

### Pruning Citrus

Citrus are evergreen trees, thus generally require less pruning than deciduous trees. However, they do need to be pruned regularly for optimal fruit quality and productivity.

Pruning can improve fruit quality through increasing light in the canopy. In some cases, pruning out water sprouts (gourmands) may improve yields. Reducing tree height facilitates harvesting, reducing labor costs as well as risk of injury from ladders. Skirt pruning facilitates weeding, mulch laying, and other cultural practices, as well as reducing risk of soil borne pathogens affecting the fruit. Pruning may reduce insect and disease pest problems.

### Pruning Tools

Essential tools for pruning citrus include:

- secateurs or hand pruners;
- loppers for branches larger than  $\frac{1}{2}$ " diameter (1.25 cm);
- and a pruning saw.
- A pole pruner may be useful in larger trees, and
- a chainsaw may be needed for big old trees.



Orchard ladders may be necessary for larger trees. However, pruning large trees can be costly in terms of time and/or labor cost, as well as increasing risk of injury and liability. Trees maintained under 8 feet (2.5 meters) in height facilitate pruning, harvesting and other cultural operations, keeping costs down.

All pruning tools should be sharp and clean. Generally, sterilizing pruners is unnecessary when dealing with soil- or airborne bacterial and fungal pathogens. Your clothes are much more likely

sources of contamination. For diseases that invade the vascular system or form oozing cankers, pruning shears can be a source of infection.

Viruses and viroids can be transmitted via pruning shears. Several virus and viroid diseases are common in older trees ( $>40$  years) because they were not recognized or treatable at that time. Use of disease free budwood and rootstock in more recent years has reduced the incidence of these diseases.

Citrus *Exocortis* is a viroid-caused disease which kills the bark of susceptible rootstocks. The bark dries and cracks, and shells off. Trifoliate rootstocks are the most susceptible to the disease. If *Exocortis* exists in the orchard, pruning shears should be sterilized with bleach as heat does not kill the viroid.



*Psorosis*, a disease causing shelling of bark on the scion is caused by a virus. It is also common on old trees. It is graft transmissible and may be transmitted from one tree to another through root grafting. It can be transmitted on pruning equipment so sterilization is recommended if it exists in the orchard.

### Pruning Techniques

Major pruning activities should take place after risk of a freeze has passed, but well before summer heat. If trees are pruned too early in the spring, the pruning can stimulate a growth flush which is susceptible to frost or freeze damage. Any maintenance pruning done in winter should only be small branches,  $\frac{1}{2}$ " (0.5 cm) or less in diameter.

If major pruning exposes previously shaded branches to sunlight, trees need to be protected

from sunburn. Sunburn can cause bark cracking and cankers, which may kill the tree over time. Exposed branches should be whitewashed or painted with a 1:1 mixture of interior latex paint and water.

Pruning should be done as carefully as time allows. Citrus bark is thin and easily damaged, so avoid nicking the bark. Pruning cuts should always be made with the blade toward the tree so as to cut cleanly and avoid damage to the remaining branch.



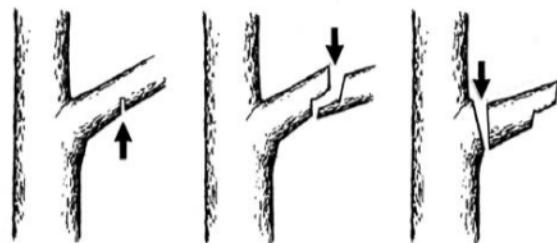
Branches should not be cut flush with the trunk or larger branch in order to preserve the branch collar. The branch collar is the area around the base

of a large branch, often visible as a ridge or wrinkled bark around the branch. It contains a narrow band of cells known as the “branch defense zone” which activate the growth of “woundwood,” the callus tissue that grows over the pruning cut. The branch defense zone also triggers the production of compounds which defend the tree against decay.

