

Citrus Reset Management¹

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Replacement of dead and diseased trees in Florida citrus groves has always been an important part of the total production program. Today, tree replacement is more important than ever since overhead and production costs are escalating and a full stand of productive trees is essential to maximize production and profits. Diseases have been particularly troublesome to Florida citrus growers for many years. In more recent times, Huanglongbing (HLB), or citrus greening, has accelerated tree loss rates as well as the ability for growers to bring young citrus trees into production. Extensive tree losses coupled with the economic necessity of regular resetting has caused many growers to investigate ways to achieve new efficiencies in reset management.

Caring for young citrus trees is always troublesome because they require far more attention than larger, established trees. Florida's sandy soils, high summer temperatures, possible low winter temperatures, and scattered rainfall patterns complicate young tree care by forcing growers to water, protect, fertilize, and weed young trees regularly or face extensive losses. Resets often present an even greater problem because trees are usually scattered throughout a block of larger trees, where they compete with large, full-grown trees for limited supplies of moisture, nutrients, and, sometimes, sunlight. Scattered resets frequently have serious weed problems since removal of the previous tree allows the area to receive more sunlight and provides more favorable conditions for weed growth. In addition, they are

often difficult to locate and may be accidentally overlooked, resulting in inadequate care.

Researchers and growers are continually developing new methods of dealing with reset care. The text that follows discusses a wide range of techniques for providing young tree care. Many of these should prove useful to Florida citrus growers confronted with the problem of managing resets.

Planning the Reset Program

Efficient grove managers include tree removal and resetting as a routine part of the production program and often assign special teams or crews to deal specifically with this task. Removal and resetting should be incorporated into the management scheme along with fertilization, irrigation, insect and disease control, and pruning.

Planning ahead is very important because there is often a lag between the time replacement trees are ordered and when they are received. The wait for the desired rootstock and scion combination may be as great as one to two years. Replacement tree needs should be anticipated (when possible) and orders placed so they can be obtained at the time when needed.

Records from previous years should be helpful in estimating the trees required in an annual resetting program. Figures derived from such records are averages and do not take into consideration unanticipated natural disasters such

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as freezes or hurricanes that might increase the number of replacement trees needed.

An annually updated grove map is probably the best method for assessing general grove condition and productivity. This can help determine the number of trees that will be needed and where they should be placed. Reset maps can then be prepared to later help equipment operators locate newly-planted trees for scheduled periodic pesticide and nutrient applications. Maps can be prepared by hand, with the assistance of a computer, or GPS.

Preparing the Planting Site

Citrus growers have several methods of tree removal that can be utilized prior to replanting the site with a new citrus tree. Two most common tree removal methods include 1) complete tree removal including above and below ground parts (commonly referred to as “pushing”) and 2) “clipping” the tree off just above the soil surface with a tree shear generally used in the timber industry. Tree clipping allows the entire root system to remain intact in the soil, which means that the remaining stump must be treated with an herbicide to kill the root system.

The methods used to prepare the replant site will vary with the tree removal method. Regardless of the tree removal method used, the planting site should be properly prepared several weeks prior to planting the reset tree to allow proper decomposition of any green plant material incorporated into the soil.

If the entire tree is removed, the soil should be thoroughly aerated, and weeds and roots removed before planting. A rotovator has been found quite effective for this task since it provides soil aeration and helps cut up roots. At the very least, a non-residual herbicide should be applied to the reset area to get weeds under control before the young tree is set. The use of some residual herbicides just prior to planting is discouraged unless extremely low rates are used. Since young trees are particularly susceptible to herbicide injury, label directions for such uses must be followed explicitly.

If the tree is removed via clipping, then the reset tree will be placed some 2 feet away from the remaining citrus stump. You should never replant with the reset tree closer than 2 feet because this might expose the reset tree to issues with existing roots in the soil or to *Ganoderma* fungi colonizing the stump.

Buying and Receiving Trees

High quality trees are essential for resets. These plants will be placed in an intensely competitive situation and may sometimes receive less than ideal care, so there is no room for compromising tree quality. Only the very finest trees from registered sources should be purchased since the initial cost is but a fraction of the total cost of bringing such a tree into production.

Since 2006, all citrus trees grown in Florida have been required to be produced inside an enclosed structure that prohibits the entry of Asian citrus psyllids. The psyllid is the vector of HLB, or citrus greening. Trees are also required to be treated with an appropriate soil drench insecticide prior to delivery to the grower.

Proper site preparation, careful tree planting procedures, and quality aftercare are essential for success. Planting sites should be prepared well in advance of receipt of the trees. Ideally, trees should be planted on the same day they are received. Under no circumstances should trees be allowed to dry out. To minimize root desiccation and damage, they should be kept cool and moist until they are planted. Container trees should not be placed out in the grove prior to planting because the black container can absorb heat from the sun and allow the soil media to get hot enough to damage the roots.

