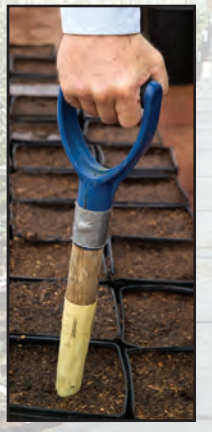
Citrus Liners

There is a lot of horticulture tied up in TreeSource Citrus Liner. It takes nearly 6 months to produce our liners. Each liner is budded onto a high quality rootstock which was grown from certified seed. The seed is germinated and then hand transplanted to a 1" x 8" plastic cone. Roots are examined during transplanting and poor quality specimens are discarded. It takes 3-4 months to grow seedling large enough for budding. We usually have finished seedlings ready to bud and can propagate shortly after your order is confirmed. Time of year and the variety will influence how long it takes before an order is ready to ship, but the average is 6-8 weeks from propagation. We don't propagate from October 15 to January 15, so be sure to give us enough advance notice for us to hit the date you want the trees. Be sure any paperwork we need prior to propagation is returned promptly to insure your delivery is not delayed. Our product is shipped in 12" x 12" x 24" boxes and we normally use UPS ground or UPS 3-day express. About 100 liners can fit in a box and we ship them without their cones to save weight and insure the maximum quantity of liners can fit in the box. Below are some tips that will help you be successful with your citrus venture. **Thanks for your interest!!**

HINTS FOR GROWING YOUR CITRUS LINERS

1 IF A LINER ARRIVES IN A CONE, squeeze slightly prior to removal. Make sure the soil media is moist before attempting extraction.

2 PLANTING is pretty simple. We normally provide one cone with every shipment to provide you an opportunity to make a dibble for transplanting. Something as simple as a shovel handle can be placed inside the cone to strengthen it. You can plant the liner as deep as you want as long as the bud isn't covered by soil. The rootstock portion of the liner will eventually be the trunk as shown in the photo on page 3, so you set the trunk length at planting time.



3 SOIL MEDIA for citrus needs to be well drained and at least 35% air flow porosity. A typical perennial mix should work well. Citrus does not like "wet feet," so be careful not over water.

4 POT SIZE can be anything up to 5 gallon. The smaller the pot, the quicker the tree will make a finished size. It takes 12-18 months for the foliage to fill into a 5 gallon under greenhouse conditions.

5 PESTS for citrus are common, but not normally a major problem in a greenhouse environment. The University of California has published an IPM manual for Citrus that might be useful. TreeSource has copies in stock or you can purchase one at www.ipm.ucdavis.edu/IPMPROJECT/pubs.html.

6 TEMPERATURE can vary widely for citrus, but it is important to stay above freezing. Soil temperature over 55° will keep the trees from going dormant, but 75° should keep them growing if there's enough light. 85°-95° is optimum soil temperature and you can let the air temperature get up to 110°as long as the humidity level is high enough. High heat and dry air could cause leaves to sunburn.

7 CITRUS IS VERY APICALLY DOMINANT which is an advantage if you want a tall tree, but it can hinder making bushy trees. Pinching is required to force side branching and can be done when a new shoot has 4-5 expanded leaves. If only one shoot develops after pinching, it will suppress additional shoot development, but normally 2-4 side shoots will develop below where the branch was cut. Lemon and Lime varieties are especially difficult to make into bushes, but careful attention as they develop will yield success. You'll make your life easier if you can teach your customers that a bushy citrus tree only looks good and a "whipped" tree is what the farmers buy! Check out our web site to see what we sell to farmers at www.citrustreesource.com.