Generally, for branches less than 2” (5 cm) in diameter, sapwood constitutes most of the branch structure. Sapwood is made up of living xylem cells which are actively transporting water and photosynthates, and thus are resistant to decay. In branches larger than 2” (5 cm), and especially those 4” (10 cm) and greater, heartwood dominates. Heartwood is older, inactive xylem, which is not as resistant to decay. Any pruning cut greater than 4” inches increases the possibility of internal decay and cracking.

When pruning off a small branch, the woundwood can quickly wall off the cut and prevent decay organisms from entering. In larger cuts, when the cut does not damage the branch collar, the woundwood grows out from all sides of the wound and forms a donut shape over the cut. If the branch collar is damaged or removed, it will produce fewer

protective compounds and the woundwood may only fill in part of the wound, predisposing the cut to decay. Research has shown that painting or tarring pruning wounds is not effective and may actually increase the likelihood of trapping decay organisms inside the wound.



Citrus wood is brittle, so using a three-cut system for branches larger than 1” (2.5 cm) prevents tearing of bark or damaging the remaining branch. For the first cut, start 10-12” out from the branch union. Cut a third to halfway through the branch from underneath (undercut). Next, move a few inches up the branch and cut from above, removing the branch. Removing the branch prevents the weight of the branch from tearing the bark. Make the final cut at the desired pruning point above the branch collar.

### ***Types of Pruning***

Young trees should be topped at planting if they are tall and spindly. This will promote side shoots which will develop into a lower, fuller canopy. The shorter the tree remains, the easier and more cost effective it is to harvest.

In order to shape a young tree, downward growing shoots should be pruned to allow upward growing buds to become dominant. Cutting the shoot just above an axillary bud (the bud in the angle between the leaf and the stem) pointing upward will redirect growth upward. This will help shape the tree for future production.

### **General Maintenance Pruning**

Remove discolored, damaged, or dead wood from trees as necessary throughout the year. Remove crossing branches or branches that shade out lower branches.

### Suckering

Shoots below the bud union should be removed as soon as they appear. These shoots grow from the rootstock and will not be productive. For trees on Trifoliate rootstocks (*Poncirus trifoliata*) the thorns from the rootstock can be a hazard to workers and may also damage the thin mandarin peel.

### Water Sprouts

Water sprouts or gourmands are long, thick, very vigorous branches that seem to suddenly appear in the canopy. These branches grow very rapidly and use large amounts of nutrients and water, but remain vegetative for a number of years. If they do produce fruit, it often is poor quality, large, rough, with dry segments, known as “uglies.” Gourmands contribute little to the productive capacity of the tree, so they should be removed at the base.



### Skirting Up

Satsuma mandarins tend to have pendulous branches that hang to the ground. These are called skirt branches, and they can impede weeding, fertilizer and compost application, and provide pathways for ant populations to use the trees.

With heavy fruit loads, these branches bend and fruit may touch the ground. Fruit may then be contaminated by soil borne pathogens. These pathogens may be plant disease-causing such as Brown rot, or potential food safety risks, depending on the practices in the orchard. Trees should be skirted up to 18-24" (75 cm) above the ground every couple of years.

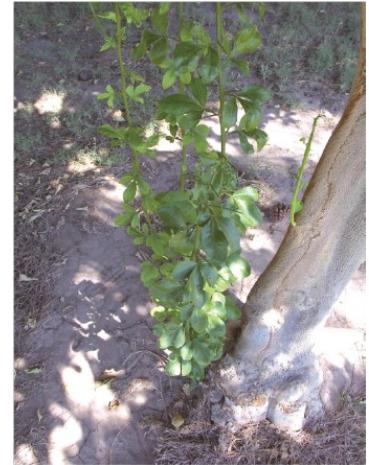
### Canopy Thinning

Fruit needs sunlight to develop flavors and sugars. Dense canopies may not allow enough sunlight to reach fruit, so thinning is needed every few years. A good judge of canopy density is whether or not you can see dappled sunlight on the ground beneath the

tree at midday. Thinning out center branches before they get too large can increase fruiting wood in the center of the tree. To facilitate thinning, divide trees into quadrants based on the scaffold or primary branch structure, assess what would be best in each quadrant, and then prune one section at a time.

