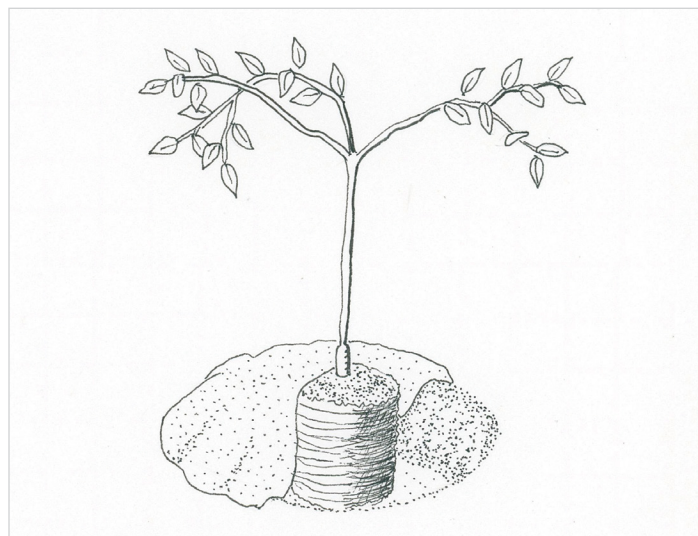


Figure 7. Plant a containerized citrus tree at same depth as it was growing in the container and twice as wide so the roots aren't crowded.

Where to Plant

Citrus trees are most productive when grown in full sun (six hours per day), but some types will tolerate partial shade. Citrus trees do best in a well-drained sandy loam with a soil pH between 6.0 and 8.0. Citrus do not tolerate excessive moisture but will grow in many soil types if well-draining or planted in raised beds. Citrus prefer soil high in organic matter.

It is recommended to plant trees at least 6-8 feet away from any structures or pavement, depending on the mature tree size for the particular citrus type. Avoid planting near drain fields or septic systems. It is recommended to plant citrus trees in a protected area, such as near the south side of a building, especially in central and north Louisiana. This will aid in cold weather protection from the north.

Citrus trees are self-pollinating, as their flowers have both male and female parts. Some tangerine and tangelo varieties, however, will have better fruit set when cross-pollinated with another variety of tangerine, tangelo or orange tree. Most citrus trees flower during the spring and summer to produce fruit in the fall and winter, depending on the citrus type. Trees usually start bearing fruit in the fourth season, and productivity and fruit yield increase until about the 10th year, when it levels off. Under good management and care, fruit trees can produce for decades.

Plant Care

It is recommended to follow [sustainable gardening](#) principles.

Watering: It is critical to provide adequate irrigation

for young plants and during fruit bud formation in the fall. Drip irrigation is very helpful to ensure consistent, adequate water for the long production season. On average, plants that are 1 year old require about 3.5 gallons of water per week. Each year of growth doubles the weekly water demand (i.e., 2-year-old plants require about 7 gallons of water per week), up to a maximum of 35 gallons of water per week. Weekly watering is recommended over daily watering. As trees increase their root systems each year, the need for hand watering decreases, depending on the season. In dry years, watering is still required for older trees.

Fertilization: Unlike most trees and shrubs, young citrus trees may be fertilized during their planting year when new growth starts. Avoid fertilization after June, which would cause new growth that may be damaged by winter cold. Nitrogen is the most important nutrient; the number of flowers formed is proportional to the nitrogen status of the tree. Commonly seen nutrient deficiencies are zinc, magnesium and iron chlorosis, which are often associated with growing citrus on high pH soils.

Organic fertilizers, such as compost, fish emulsion, composted poultry litter or manure, worm castings, and blood or bone meal, originate from living organisms. They are safer and far more environmentally sustainable than traditional synthetic fertilizers. They naturally release nutrients more slowly and over a longer period of time. When applying organic fertilizer, it is important to use in unison with compost, cover crops and crop rotation, which all work together to build soil health. Learn how to convert inorganic fertilizer recommendations to organic fertilizers [here](#).

