Care of Containerized Citrus Trees

The objectives of this activity are:

- To help develop citrus growing skills
- To have an increased awareness of the Central Florida citrus industry
- To become aware of the career opportunities in the citrus industry
- To encourage an enthusiastic interest in citrus production
- To develop an understanding about the safe use of pesticides
- To understand the relationship between citrus production and the environment and natural resources of Florida
- To understand the importance of record keeping
- To obtain the satisfaction of seeing a tree grow as a result of tender loving care and attention

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Transplanting

The first step in your Citrus Tree Project will be to transplant the young tree from its bag into the 5 gallon pot that will be its home for the next nine months. It is important to be sure you perform this task correctly.

Before undertaking the transplanting, you must have something to place in the pot with your tree. The growing medium you select will be very important for it will support the tree for the next year. You have several different options to investigate before selecting a medium. Since citrus grows nicely in sand, you may want to simply use porous sand in the container. This medium will require lots of water and frequent applications of fertilizer. It probably is not the best choice, but can be satisfactory.

The other choice for a medium is an “artificial” soil that is called a “potting media”. There are many components that can be used to make a “potting media”. Citrus needs a mix that is well drained. You can buy potting media that is already mixed for you. These are sold at a number of places as potting soil. They are not all the same. The less expensive ones usually are made with Florida peat and Styrofoam beads. The more expensive ones usually contain Canadian peat; two or three other materials such as Perlite or pine bark; fertilizer to get the plant off to a good start; and dolomite to make sure the medium is not too acid. If you buy a prepared mix, be sure to get one that is well drained, has a pH somewhere between 5.5 to 7.5 (6.0 to 6.5 is best), and has starter fertilizer incorporated (including minor elements).

You may want to make your own mix. There are many possible combinations of materials that can be used. You will want to have your mix well drained, with the best pH and starter fertilizer as well. There is not a single mix that is best, many will work fine. Here is one example;

2 parts Canadian peat : 1 part Perlite : 1 part Vermiculite

To this add 6 tablespoons Dolomite and 5 tablespoons controlled release fertilizer, such as Osmocote, per 5 gallon of mix.

Once you have your growing medium ready, you can proceed with the transplanting of the tree. There are several items you need to be aware of when transplanting. First, be sure the tree is planted at the same depth in the pot that it was in the nursery tube. You can even have it a little higher in the pot. This means no medium above the “soil line” on your tree. You may have to remove some roots off the bottom portion of the tree so it can fit in the pot. Next, be sure the tree roots are spread out in your container. If you see roots that are “wrapping” around in the nursery tube, you will need to straighten them out in the 5 gallon container. If you do not have roots that need to be straightened, then you can plant the tree without disturbing the roots. Lastly, be sure to firmly pack the medium around your tree, but do not overdue this operation. Remember, you want a well drained medium, not a compact one.
Irrigation

Probably the most important item your tree needs in order to grow quickly is water. Of course, you will need to feed the tree with a balanced fertilizer and may have to spray it once in a while for bugs. Some research work has shown that water is the most important item for obtaining maximum growth. The planting medium you have used will influence how much water to apply and how often you will need to irrigate. Avoid over watering which causes water logging. Forty-eight hours of water logging will severely damage the root system. If the potting medium dries out, it is difficult to wet the medium thoroughly. In this case, apply water very slowly, almost at a drip, to re-wet the medium. Do not apply the water at a rate which it flows over the surface, down the sides, and out the drain opening faster than it soaks in. Apply enough water so the excess flows out of the drain openings. If your medium is well drained and the container will allow excess water to percolate through the pot, then the likelihood of water logging is slight. However, excessive use of water will “leach” fertilizer from the medium.

Irrigating twice a week should provide enough moisture to prevent wilt. During the cooler months once a week will be adequate; and during the hottest months perhaps three times a week will be required. The best way to determine the moisture of your soil medium is the “two finger moisture meter” where you simply insert your fingers into the medium pinching the soil to determine the moisture present. As the tree grows, the need for more water increases greatly. If you see the tree is actually wilting, you have waited too long to water your tree. You will need to experiment with your tree to see how much water the medium can hold. Slowly add water and wait a few minutes to see if any drips out of the bottom, note how much water was applied. Repeat this process two or three days later. The amount needed the second time should be given to the tree every two or three days (depending on how long you waited). As the tree grows more roots and produces a bigger top, the demand for water will increase. You may want to carry out this test several times during the year to see if the tree needs more water.