### Reducing Tree Height

While many rootstocks such as Trifoliate are semi-dwarfing, that just means it takes longer for the tree to reach full size, but it does eventually get quite large. The canopy grows correspondingly, and the tree rows grow together, shading out fruit production on lower branches. Eventually, all the fruit production is at the top of the tree, which increases time and costs of harvest. Typically, one would want to reduce height by cutting major branches back to the base.



However pruning a whole tree so severely can kill the tree. Generally, not more than a third of the height should be diminished at once. Some branches with good foliage cover should be left to continue to photosynthesize and draw water through the plant.

### Pruning for Pest Management

Citrus pests include many soft-bodied, sucking insects such as scale and mealy bugs. These insects thrive in dense canopies with high humidity and little air movement. The dense canopy may also impede the ability of predators and parasitoids to find the pest insects. Thinning the canopy can often significantly reduce insect pest populations to the point that insecticide sprays are unnecessary.

Citrus blast, caused by *Pseudomonas syringae* is a common disease in the climates where Satsumas thrive. Citrus blast usually starts at the base of the petiole on small shoots. However, if left unchecked, the disease can move down into larger branches, where it can cause cankers which may kill the limb.

Blast damage should be pruned out each spring to remove as much of the infection as possible.

### **Pruning to Mitigate Alternate Bearing**

Alternate bearing is the phenomenon where a tree carries a very heavy crop load one year and then a very light crop the next. In heavy years, the tree's resources are depleted and it produces less new growth and is unable to set as much fruit the next year, giving only a minimal yield.

Pruning can mitigate alternate bearing to a degree. Trees should be heavily pruned after a light crop year, to reduce bearing wood and potential fruit load. Major branch pruning as well as canopy thinning should occur at this time. Pruning heavily after a light year allows the tree to replenish its reserves and move to a more balanced bearing habit.

### **Conclusions**

Pruning citrus can provide many benefits. It may help to cut costs by reducing labor for harvesting, weeding, and pesticide applications. It may also improve quality through better flavor and color, and in some cases, increase the percentage of larger fruit.

As food safety issues determine available markets, the importance of Good Agricultural Practices (GAPs) such as skirt pruning will increase. As more and more pesticides are restricted, pest management will need to rely more on cultural practices such as pruning and other low toxicity techniques.

Each grower must weigh the cost of pruning against the increased revenue from higher quality and/or higher yields. Pruning must be an economical activity, that is, provide an increased return to compensate for the increased cost of production.



### **More Information and Other Resources**

**Citrus Pruning.** <http://www.crgsandiego.org/Presentations/CITRUS%20PRUNING.pdf>

Interesting PowerPoint presentation...some good ideas.

Citrus skirt pruning – a management technique for

Phytophthora brown rot in *California Agriculture*.

1994. P. P. Phillips, N.V.

O'Connell, J.A. Menge. <http://ucanr.org/repository/cao/landingpage.cfm?article=ca.v044n06p6&fulltext=yes>

Research-based information on brown rot prevention.

**Pruning Citrus.** <http://cals.arizona.edu/pubs/crops/az1455.pdf> Some parts may not be applicable .

**Pruning Citrus.** <http://aggie-horticulture.tamu.edu/citrus/pruning/L2308.htm> Texas Citrus. Large scale citrus orchards, but principles are good.

**Shedding Light on Pruning Orange Trees.**

<http://www.citrusource.com/publications/other/Shedding%20Light%20On%20Pruning.pdf> Explains why pruning is useful.

**Your Florida Dooryard Citrus Guide -**

**Pruning.** <http://edis.ifas.ufl.edu/pdf/HS/HS12100.pdf>

