

Growing Citrus in Containers

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Growing citrus in containers can offer certain advantages, but can also present some special challenges. I have written this brief guide to help you get started, and to avoid some of the most common mistakes.

Choosing a tree. The first step is deciding just what type of tree to buy. Even though almost all citrus can be grown in a container, it pays to choose a variety that stays relatively small. There are many varieties to choose from, here are some suggestions.

Satsuma Mandarin

Kumquats and Kumquat Hybrids

Calamondin Orange

Meyer and other Lemon

Key Lime

'Flying Dragon'- Trifoliolate Orange (ornamental only) contorted, very hardy.

Procimequat - Ornamental only. Makes an interesting specimen with tiny, marble size fruit.

Selecting a Container. Your next decision is to choose a suitable container. Look for one that is neither too large, nor too small. One or two sizes larger than the container the tree is currently in is normally about right. A pot that is too large will tend to dry too slowly, resulting in the roots remaining wet longer than desirable.

The shape of the pot is also important. Choose a pot that is taller than it is wide as it will provide better drainage for your tree. Select a pot that is tapered enough to allow easy removal of the plant when it comes time to repot.

Containers can be made from a number of materials such as plastic, clay and concrete. Each offers advantages and disadvantages. Plastics are resistant to breaking, and are light in weight. Modern, high quality plastics can look good, and will hold up well to the elements. One disadvantage some plastics have is that the sides are thin, a characteristic which may cause roots on the sunny side of the pot to be damaged by the heat of the sun. With this in mind you might consider selecting a lighter colored material that would absorb less heat. Choosing a site where the sun does not shine on the pot during the hottest hours of the day can also help with overheating. Another way of dealing with overheating is to slip the plastic pot inside another slightly larger container. Last, be sure the container you choose has good drainage.

Media. Choose a good potting mix, even if you have to pay a little more for it. Potting media provides support for the plant, holds moisture, serves as a reservoir for nutrients, and provides the pore space (air space) needed to ensure the gas exchange required by a healthy root system (citrus roots have to "breathe"). Look for a media suited for large containers. The particular material you find will often depend on where you live. In the Southeast most good mixes consist primarily of pine bark, with other materials added to improve drainage, supply nutrients, adjust ph, etc. Look for a mix that drains well, has good pore space, and is capable of holding enough moisture to meet the plant's needs, without being soggy. If you find it difficult to obtain a mix with adequate pore space, drainage can be improved by adding 25% coarse perlite to a good standard mix.

Watering. Overwatering is a very common problem with container grown citrus. To understand why, it helps to have a feel for what goes on in the pot when you water your tree. Both in the ground, and in a container, water movement is controlled by the forces of gravity, adhesion, cohesion and capillary action. We all are aware of the part gravity plays, but the other forces are not as well known. They actually serve to hold water in the media against the pull of gravity. Adhesion causes water to stick to the media. It is the force that causes water to cling if you throw a glassful against a wall. Cohesion is the attraction of water to itself. It can be seen at work on a window, during a rainstorm, when water is drawn to itself and forms droplets. Capillary action (the result of the combined forces of adhesion and cohesion) is the force that causes a sponge, or towel, to draw water against the force of gravity. You can see it at work when you place a dry pot plant in a saucer of water and find the surface of the media wet the next day.

When you water, the water is drawn through the potting mix by gravity, with some held by adhesion/cohesion. At the bottom of the container, the downward pull of the adhesive/cohesive forces, that are ordinarily affecting water movement in all directions, are limited to affecting the water from above, because of the barrier presented by the bottom of the container. This force is strong enough to hold some of the water near the bottom of the pot, against the gravitational force, and results in a highly saturated area right at the bottom of the pot. The tendency of water to be held at the container bottom is sometimes referred to as “perching”, or as the Perched Water Table (PWT). The depth of this saturated area is directly related to the particle size of the potting media. Larger particle sizes, having less total surface area (thus less adhesive/cohesive force), than smaller material, exerts less force on the water, and thus drains better. This PWT can create a serious problem for the plant, because this is the area in which a potted plant’s roots tend to concentrate.