At high rates of fertilizer, too little water will encourage the fertilizer salts to accumulate, thereby increasing the chances of root damage. Also too little water will reduce growth. Even though it is better not to over irrigate citrus trees that are growing in the field, those grown in containers probably will do better if they receive a little too much water! Try not to irrigate with the full amount after you apply fertilizer. It would be better to irrigate and then apply fertilizer. Then come back in two or three days and irrigate again. Water management is critical for maximum growth of your tree.
**Fertilizer**

Nutrition may be maintained by several methods: liquid fertilizer, mixed dry fertilizer, or slow release fertilizer can all be used to feed your tree. For liquid fertilizer, follow the instructions on the container. Liquids can be applied weekly, however, it would be better to use them every two weeks. You can use a 6-6-6 or 8-2-8 analysis dry mix at the rate of 3 to 4 ounces per month. Slow release fertilizers such as Osmocote may be applied every other month at 6 level tablespoons for each application. You may even want to try a combination program that uses slow release and liquid. Cut back on both rates if going in this direction. You will want to maintain dark green foliage and maximize growth. Remember, the more you irrigate, the more you will need to fertilize.

Fertilizers can and do burn, especially if the moisture remains low. Measure the fertilizer carefully and lightly incorporate into the surface of the potting medium. Remember, that in addition to nitrogen, phosphorus, and potassium (these are the elements represented by the first 3 numbers on your fertilizer analysis (for example 6-6-6 or 8-2-8), the elements calcium, magnesium, manganese, iron, and copper are also necessary. These elements are applied either in the fertilizer or in a nutritional spray for commercial citrus. It is far better to have them applied to the potting medium. Therefore, find a fertilizer that contains “minor elements”. It will be hard to find a liquid fertilizer that has all the minor elements. It may be easier to locate a slow release mix that has them and a regular dry fertilizer will be the easiest to find with minors. Just because you use a dry mix with minors does not mean you cannot also use liquids or slow release. Figuring our own combination will be a challenge. Do some investigation; read fertilizer labels and talk to some knowledgeable horticulturists.

If the tree is lacking some nutrients, it will have “deficiency patterns” in the leaves. It is hard for the novice to distinguish specific deficiency patterns. In addition other problems cause yellow patterns in the leaves. If you have patterns, it is best to get help. The following may give a clue to the problem.

**Nitrogen:** Pale yellow mature leaves are a good sign of nitrogen deficiency. If there is a pattern that has a yellow vein and the rest of the leaf is darker green, the problem could be root damage, not nitrogen deficiency.

**Magnesium:** Yellowing leaves with a green wedge starting from the base of the leaf up towards the top of the leaf on mature leaves.

**Manganese:** The only deficiency that is pale green and not yellow. The areas are scattered throughout the leaf blade.

**Zinc:** Yellow splotches between veins. Generally the yellow area will become brighter as the leaf matures.

**Iron:** Green veins and a pale yellow leaf blade. This is generally rare, however, Swingle rootstock has a problem with the uptake of iron. Watch for this problem, it may be hard to separate it from the yellow vein mentioned in nitrogen section. Yellow veins are not a good sign. It could be root damage or iron deficiency.

**Calcium and Copper:** Do not worry about any leaf symptoms for these elements, even a professional uses other methods to determine a deficiency.
Integrated Pest Management (IPM)

A wide variety of pests will attack citrus fruit, leaves, roots, and even the limbs. Most of the pests cause only minor damage and in many cases there is no reason to try and control the pests. Other pests cause cosmetic damage that will prevent the fruit from being sold fresh, therefore these pests need to be controlled. There are a few pests and diseases that can seriously damage, or even kill a citrus tree. Obviously, these major problems need to be controlled. There are several methods that can be used to control diseases and pests of citrus. You can elect to treat the problem with one or more chemicals called “pesticides”. There are many pesticides that are labeled for use on citrus. This means the government has approved the application of the pesticide on citrus. In order to obtain the “label”, the manufactures of the pesticide must spend millions of dollars for all the required testing. All of the money and time invested provides growers with the assurance that if the pesticide is used correctly they will control the pest without hurting the person applying the chemical or damaging the environment.

Always be Careful When Using any Pesticide

Another way to control pests is to use biological control. In nature there are lots of insects and diseases that attack the pests. Sometimes these “good guys” or beneficials are native to Florida, while some are not and we have to bring them in from places like China or Australia. Biological control is the best way to control pests because it is less expensive and in most cases the results are much better. The biological agents kill almost all the pests, while chemicals only eliminate a large portion. Unfortunately, not all pests in Florida have biological control agents. Scientists continue to look for these agents. In some cases the biological control agents are produced in a laboratory and then released into the grove to attack a specific pest. In Florida, there are many biological agents at work, most are native and do not need to be introduced into groves. Others were brought in by scientists and have become established in the state. The last group of biological agents are those that are produced commercially and used in the same way as pesticides, applied to the citrus tree.

