

**COVER STORY**

# What to consider when putting a new grove in place

By Mongi Zekri

**T**here is a high degree of planning and preparation that goes into making a new citrus tree planting successful. Site preparation, installation of an irrigation system, selection of varieties and rootstocks, tree spacing, purchasing trees from reputable nurseries, and tree planting and care are all important.



## SITE PREPARATION

The planting site should be well prepared. Soils at the site should be well drained. Drainage is usually adequate in the sandy soils of the Central Florida Ridge, and no grove preparation is needed to improve this feature. Sites in the southern and coastal areas of the state referred to as the Flatwoods area are poorly drained. Since citrus does not tolerate flooding, these poorly drained sites need to be drained to provide an adequate rooting zone for citrus trees. Trees in these areas are usually planted on double-row, raised beds to provide for adequate drainage. The crown of raised beds should be at least 3 feet above the bottom of the furrow. Drainage systems consist of water furrows, ditches, tile drains if needed and a perimeter ditch to remove excess water. The drainage system for flatwood bedded grove soils should be designed to remove 4 inches of water per day.

## IRRIGATION SYSTEM

Due to the non-uniform distribution of rainfall in Florida, citrus plantings need to have an irrigation system. The irrigation system has to be properly designed and installed before planting. Microirrigation systems are cost-effective and use less water than other irrigation systems. Microirrigation systems are easily automated, operate at lower pressures and, hence, use less energy. Microsprinkler systems offer some degree of cold protection.

Properly managed microirrigation provides good water application uniformity, improves water use efficiency, and minimizes water losses to evaporation, runoff and deep percolation below the root zone. Microirrigation also reduces diseases that require a moist environment and a wet canopy. Microirrigation efficiently delivers fertilizers (fertigation) and other chemicals (chemigation) through the irrigation system and has the ability to irrigate land deemed too steep for other means of irrigation.

## System Requirements

To ensure the water source does not become contaminated, Florida law, Environmental Protection Agency regulations, and county and municipal codes require backflow prevention assemblies on all irrigation systems injecting chemicals into irrigation water. A properly designed microirrigation system should also include a variety of different chemical preventive measures to avoid emitter plugging due to microbial growth and/or mineral

precipitation. To minimize sediment buildup, regular flushing of microirrigation pipelines is recommended.

## Water Quality

Testing the quality of irrigation water in a laboratory is also necessary. Alkalinity, caused by carbonate ( $\text{CO}_3^{=}$ ), bicarbonate ( $\text{HCO}_3^{-}$ ) and hydroxyl ( $\text{OH}^{-}$ ) anions, has been documented to be detrimental to HLB-infected trees. Therefore, it is recommended to neutralize the alkalinity effect of the water by adding acid to the irrigation water before it is applied onto the soil. Lowering the soil pH can also be accomplished by using acid-forming fertilizers and/or applying elemental sulfur to the soil. Citrus trees perform best in a soil pH of 6.0 to 6.5.

## PURCHASING TREES

High-quality nursery trees are essential for maximum performance. Citrus growers should deal only with reputable, registered nurseries to get healthy, uniform, high-quality, true-to-type trees. The scion variety should be selected based on predicted potential of the future market and demand. New genetic material should be considered in the design of a new planting. The incorporation of new rootstocks that provide some degree of greening tolerance and tree size control are advantageous. Go to <https://edis.ifas.ufl.edu/pdffiles/HS/HS17800.pdf> for information on choosing rootstocks. See <https://edis.ifas.ufl.edu/pdffiles/HS/HS126000.pdf> for information on characteristics of Florida citrus rootstocks.

## TREE SPACING

After the site has been engineered and the water-delivery systems have been installed, wise consideration must be given to decisions about tree spacing. Tree spacing is an important factor in the profitability of a planting and should be based on the vigor of the scion/rootstock combination and the expected life of the grove. Sunlight is the source of energy for tree and fruit growth. The focus of grove design involves the arrangement of tree canopies to capture sunlight efficiently. Sunlight falling on the ground between the trees does not produce fruit. Tree rows are typically oriented north to south for maximum sunlight interception. However, row orientation may depend on the row length and water drainage direction at the site.

A good design results in healthier, more productive trees and higher fruit quality with only minor pruning. Groves



planted with trees closely spaced provide an earlier return, but are more expensive to establish and more difficult to maintain. A spacing of 18 to 22 feet between rows is generally the norm for citrus groves. Within rows, it is desirable to space trees 8 to 12 feet apart. Inside this range, the influence of climate, soil, variety and rootstock on tree vigor must be considered.

A final decision on tree spacing requires careful economic analysis. Regardless of which scion variety, rootstock and tree spacing are used, the new grove must be designed to provide maximum economic return averaged throughout the expected life of the grove.

## PLANTING TREES

Young citrus trees can be planted in the grove any time of the year. In regions where there is potential for freeze damage, planting should be delayed until the spring. 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, trees should be kept cool and moist until they are planted.

Trees should be removed from the container and inspected for evidence of pot-binding. Roots that are pot-bound should be root-pruned. Trees with irregular root systems should not be planted. Make several vertical slashes about 1-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 hole. It may be easier to expose some of the outer roots by pulling them, so they protrude from the ball and extend into the soil in which the tree is planted. Otherwise, the tree may not grow quickly and satisfactorily.

## CARING FOR YOUNG TREES

Florida's sandy soils, high summer temperatures, possible low winter temperatures and scattered rainfall patterns complicate young tree care by forcing growers to protect, fertilize and weed young trees regularly or face extensive losses. The primary objective during the first few years is rapid development of the tree canopy.