Planting the Tree

Container-grown trees should be removed from the container and inspected for evidence of pot binding—a mass of roots growing in a spiral around the root ball. If pot bound, make several vertical slashes about one inch deep through the root ball to encourage root branching. These slashes also allow the potting soil and roots to interface more closely with the soil in the planting site. It may be easier to cut some of the roots with pruning shears and pull them so they protrude from the ball. In cases where the roots at the end of the container form a circle, it may be good to cut the lower 1 inch of roots off prior to planting to ensure those roots do not continue to grow in a circle and later cause root issues.

A common problem with container-grown plants is that the potting mixture is often highly organic. It is difficult to permeate such materials with water after the young tree is planted in sandy soils and irrigated. The outer third or more of the organic ball should be removed by pulling or washing so that the roots can extend into the soil in which the tree is planted. Otherwise, the tree may not grow off satisfactorily.

Dig the planting hole large and deep enough to accommodate the root system. Spread the roots out in the hole, if necessary. Set the plant slightly higher than it grew in the container. It is important to keep the bud union well above the soil level to help avoid foot rot. Since the soil (and tree) are likely to settle slightly, set the soil line of the young tree about one inch higher than the surrounding soil.

Backfill around the plant to half fill the hole and press the soil down to remove air pockets. Water thoroughly and allow to settle. Backfill to near the top of the hole, firm the soil down and water again. This process is commonly referred to as “mudding the tree in.” Finish filling the hole, firm the soil around the tree, and move the low volume irrigation sprinkler close to the tree to supply water as needed.

Growers may want to consider increasing tree density in areas that need to be reset extensively especially when trees are widely spaced in row. It is not uncommon for growers to plant two trees back for each one removed, especially when removing one or more adjacent trees or when trees are planted at wider in-row spacing.

Cold pockets, poorly drained areas, weak soils, or groves with disease problems could be planted at increased spacing to increase early yields. In many cases, such locations might be better if abandoned completely. Decisions to replant or abandon problem sites should be made only after a careful economic analysis of the particular situation.

Insect and Disease Control

The control of HLB, citrus leafminer, and canker is very important when establishing new trees. Failure to properly control these pests will result in poor tree performance and decrease the likelihood of the tree reaching maturity and thus producing an economically viable crop.

It is recommended to soil apply systemic insecticides (neonicotinoids) at approximately 6-week intervals for psyllid (and citrus leafminer) control on young trees. These 8 to 9 applications per year should provide season-long protection.

As of 2020, there are three neonicotinoid products for use in Florida citrus: imidacloprid (Admire Pro), thiamethoxam (Platinum) and clothianidin (Belay). Various generic formulations of imidacloprid are also available. These products will cause the psyllids to quit feeding on the plant when their mouthparts contact insecticide treated tissue,

thus reducing the chances for the tree to become infected with HLB.

Be aware that neonicotinoid insect resistance is a problem in using insecticides.

Once the trees are planted, neonicotinoid insecticides should be applied as soon after planting as possible since the uptake of insecticides ceases when the root system is disrupted at planting.

Be aware that each of the above listed products have maximum rate per acre per year, which will require that multiple products be applied to give year round protection. In addition to the soil-applied neonicotinoid products, growers are encouraged to apply foliar sprays in between those applications to minimize pesticide resistance.

Citrus canker, caused by *Xanthomonas citri*, is a leaf, fruit, and stem blemishing disease that affects most citrus varieties. The incidences of the disease will vary from location to location within the state. New shoots, which are more frequent on young trees, are more susceptible to citrus canker than mature foliage. Areas within the grove that are more open will also have higher incidences of the disease because the bacteria is spread by windblown rain within or between neighboring trees and wind speeds are higher in open areas than in areas that are buffered by mature trees.

In areas where canker is endemic, the primary means of control are threefold: 1) plant windbreaks, 2) spray with copper to aid in protecting the leaves, and 3) reduce citrus leafminer populations to minimize damage to plant tissue, which increases the ability of the bacteria to enter the damage plant and spread from that area in the future.

For more information on citrus canker control, please see *Florida Citrus Production Guide: Citrus Canker* at <https://edis.ifas.ufl.edu/cg040>.

Weed Control

Weeds compete with young citrus trees for moisture, light, and nutrients and thus must be controlled to achieve proper tree growth. Weed control around a reset site should be considered at 3 periods: 1) pre-plant, 2) early post-plant, and 3) after the tree is established.