Alternatively, a synthetic fertilizer may be used. For newly set trees, about six weeks after planting, apply one-half pound of 13-13-13 fertilizer per tree. Beginning in mid-March of the following year, apply 1.5 pounds of 13-13-13 per year of tree age (i.e., 3 pounds for a 2-year-old tree, 6 pounds for a 4-year-old tree), scattered over the root system and watered in. Increase the amount by 1.5 pounds every year until the tree reaches maturity at 10-12 years. Mature trees should receive about 15 pounds of fertilizer every year in early spring. If an organic fertilizer is preferred, compost, aged manures and blood meal are good slow-release nitrogen sources. Rake back the mulch, scatter fertilizer material evenly over the root system and reapply mulch.

Weeds: Organic mulch will control most of the weeds;

hand pull weeds close to the plant and reapply mulch as needed, not allowing the mulch to touch the trunk. It is important to keep a 3-5-foot weed-free area around each tree to prevent competition for nutrients and moisture.

Freeze Protection: Temperatures between 20-30 F for more than 5 hours will cause fruit damage, while temperatures below 20 F for more than 5 hours can kill some trees. Reduce freeze damage by controlling pests and diseases to keep trees healthy; clearing the ground around the tree from mulch, grass and weeds; and covering the tree with a plastic tent during freezes. As daytime temperatures moderate, it is essential to remove plastic coverings before the sun can overheat and damage the tree. Bare ground under trees allows for greater absorption of the sun's heat. Young trees (4 years or younger) can also be banked with soil up to 15 inches up the trunk, or the trunk can be wrapped heavily with cloth to insulate. Remove soil banks or wrappings after the last freeze date.

Pruning: The purpose of pruning young, nonbearing trees is to shape the tree and develop main supporting branches that are distributed around the tree before growth starts in the spring. If possible, select a tree 2-4 feet tall with a branching framework already in place. If nursery-pruned citrus trees are not available, trees should be pruned at planting time. After pruning, the top of the tree should have 3-4 evenly spaced branches in an upward growing pattern starting at 18-24 inches above the ground. Growth below these inverted umbrella-shaped branches should be removed. After creating this branching framework, some pruning is needed during the first three years for citrus trees. See Figure 8.



Figure 8. Pruning a citrus tree during the first three years.

Pruning of older trees should be done in midwinter (January and February) to thin out thick growth, remove dead or crossing branches, branches touching the ground and long, vigorously growing shoots (especially those growing from the soil line). Additional pruning may be required to remove branches damaged by disease or freeze. When pruning, cut flush with the trunk to avoid leaving a stub. Unnecessary pruning may reduce fruit production.

Insect pests and diseases: Some citrus varieties are more susceptible to certain diseases and insects. When planting few citrus trees, they may not require insect pest management measures as they may be

naturally controlled. The key citrus insect pests are aphids, scales, Asian citrus psyllid, mites, root weevils, leafminers and leaf-footed bugs. Citrus trees are also susceptible to fungal diseases (e.g., anthracnose and citrus scab) and bacterial diseases (e.g., citrus canker and citrus greening). Prevention and regular monitoring can help identify symptoms of these insect pests and diseases to allow for early diagnosis and management. Generally, recommended tools for disease prevention are using mulches, adequate pruning and plant spacing, weed control and avoiding overhead irrigation. See Table 3 to aid in diagnosis and management of some common citrus insect pests and diseases.

Table 3. Organic and Natural Management for Common Citrus Insect Pests and Diseases

Symptoms	Diagnosis	Organic and Natural Management
<ul style="list-style-type: none"> Fungal disease that predominantly infects orange, grapefruit and lemon trees Tan spots with purple border on foliage Dry, firm fruit decays and fruit rots Lesions produce dark fungal spores Twig death; leaf drop Wet weather and stressed trees 	Anthracnose	<ul style="list-style-type: none"> Remove infected fruit and dispose away from the trees Avoid overhead irrigation Fungicides
<ul style="list-style-type: none"> Soft-bodied insect with a tough shell that is small, round and either red-brown, yellow-orange or tan Feeding on foliage, fruit, wood of trees Leaf and fruit drop; twig death Peaks in March-April, June-July, September-October 	Armored scales (Florida red, yellow, purple, Glover)	<ul style="list-style-type: none"> Weed control Beneficial insects: parasitic wasps Petroleum oil sprays Supplementary systemic insecticide
<ul style="list-style-type: none"> Spreads citrus greening (bacterial disease) Very small insects that lay bright orange eggs on new growth Feed on new growth foliage 	Asian citrus psyllid	<ul style="list-style-type: none"> Weed control Beneficial insects: parasitic wasps Yellow sticky cards to monitor when use of pesticides is warranted
<ul style="list-style-type: none"> Bacterial disease spread when leaves are wet Highly contagious Tiny raised, brown blisters that expand on leaves and fruit Lesions on both sides of leaves Corky, craterlike lesions on fruit Defoliation and twig dieback Premature drop of blemished fruit 	Citrus canker	<ul style="list-style-type: none"> Select less susceptible citrus types (lemon, satsuma, tangerine, mandarin, kumquats) Remove infected trees Purchase trees from certified nurseries only