It would seem logical that one could add stones, or other coarse material, to the bottom of the pot to improve drainage. Actually, this practice raises the perched water table, because the larger material does not provide the adhesive/cohesive force exerted by the potting media, so the water tends to “perch” (or in this case maybe one should say “hang”) above the coarse material, much like water would be held by a sponge on a layer of rock. In fact, this added material further reduces the usable depth of media available to the plant by the depth of the coarse material. Covering the drain hole with a piece of broken pottery or shell, to help prevent blockage is OK, but adding coarse material to the bottom of the container is counterproductive.

When to Water. How often you water is critical where citrus are concerned. If you water too often, the bottom of the pot will stay saturated because the PWT (which will occur to some degree, even in well-drained media) will not have time to dissipate before the next watering. This dictates that you water only when your plant needs it, not on a periodic time schedule. The moisture requirements for your plant are constantly changing, depending on the season of the year, plant size, weather conditions, etc. In winter, even weekly watering may not allow adequate time for the PWT to dissipate. In the heat of summer, daily watering may be necessary.

Therefore, you should learn to adjust your water schedule to maintain the balance between adequate moisture, and adequate pore space. Test for moisture by pushing your finger into the top soil ½” to 1” deep. If you cannot feel moisture, it is time to water. If you feel any moisture at all, wait a while to water. With some practice you can learn to judge how much moisture your pot contains by the heft of the pot. (Container weight changes significantly as the pot dries out.) Once you have a little experience, you should be able to simply lift, or tilt the pot a little to get an idea of how dry it is. When you decide it is time to water, apply enough so that a little flows out of the bottom of the pot, and absent a good rain, about every third watering use enough to flush out excessive fertilizer salts, which can build up in the media and damage tender roots. This flushing action should be 20% or more of the actual amount of water applied.

How Much Sun? Citrus require high light levels. Full sun will result in more fruit, but they are naturally understory trees and will do OK with about 6 hours of sun, or equivalent. Bright light or dappled sun may suffice, but this would depend on light intensity and how long it is available. The light under tall pines is usually adequate, and can serve as a pretty good guidepost as to what is minimally needed. Additionally, pine trees have the added benefit of providing a significant level of freeze protection.

Freezing Weather. Most citrus are able to tolerate some cold, even a hard freeze, but this varies widely among the different cultivars, so you need to have an idea of how much cold your tree can safely endure. When potentially damaging freezes are in the forecast, you will need to move your tree to a protected area, cover it, or otherwise keep it at a safe temperature. This temperature your tree can tolerate can vary from 20 to 32 degrees, depending of the particular kind of tree you have, its condition, and how long the freeze lasts. With containers, you must also consider that clay or concrete containers themselves can be damaged by freezes.

Winter Leaf Drop. With citrus, especially tropical citrus such as lemons and limes, there is a problem that arises in winter, sometimes referred to as Winter Leaf Drop, or WLD. Generally speaking, citrus roots cease to function below about 55 degrees, especially tropical citrus such as lemons and limes. If the roots fall below this temperature (which is often the case after a chilly night), and the leaves are exposed to sunlight the next day, the tree may respond by dropping its leaves. If this happens repeatedly, the tree may soon become bare. WLD occurs because the leaves cannot get the support they need from the root system, which is slower to warm up than the leaves. Some ways to avoid the problem is to be sure that the root system stays at, or above, 60 degrees f, keep the tree out of direct sun until the roots warm up, or cover it with something like a frost blanket. I should add here that some leaf drop in winter is normal.

Fertilization. With containerized citrus you have to provide all of the nutrients the plant requires. This includes the basic NPK (Nitrogen, phosphorus, and potassium) plus minor elements. The can be a time release fertilizer, a concentrated soluble that is mixed with water, or any balanced fertilizer that is suited for use in containers. The ratio normally recommended for citrus is 5-1-3, but fertilizer with that particular formula may be hard to find, and something that roughly approximates this ideal normally works just fine. It also is best to look for a fertilizer containing needed micronutrients. If your fertilizer does not have the minor elements required, you will need to apply them separately. Frequency of application, and amounts needed, will depend on the particular fertilizer used, so you will need to consult the directions that come with the fertilizer you are using. There are slow release fertilizers available that last as long as 9 months.