Weeds can be controlled prior to planting in several ways. If residual herbicides are used, they should be used at reduced rates and well in advance of planting so that harmful residues do not remain, which might damage the

reset. Contact or growth regulating herbicides are usually preferred since they do not leave soil residues. Regardless of the type of herbicide used, the pesticide label or labels should be reviewed for any restrictions on planting or time that must pass between herbicide applications.

Weed control during the establishment period—approximately the first year of tree growth—is frequently quite difficult. Hand labor is scarce and expensive. Trunk damage by hoes or other cultivation equipment further compounds the problem. Chemical weed control provides at least a partial solution to the problem during this establishment period. There is now a fairly wide selection of herbicides available that can be used on young trees. Most of the compounds will need to be applied more frequently at reduced rates. Regardless of the herbicidal material(s) used, be sure to read labels carefully for restrictions on the use of such materials.

After the reset has been planted for a year or more, modifications of the weed control program can be considered. Labels of materials under consideration should be checked carefully for hazards or restrictions prior to use. Reduced rates of residual herbicides for young trees are required to assure that no harm will come to resets planted among older trees. Specially modified herbicide applicators are available that enable the equipment operator to deliver a half-rate of material at the operator's discretion.

Weeds growing around the reset can also absorb soil applied insecticides for psyllid control, making less of the insecticide available to the reset. Efforts to control emerged weeds prior to application of soil-applied insecticides should be actively considered.

For more information on currently recommended herbicides or weed control, please see the annual *Florida Citrus Production Guide* at <https://edis.ifas.ufl.edu/cg013>.

Fertilization

Frequent reset fertilization requires extra effort beyond the needs of the bearing grove. Water-soluble fertilizers can be applied via irrigation water in a process called fertigation.

To prevent nutritional deficiencies or toxic excesses, great care must be taken to ensure that proper rates of fertilizer materials are dispensed. Frequent, light applications usually produce best results and lessen the danger of leaching, but these practices need to be evaluated for cost effectiveness. Highly organic or slow-release fertilizers may reduce application frequency. The total amount of nutrients applied

on an annual basis should remain the same. Cost savings result because fewer trips to the reset are needed each year to provide the required amount of fertilizer.

For more information on citrus nutrition, please see *Nutrition of Florida Citrus Trees, Third Edition*, at <https://edis.ifas.ufl.edu/publication/SS478>.

Irrigation

To survive, young citrus trees require frequent but moderate water application to meet transpiration needs and to sustain proper growth. Competition for water is accentuated if the young tree is close to older trees (as most resets are) or if weeds are allowed to grow in the rooting zone of the plant. Anything that can be done to discourage competition for available soil moisture or nutrients should be beneficial to the young tree.

Where irrigation systems are in place, special modifications can sometimes be made to supply water for resets. However, the irrigation frequency necessary to sustain a mature grove is rarely adequate for good growth of newly-set trees, and young trees should be checked frequently to be certain they are receiving sufficient water.

Sprouting and Cold Protection

Young citrus trees require periodic sprout removal or devices (tree wraps) placed on the tree trunk to minimize sprout growth. The growth regulator naphthalenacetic acid (NAA) in a 1% solution has shown promise as a sprout inhibitor and can be sprayed directly on tree trunks. This material should **not** be applied in the fall to trees that may be damaged by cold since such trees would be unable to re-sprout and grow a new top if frozen back.

The use of tree wraps usually reduces the need for sprouting and affords only a very limited degree of cold protection. Most wraps cannot supply the same degree of protection as well-constructed soil banks. The combination of microsprinkler irrigation and tree wraps has been shown to provide excellent cold protection for lower portions of young citrus trees. Additional information on cold protection by wraps, irrigation, or combinations of methods is available at <https://edis.ifas.ufl.edu/topics/citrus-and-cold>.

Wraps often stay in place for several years and may not need to be removed until the tree is well established. They should, however, be checked periodically for the presence of ants or fungal diseases. Even though the protective value of a wrap is not as great as soil, the ease of application, relative permanence when compared to banks, and freedom

from sprouts may be enough to justify their use. Wraps will also provide protection from errant herbicide applications. Soil banks will provide more protection but are difficult to construct and maintain. They must be removed in the spring and reconstructed the next winter and may also predispose the young tree to injury from certain insects and diseases.

Grove Plat Maps

Since resets are usually scattered throughout a block of much larger trees, they are often difficult to locate and may be accidentally overlooked, resulting in inadequate care.

An annually updated grove plat is probably the best method for assessing general grove condition and productivity. This can help determine the number of trees that will be needed and where they should be placed. Reset plats can be prepared to later help equipment operators locate newly-planted trees for periodic care.

Conclusion

There are no simple answers to the replant problem. Each situation is different and requires careful horticultural and economic consideration to arrive at the best procedure to remediate the problem.