8 FERTILIZER can be applied in many ways. We use a 20-20-20 soluble fertilizer with micronutrients, but you can also use a slow release such as 18-6-12. Citrus is a strong nitrogen user and also can be Zinc and Manganese deficient. Foliar feeding works very well with citrus utilizing low biuret urea at about 8 pounds/100 gallons water. Most micronutrients can be applied along with the urea. Monterey

TREESOURCE CITRUS NURSERY

Chemical has a good line of foliar materials as is Miller's ZMC Express. E-mail us if you have questions on citrus nutrition. Taking a leaf sample is the best way to check nutrition. The optimum fertility ranges for citrus nursery tree leaves are:

	%					ppm				
	N	P	K	Ca	Mg	Zn	Mn	Fe	Cu	B
OPTIMUMS	2.5 to 3.5	0.2 to 0.3	2.0 to 3.0	1.5 to 2.5	0.2 to 0.35	20 to 80	25 to 150	50 to 100	5 to 15	30 to 80

9 FROST is a concern for all citrus varieties. Lemons, Limes and Citrons are the most frost sensitive while Mandarins and Kumquats can handle temperatures in the low 20's. The best plan is to keep a greenhouse no colder than 30° and to gradually cool the house down in October so the trees will go into dormancy. Once dormant they can probably take 3-4 hours at 28° if you're trying to conserve heating fuel, but be careful.

10 DAY LENGTH does affect citrus tree growth. Shorter days will stop the trees from growing actively since citrus needs over 11 hours of light to stay active. In California we typically don't try and get any growth in December and January, but do keep the trees active by insuring the trees see 12 hours of light. This is not enough artificial light for photosynthesis, just enough to confuse the trees and keep them from going completely dormant. This allows them to wake up faster when the days get longer in February and March.

11 As with most plants, **SUNLIGHT** is important to citrus. At TreeSource, we have to fight winter fog which is the main reason we don't try to accomplish much in December-January. Citrus only require 70% sunlight for maximum photosynthesis, but it doesn't grow at optimum during grey days. 20% shade is okay, but don't pack the trees too close together since all the leaves need to be catching sunlight. Shade isn't just created overhead, it can occur sideways as well. We've found that IR poly works well for citrus in California with its diffused light, but if you maximize the amount of sunlight, the trees will be happy.

12 HUMIDITY helps citrus grow better. The more humid it is the happier the trees will be since they like tropical climates. You may find some algae growth on the leaves when the humidity is high, but that won't hurt much unless it is inhibiting photosynthesis. In California's dry summer climate, we do all we can to keep humidity levels high in our greenhouses. They'll grow fine in a dry environment as is evident by the commercial citrus grown in desert areas, but if you're trying for optimum, keep the humidity high.

13 CARBON DIOXIDE is often overlooked as an important factor in plant growth. Air tight greenhouses with lots of plants are oxygen rich and often CO2 deficient. A CO2 burner or enriching to levels of 1000 ppm will enhance tree growth. 380-400 ppm is about the normal amount of CO2 in the atmosphere, so if it's not too cold, just giving the house some fresh air will help.

10 IRRIGATION can be done by hand, drip irrigation, spray stake, under canopy sprinklers, or even overhead. Citrus leaves do often prevent uniform overhead watering, so just make sure every tree gets what is needed. It is easy to over irrigate citrus, so error on the dry side. If watering overhead, it is better to not mix the citrus with other plants so you can irrigate to their specific needs. Make sure your watering goes to the bottom of the pot and test your irrigation water so you know how that influences tree nutrition. High Boron and Sodium can be a problem.

15 SUCKERING is necessary if shoots develop below the bud union. These suckers come from the rootstock and won't help you make the tree you desire. Be sure to take them off before they get to the point where you need pruning shears! Shoots that develop at the bud union alongside the shoot that TreeSource supplied, often help create a bushy effect if that is what you desire. Just let those new shoots develop. It's okay to have multiple branches from the bud since the trunk will be the rootstock.

16 Citrus takes **PRUNING** pretty well, but remember it is very apically dominant as mentioned above. If you're shaping the tree after it has developed large branches, remember that wherever you make a cut, 2-3 shoots will develop right by the cut. Severe pruning of a tree that is out-of-balance may be the best solution in the long run. The tree shown here is very saleable and can be achieved in 12-18 months in most greenhouse operations.

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