Symptoms	Diagnosis	Organic and Natural Management
<ul style="list-style-type: none"> Bacterial disease transmitted by Asian citrus psyllid Blotchy leaf mottling, thick veins; yellow shoots Twig death Stunted growth Green color on ripe fruit; bitter and sour tasting; irregular ripening; lopsided 	Citrus greening (yellow shoot disease or huanglongbing)	<ul style="list-style-type: none"> Worse on some varieties (sweet orange and mandarin highly susceptible) Remove infected trees Manage Asian citrus psyllid Purchase trees from certified nurseries only
<ul style="list-style-type: none"> Small, deep yellow, wedge-shaped mites Feeding on the outside of fruit: silvery rind on lemons, brown rind on mature oranges, black rind on immature oranges Early spring to early summer in warm, humid conditions 	Citrus rust mite	<ul style="list-style-type: none"> Weed control Beneficial insects: predatory mites Insecticides
<ul style="list-style-type: none"> Small, red mites that lay red and white eggs on foliage Corresponds with new tree growth (spring, late summer, early fall) Fruit infestations and stippling on upper leaf surface Water stress, hot and dry weather 	Citrus red mite	<ul style="list-style-type: none"> Weed control
<ul style="list-style-type: none"> Fungal disease Most citrus trees are susceptible Scabby wart growths on foliage, fruit, young shoots Misshapen, distorted fruit with thick and puffy rind Moist conditions, 68-80 F 	Citrus scab	<ul style="list-style-type: none"> Select less susceptible citrus types (oranges and limes) Remove infected leaves and fruit Avoid overhead irrigation Morning watering Fungicides
<ul style="list-style-type: none"> Large weevil that may be gray, yellow, orange, or black Feeds on foliage Larvae (white grubs) feed on root, causing root injury and potential tree death 	Diaprepes root weevil	<ul style="list-style-type: none"> Weed control Pesticides
<ul style="list-style-type: none"> Feed on ripening fruit Fruit drop Transmit a yeast that causes dry rot 	Leaf-footed bug	<ul style="list-style-type: none"> Weed control Beneficial insects: tachinid fly Insecticides
<ul style="list-style-type: none"> Small pests that lay eggs on the underside of foliage Larvae tunnel in the leaf, leaving visible trails Leaf curl 	Leafminers	<ul style="list-style-type: none"> Weed control Prune suckers Beneficial insects: parasitic wasps Spinosad, neem

Symptoms	Diagnosis	Organic and Natural Management
<ul style="list-style-type: none"> Bright orange, pink, yellow, or brown body covered in wax Lay pink-red eggs in a sac Decreased vigor, fruit drop, defoliation Secrete honeydew on the plant which develops into sooty mold Tree death from injected toxins 	Soft scales (cottony cushion and Florida wax)	<ul style="list-style-type: none"> Weed control Increase air flow by pruning dense canopies Beneficial insects: vedalia beetle and parasitic flies
<ul style="list-style-type: none"> Mites are small and pale yellow with dark spots Webbing on fruit and foliage, clear and opaque Yellowing or stippling on foliage Mites and eggs on underside of foliage 	Two-spotted spider mite	<ul style="list-style-type: none"> Weed control Adequate irrigation Beneficial insects: predatory mites, lady beetles, six-spotted thrips, minute pirate bug Petroleum oil sprays Miticides

Note: Adapted from LSU AgCenter and University of California Integrated Pest Management guides. The Louisiana Pesticide Law regulates the use of pesticides in schools to protect children and staff from harmful exposure to chemicals and is enforced by LDAF. The recommended alternative to routine pesticide use is integrated pest management (IPM), which combines pest control, disease management techniques and organic/natural alternatives, many of which are found in this table.