Since we cannot control all of the pests biologically, but want to take full advantage of all the good guys we have, citrus growers are careful when using pesticides. The growers use an “Integrated Pest Management” (IPM) program. This means they only use chemicals when there is no other choice, and they select a pesticide that will not seriously damage the biological control agents or harm the environment. IPM allows growers to live with a wide variety of pests and minimizes the use of pesticides.

The first step in IPM is the identification of the target pest(s). Once you know what the pest problems are, then you can determine what is the best method of control. Is it likely that a biological control agent will handle the problem, or you will need to use a chemical. If a pesticide is needed then be sure to use one that will control the target pest, but not harm any biological agents that may be present. Since your citrus trees needs to be perfect, you may not want to let aphids suck on the leaves. A commercial grower most likely would tolerate more damage than you can. Understanding the principals of IPM is important for if we cannot manage pesticides properly, this valuable tool may be removed. In addition if growers are not aware of all the possible methods of pest control and completely rely on pesticides, they are spending more money than they should and have the potential to damage the environment. Wise use of pesticides is an essential part of a sound citrus production program.
Diseases

**Melanose** - Small, raised, brown bumps that feel like fine sandpaper on fruit, leaves and twigs.

**Scab** - Causes large raised lesions on fruit and leaves, only attacks certain varieties, grapefruit is one it likes.

**Greasy Spot** - Looks like a greasy spot which shows through on both sides of the leaf. Causes leaf drop. Early damage is a light brown spot on bottom side of leaf.

**Aschersonia** - Kills the immature states of whiteflies, fruiting bodies are red or yellow, known as friendly fungus.

**Sooty Mold** - A black film on the leaf surface which develops on the honey dew excreted by aphids and whiteflies.

**Footrot** - A disease of the trunk and roots where the bark cracks, dies and exudes gum like sap.

Insects and Mites

**Whiteflies** - Small white bugs about the size of a gnat which excrete honey dew, found on the new growth

**Orange Dog** - Ugly caterpillar, with red tongue, of the swallowtail butterfly, eats lots of foliage.

**Grasshoppers** - Several types that will eat large chunks from the leaves.

**Aphids** - Soft-bodied bugs with 3 prongs on their abdomen. Most are green, one species is black. Causes severe leaf distortion and curling from tip to base.

**Rust Mite** - Microscopic mite which causes a smooth dark brown to black color on leaves and fruit.

**Texas Citrus Mite** - A light brown mite which etches leaves when feeding causing a “silver” cast to the leaf.

**Citrus Red Mite** - A red to purple spider mite which causes the same type damage as the Texas Citrus Mite.

**Scales** - Several species found on citrus. Snow is white and likes trunk and limbs. Red is round and found on fruit and leaves (size of pin head). Purple also likes fruit and leaves, it is shaped like oyster shell and same size as red scale. Black scale likes the stem of fruit, but can be found on all twigs. Has an H shape back and babies are soft and light brown in color.
Pesticide Selection

If it is necessary to control a pest chemically then select the proper spray from the suggested list below. A more detailed list is provided in the Citrus Pest Management Guide SP-43 which can be ordered from the University of Florida.

<table>
<thead>
<tr>
<th>Pest — Pesticides</th>
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</thead>
<tbody>
<tr>
<td>Greasy Spot – Copper, Oil</td>
<td>Texas &amp; Red Mite– Oil</td>
</tr>
<tr>
<td>Melanose – Copper</td>
<td>Whitefly – Oil, Malathion</td>
</tr>
<tr>
<td>Scab – Benlate, Copper</td>
<td>Aphids – Malathion</td>
</tr>
<tr>
<td>Sooty Mold – Oil</td>
<td>Scales – Oil, Malathion</td>
</tr>
<tr>
<td>Ants – Baits</td>
<td>Leafminer – Oil, Neemix</td>
</tr>
<tr>
<td>Rust Mite – Oil</td>
<td>Orange Dog, Grasshoppers ----</td>
</tr>
<tr>
<td></td>
<td>Hand Remove, (do not spray)</td>
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</tbody>
</table>

You will note the wide variety of pests that can be controlled with oil. Use a horticultural oil, there are several brands. You can combine any of the materials listed above into a single mix that can be applied to the tree. If you use other materials check before mixing, some pesticides can not be mixed with certain materials.

The rates for the above materials are given on the label, read and follow the label. For spray oil, a .5% solution will work for most pests. You may need a 1% mix for rust mites and greasy spot. To get a .5% solution add 6 teaspoons of citrus spray oil to a gallon of water. It may be helpful to know that:

1 tablespoon = ½ ounce liquid
1 tablespoon = 3 teaspoons
1 gallon = 128 liquid ounces

Now all you have to do is the math to convert from ounces or gallons to tablespoons or teaspoons.