Due to high levels of vegetative growth, young trees are more sensitive and more attractive to pests than mature trees. Monitoring for insect pests and diseases is essential in newly planted trees. Therefore, special care is needed to ensure pests are adequately controlled.

Weed management is especially important in newly established groves to reduce competition and enhance young tree growth. Application rates of some chemicals, including herbicides, need to be adjusted for the size of the trees.

Irrigation and nutrition are critical factors in the growth of young trees. Because of their smaller root systems, young trees have more frequent demand for water and nutrients than mature trees. The quantities of water and fertilizers to apply increase each year as the trees grow and should be based on tree size and canopy density. Minor selective

pruning may be beneficial during the first two years to develop good tree shape.

## Weed Control

Because weeds compete with young citrus trees for water, nutrients, soil-applied pesticides and sunlight, they must be properly managed. Weeds should be controlled prior to planting. If residual herbicides are used, they should be used at proper rates and at least 30 days in advance of planting so that residues do not impact young tree growth. After planting, when weeds become a problem, herbicide materials should be applied at recommended reduced rates.

Be sure to read labels carefully for restrictions on the use of herbicides around young trees. To minimize herbicide contact to young trees, many growers apply a wrap or guard around the tree trunk. When using these wraps, be sure to monitor them for ants or other pests that may damage the tree trunk.

## Sprouting

Young trees require periodic sprout removal. Rootstock sprouts should be removed during the growing season before the sprouts become large enough to compete with the scion variety shoots. Tree wraps usually reduce the need for sprout control.

## Irrigation and Drainage

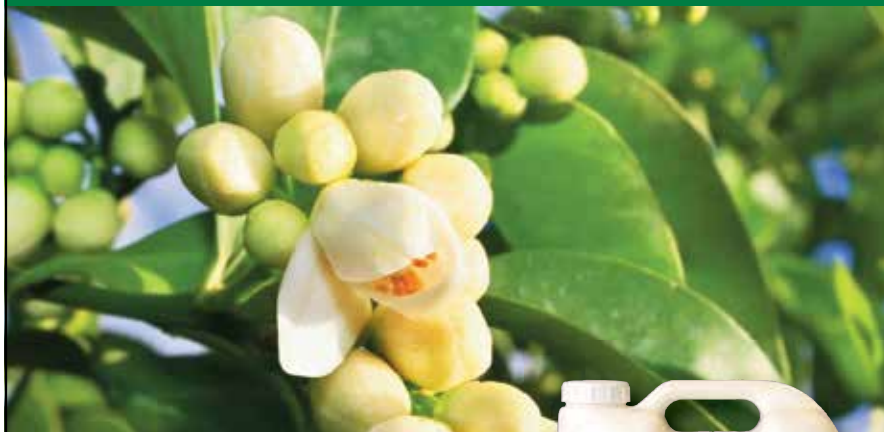
Young citrus trees require frequent but moderate water application for survival and proper growth. Irrigation systems should be in place before planting trees. Trees should be checked frequently to be certain they are receiving sufficient water. Drainage is as important as irrigation. Excess water must be removed from the root zone, and the concept of total water management must be practiced. If either system — irrigation or drainage — is not designed, operated and maintained properly, then the maximum profit potential of a grove may never be realized. In Florida, in poorly drained soils, both surface and subsoil drainage is oftentimes necessary to obtain healthy and strong root systems for the trees.

## Fertilization

The goal of fertilizing young trees is to promote vigorous vegetative growth that rapidly produces a canopy with high fruit-bearing capacity. Applying fertilizer in several small doses increases fertilizer efficiency because it maintains constant nutrient availability and reduces leaching losses. Foliar nutrition is an efficient method of applying nutrients. Like soil nutrition, foliar fertilization stimulates vegetative growth and improves tolerances to pests and diseases. Considering the wide variations in soil types and pH, foliar sprays of micronutrients are a more effective, more economical and quicker way to supply nutrients than soil application. Frequent application of water-soluble fertilizers with irrigation water (fertigation) or use of controlled-release fertilizers can also increase overall fertilizer efficiency.

Great care must be taken to ensure that proper rates of

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### Pest Control

Because young trees have more frequent root and shoot flushing cycles than mature trees, they are more attractive and sensitive to pests. Therefore, special care is needed to control citrus psyllids and leafminers to reduce their damage to new leaves. This will reduce the severity of citrus canker, as well as the spread of citrus greening. Relying solely on foliar contact insecticides for young trees is not a good strategy. Soil-applied, systemic, neonicotinoid insecticides that provide six to eight weeks of control are the most effective tool for managing psyllids and leafminers on young trees with the least negative impacts on beneficials. However, their rates are limited per acre per growing season, regardless of application method. This rate limit makes it difficult to protect trees planted at high densities for more than two years.

Foliar sprays of broad-spectrum insecticides should be used between soil-drench applications to provide additional control of psyllids, leafminers and other pests. This will minimize development of insecticide resistance. Foliar sprays targeting psyllid and leafminer adults are most effective when used before the presence of new flush. Go to [www.crec.ifas.ufl.edu/extension/pest/PDF/2015/ACP%20and%20Leafminer.pdf](http://www.crec.ifas.ufl.edu/extension/pest/PDF/2015/ACP%20and%20Leafminer.pdf) for more information on management of citrus psyllids and leafminers.

With careful planning and management, growers can get a young tree grove off to a good start and avoid headaches later on. 🍊

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