Harvest and Storage

In general, citrus is ready for harvest in the fall and winter when the fruit has turned from green to the optimal ripeness color. To harvest citrus without damaging the plant, gently pull the fruit off the stems by hand or cut the stem of the fruit with shears. During fruit production, citrus may be harvested every week for 3-5 months, varying by variety. Be sure to harvest citrus fruit before they are exposed to freezing temperatures. Citrus fruits left on the tree develop more color and improve quality

with exposure to low temperatures, but extended freezing temperatures may freeze the fruit. Harvest fruit before the end of February to avoid reducing blooms and fruit set for the next year's crop.

Citrus can be stored for a few days at room temperature or in the refrigerator for several weeks. Preserve citrus by juicing the fruit and freezing peels or zest. Some citrus can be used to make marmalades or curd, which can then be canned.

Nutrition

Citrus Is Nutritious and Good for You

Rich in vitamin C

Important for bones, skin, blood vessels.

Good source of dietary fiber

Important for bowel health, lowering cholesterol, controlling blood sugar and maintaining a healthy weight.

Excellent source of folate

Helps to maintain healthy cell growth and function.

Recipes

Taste Test Ideas



Lemonade or Limeade



Citrus Smoothie



Citrus Salad

Other websites with many citrus recipes:

**Oregon State University's
Food Hero**

foodhero.org/recipes/category/1334

Recipes include creamy fruit salad, fruit smoothie and more.

USDA MyPlate Kitchen

Visit www.myplate.gov/myplate-kitchen/recipes and search for citrus recipes. Recipes include orange delight juice, lemon potatoes, citrus vegetables and more.

**Produce for Better
Health Foundation**

Oranges: fruitsandveggies.org/fruits-and-veggies/orange/?view=recipes

Recipes include orange-sesame quinoa salad, orange cream popsicles, citrus ceviche and more.

Grapefruit: fruitsandveggies.org/fruits-and-veggies/grapefruit/?view=recipes

Recipes include grapefruit ice, rise and shine Rio shake, early morning round-up parfait and more.

Lemons: fruitsandveggies.org/fruits-and-veggies/lemon/?view=recipes

Recipes include blueberry lemon ricotta rice cakes, cherry rose lemonade and more.

Limes: fruitsandveggies.org/fruits-and-veggies/lime/?view=recipes

Recipes include guacamole, avocado and fresh tomato salsa, and more.

Louisiana HARVEST of the MONTH

Orange Cranberry Oatmeal

Home Recipe

Serves: 5
Prep Time: 5 minutes
Cook Time: 10 minutes

Ingredients

- 2 oranges or satsumas
- 1 tsp orange zest
- 2 $\frac{3}{4}$ cup milk
- $\frac{1}{2}$ cup dried cranberries
- 2 $\frac{1}{2}$ cup oats
- 1 tsp sugar
- 2 tsp brown sugar
- $\frac{1}{4}$ tsp cinnamon
- Optional: toasted walnuts

Nutrients Per $\frac{2}{3}$ Cup Serving

- | | |
|-----------------|---------|
| • Calories | 243 |
| • Total Fat | 2.6 g |
| • Saturated Fat | 0.5 g |
| • Cholesterol | 2.17 mg |
| • Sodium | 60 mg |
| • Carbohydrates | 45 g |
| • Dietary Fiber | 5.7 g |
| • Protein | 9.5 g |
| • Calcium | 271 mg |
| • Iron | 1.6 mg |
| • Vitamin C | 31.4 mg |

Cooking Instructions

1. Zest orange to get 1 teaspoon of zest. Supreme the oranges (or peel the satsumas) and cut the segments into $\frac{1}{2}$ inch pieces .
2. In a large pot, bring the milk to a boil. Add the orange zest, dried cranberries, oats, sugars and cinnamon. Reduce heat and let the oats cook for about 5 minutes.
3. Remove from heat and stir in $\frac{3}{4}$ cup of orange pieces. Serve topped with extra orange slices and walnuts.