Pesticide Application

When applying pesticides be sure to thoroughly cover the area where the pest is located. Controlling rust mites does not require application of pesticides to the trunk, therefore, only spray the leaves. A simple hand operated spray bottle will work nicely. One that is marked and designed for the application of chemicals would be best. Add the proper amount of chemical to the container, add water and mix thoroughly. Read the label and follow the instructions. Please read carefully the page on pesticide safety.
**Pesticide Safety**

Before using any pesticide read the label on the container. The label will tell you how to use the pesticide and what precautions to be aware of when using the pesticide. Pesticides can be absorbed into the body through the skin (hands and feet especially), inhaled into the lungs when you breathe the vapors, or through the mouth, on food primarily. The following are some common sense rules in using pesticides.

1. Have your parents or guardian present when you spray.

2. Wear clothing that covers your arms and legs. Wear rubber or plastic gloves and shoes to protect hands and feet. If you accidentally spill a pesticide on your clothes, immediately change clothes and wash the area of your body contacted by the pesticide. Wash contaminated clothing separately.

3. Mix pesticides according to directions. Do not look inside the sprayer while you are mixing a pesticide. Stand off to the side so the pesticide does not splash in your face.

4. Do not spray when it is windy. If you spray during a gentle breeze, make sure the spray drift blows away from you.

5. Spray pesticides in a well ventilated area. If you start feeling dizzy or nauseous when applying a pesticide, stop spraying and move to an area of fresh air until symptoms pass.

6. If you mix more pesticide than you can use, dispose of the excess by spraying on labeled plants or turf. Do not leave pesticides in the sprayer. Do not dispose of excess pesticides in the sink.

7. Once you have finished spraying, rinse the sprayer 3 times.

8. Do not mix or store pesticides in areas where food is prepared.

9. Always store pesticides where children cannot get into them. Never transfer a pesticide from its original container into another.

10. If a person is accidentally poisoned by pesticides, take them to a doctor immediately. Take the pesticide label with you to the doctor, and check the label for first aid information as to what you can do before the person reaches the hospital.

*Always read and follow the label instructions*

*The label is the law.*
Pruning

Heading back and thinning are two types of pruning. Cutting back or heading back is simply cutting off the end of a twig or branch. This encourages lateral buds to develop, thus making a dense, heavily sprouted limb. Thinning on the other hand discourages lateral development because the entire branch is removed at its origin. Some new growth will develop, but this will not nearly equal the growth associated with heading back.

Remove dead wood and weak growth as necessary using the thinning technique. When cutting weak and dead wood, cut into living wood as close to the branch or twig as possible to eliminate any stubs. Removal of the shoot tip will encourage branching, which is necessary to form a well shaped and dense canopy. This technique can be used most effectively when the new shoots are 4 to 6 inches long. All pruning which encourages branching should cease in late January or early February unless the tree can be easily protected from cold weather. Always figure on six weeks for the new growth to develop. Also prune or shape to maintain a symmetrical appearance. Long and leggy growth should be cut back to discourage uneven or lopsided growth.

In some cases, certain branches can be trained in a desired direction by staking or tying. This is a good substitute for pruning when the tree has adequate foliage, and no need exists for encouraging more branching. All growth that takes place below the main scaffold limbs should be removed. Certainly, any root spouts that may develop need to be removed as soon as they are discovered. The trunk should be straight and free from any growth below the bottom limbs that were established in the nursery. There is no need to paint pruning cuts, they will heal quickly. It is best to prune small limbs and not wait until they reach ½ inch or more. A well pruned tree takes an eye for symmetry, the tree needs to look the same from all angles.

Cold Protection

Citrus trees must be protected from frosts and freezes to prevent damage to the foliage, twigs, and the trunk. The simplest, and recommended practice is to place the tree in a protected area such as a porch, carport, or garage. Do not leave the tree in a shady area for extended periods of time for this will produce “leggy” rather than compact growth. The next best approach is to place stakes, 3 or 4, around the pot and enclose with a tarp or blanket. If you use clear plastic be sure the tree does not touch the material. You do not have to cover the top of the tree. If the tree is to be left outside during the winter and it is enclosed in its “house”, it will be necessary to have a heat source available during those nights the temperature is expected to reach the thirties. You can use a light bulb or a small amount of water that flows continually, at least 10 gallons per hour will be fine, as a heat source. Those trees that are left out in their “house” will continue to grow because they will be warm during the day as well. In addition to cold, winds (especially cold dry winds) can cause severe and possibly total leaf drop. Protecting the tree from windy conditions is the only means of avoiding this condition. Your citrus tree should be protected from the wind all year long. It may be best to build a ‘house” for the tree, you may need to take it inside on cold nights, but most of the time it will do well in the warm sun.