Pruning. When trees are grown in a container, pruning may be needed to create a compact, balanced plant. In the interest of brevity, I will simply say that citrus respond to pruning well, so there is no reason to think you will harm your tree by judicious pruning. You can prune almost any time of year, keeping in mind that cutting the tree back in fall or early winter may stimulate tender growth and late pruning may affect flowering the next spring.

Pollination. There are a few exceptions, but most citrus do not require pollination to bear fruit. A few that benefit from pollination are Orlando tangelo, Minneola tangelo, and Robinson tangerine.

Graft Union. Many citrus (but not all) are grafted to a rootstock which produces a two part plant. The rootstock provides the root system, and part of the trunk. The scion provides part of the trunk and the fruiting portion. When dealing with grafted plants, it is important to know where the graft union (where the rootstock and scion united) is located. This is normally 2-12 inches above the soil line, and can be seen as a change in trunk size, bark texture or color. Any new growth at or below this point should be removed, as it comes from the rootstock, and will overtake the scion, making your tree useless as a fruit tree. The rootstock will bear inferior fruit or no fruit at all.

Repotting. Consider repotting when your tree becomes too large for the container, or when the media becomes old and compacted (normally occurs after 2-3 years).

If you plan to increase the pot size, choose one a little larger than the one it is in, or prune the roots and top when repotting in the existing container. For most citrus, a minimal size is a pot that is at least 20 inches diameter. When using an old pot, clean it by washing thoroughly with a 10% solution of household bleach solution. Remove the old media from the roots by gently shaking them, or by washing them off with a hose. If necessary, prune away any dead roots and any that encircle the container. Prune the top so that it's brought into balance with the container and root system. Repot, using new media, and by washing the media in carefully, so there are no air spaces or voids. Put the tree out of direct sun and give it a few weeks to get used to its new home.

Insects. Spider mites, mealy bugs, white flies, scale, and the Orange Dog (Giant Swallowtail butterfly caterpillar) are all attracted to the citrus trees. Surprisingly, the trees seem to tolerate heavy insect infestation and still produce heavy crops of fruit. Still, it is best to provide some degree of control, especially for container trees, which insects seem to find very attractive. In dealing with insects, the old adage "know your enemy" (some may prove to be friends) is the first step in winning the battle. You can find excellent advice in books, on the internet, and through your county agent. Several state agricultural universities, county agents, and other entities have excellent resources on the web, that includes pests and diseases and often include [photos](#) that are great for making positive identification much easier. Links to many such sites can be found at [plantfolks.com](#).

Before moving your tree inside for the winter, try to eliminate any resident insects. Keep an eye on the tree while in storage. Certain insects, such as spider mites and mealy bugs, love conditions where they are isolated from predators.

The citrus leaf miner warrants special mention. The citrus leaf miner is a tiny fly-like moth that lays its eggs on young, newly emerging citrus leaves. After hatching, the larvae bore into the leaf and spend this stage of life feeding between the upper and lower leaf surfaces, where it is protected from the weather, sprays and predators. Here it spends its life tunneling between the upper and lower surfaces of the leaf, leaving a winding trail, and causing the leaf to become distorted. After it emerges from the leaf, it forms a cocoon on the leaf lower surface, and later emerges as an adult to begin the cycle anew. You can find more information about how to control them on the web. Several such sites are listed on our links page at [plantfolks.com](#)

Citrus Greening and Citrus Canker are two diseases that are of great concern for both homeowners and commercial interests. At this point in time, both diseases are mainly limited to Florida, though Citrus Greening has been found in several parishes in Louisiana. Citrus Greening is an extremely serious disease because it is fatal to the tree, and at this time, there is no known cure. The current method of dealing with it is to keep it contained to areas where it has already spread. **To help prevent further spread, avoid bringing any living citrus trees, citrus tree parts, or citrus relatives out of Florida, or from any other area that is under quarantine for CG, until authorities deem it safe to do so.** The Citrus Psyllid, which is the vector for greening, has been found in Charleston, Beaufort and Colleton Counties in South Carolina, as well as many other areas of the Deep South. The disease itself has spread beyond Florida, and has been found in several parishes of Louisiana, Beaufort and Charleston counties in South Carolina, and several places in Georgia. You can find more about both the disease, and the psyllid on the web, or in recent gardening publications. Finally, remember that the regulations are subject to change as conditions change, so be sure you are adhering to current requirements.

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