For More Information
louisianafarmtoschool@agcenter.lsu.edu
www.SeedstoSuccess.com

This Institution is an equal opportunity provider.



THE LOUISIANA FARM TO SCHOOL PROGRAM

Sources

- LSU AgCenter, Louisiana Home Citrus Production www.lsuagcenter.com/~media/system/0/3/0/3/0303c226dfecea46ee66229eb7bf1d7f/pub1234citrus_adapdf.pdf
- LSU AgCenter, The Louisiana Home Orchard www.lsuagcenter.com/NR/rdonlyres/CF2350DE-B6C5-43E8-B1B6-E9D2AA4F54B0/38101/pub1884homeorchardHIGHRES1.pdf
- University of Florida IFAS Extension, Citrus Culture in the Home Landscape <https://edis.ifas.ufl.edu/hs132>
- University of Florida IFAS Extension: The Satsuma Mandarin edis.ifas.ufl.edu/ch116
- Texas A&M AgriLife Extension, Fruit & Nut Resources: Citrus aggie-horticulture.tamu.edu/fruit-nut/fact-sheets/citrus
- Texas A&M AgriLife Extension, Texas Citrus and Subtropical Fruits: Home Fruit Production-Grapefruit aggie-horticulture.tamu.edu/citrus/grapefruit.htm
- University of Georgia Extension, Citrus Fruit for Southern and Coastal Georgia extension.uga.edu/publications/detail.html?number=B804&title=Citrus%20Fruit%20for%20Southern%20and%20Coastal%20Georgia#Historical
- University of California Agriculture and Natural Resources, Agriculture: Pest Management Guidelines for Citrus www2.ipm.ucanr.edu/agriculture/citrus/
- Morton, J. 1987. Orange. p. 134–142. In: Fruits of warm climates. Julia F. Morton, Miami, FL. www.hort.purdue.edu/newcrop/morton/orange.html
- Morton, J. 1987. Lemon. p. 160–168. In: Fruits of warm climates. Julia F. Morton, Miami, FL. hort.purdue.edu/newcrop/morton/lemon.html
- UMass Extension Vegetable Program: Disease, Insect, and Mites Fact Sheets ag.umass.edu/vegetable/fact-sheets
- Alabama A&M & Auburn Universities Extension, Crop Production www.aces.edu/blog/category/farming/crop-production
- University of Georgia Extension, How to Convert an Inorganic Fertilizer Recommendation to an Organic One, Circular 853. extension.uga.edu/publications/detail.cfm?number=C853

Authors:

Johannah Frelier, M.P.H.

JFrelier@agcenter.lsu.edu

Louisiana Farm to School Program Manager
Louisiana State University Agricultural Center

Denyse Cummins, M.S.

DCummins@agcenter.lsu.edu

Extension Horticulturist
Louisiana State University Agricultural Center

Carl Motsenbocker, Ph.D.

CMotsenbocker@agcenter.lsu.edu

Louisiana Farm to School Executive Director
Professor of Horticulture and Sustainable Agriculture
Louisiana State University Agricultural Center

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, sex, disability, age, or reprisal or retaliation for prior civil rights activity in any program or activity conducted or funded by USDA.

Persons with disabilities who require alternative means of communication for program information (e.g. Braille, large print, audiotape, American Sign Language, etc.), should contact the Agency (State or local) where they applied for benefits. Individuals who are deaf, hard of hearing or have speech disabilities may contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, (AD-3027) found online at: How to File a Complaint, and at any USDA office, or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by:

1. Mail: U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410;
2. Fax: (202) 690-7442; or
3. Email: program.intake@usda.gov.

This institution is an equal opportunity provider.



Visit our website: www.LSUAgCenter.com

Luke LaBorde, Interim LSU Vice President for Agriculture
Louisiana State University Agricultural Center
Louisiana Agricultural Experiment Station
Louisiana Cooperative Extension Service
LSU College of Agriculture

PUB3761-L (online) 11/21

The LSU AgCenter and LSU provide equal opportunities
in programs and employment.