

# Florida citrus nursery industry status and research update

By Timothy M. Spann

There are currently 42 commercial citrus nurseries which meet the requirements of Rule 5B-62 and are registered with the state (down from 75 in 2000). These nurseries have a combined capacity for approximately four million propagations annually, with sweet oranges accounting for slightly more than three million of these in 2008. Hamlin and Valencia are nearly equal in propagations, and combined represent 88 percent of all sweet orange propagations.

Each of these nurseries is inspected every 30 days by FDACS's Nursery Inspection Department to ensure the good quality of the trees being sold to growers. To date, no citrus greening has been found in any of our commercial citrus nurseries or budwood sources. This means the effort and expense of moving production inside structures is working.

The new 82,000-square-foot budwood facility in Chiefland is planted with approximately 950 trees representing more than 300 different clonal selections. Capacity of this facility is slated for 1,180 trees. The facility serves the dual purpose of preserving germplasm (400 trees) and budwood multiplication (780 trees) for distribution to nurserymen. The remaining unplanted tree spaces are currently reserved for new varieties that have been introduced by the Citrus Germplasm Introduction Program from outside of Florida and new varieties developed by breeders within Florida.

Plans are moving forward on the construction of the backup foundation facility in northern Alachua County at Boston Farms (an IFAS beef research farm). This backup facility will house one accession of every selection at Chiefland as well as the Citrus Germplasm Introduction Program.

## RESEARCH PROJECTS

One would think that moving a nursery inside a greenhouse where conditions can be closely monitored and the nurseryman has control over important factors such as temperature and water would reduce losses and improve productivity. Unfortunately, it's not that simple. Each greenhouse is a unique environment, so even within one nursery conditions may vary from house to house. These unique environments present many challenges and each nurseryman must learn what these environments are and how to grow trees in them.

Unlike most of our old outdoor nurseries where space was plentiful, conditions are crowded in the new nurseries. Greenhouses are expensive to build and it's important to maximize the use of space in these structures. Most nurserymen are growing their trees pot-tight to get the most plants per square foot in an effort to keep tree costs from skyrocketing. However, growing trees pot tight in a greenhouse, which naturally has less airflow than an open outdoor nursery, reduces airflow around pots and may cause neighboring trees to shade one another. In addition, when space is at a premium, even "normal losses", which are generally expected, become more costly to the nursery. For these reasons, a number of research projects have been conducted in the past year to start investigating factors which may affect bud survival and growth in an effort to reduce losses and

improve tree growth.

In a number of different species, it is well documented that the position of a bud along the parent shoot affects its growth. That is, buds in some positions (e.g., near the base of a shoot) are inherently more vigorous than buds in other positions. This variation in vigor can remain when the buds are cut and used to bud trees and has been shown to exist in citrus under South African conditions.

Under our experimental conditions in Florida, the position of the bud did not affect the total length of growth from the bud or the rate of growth. We also did not find any relationship between rootstock diameter at the time of budding and final growth. That is, a small rootstock seedling did not necessarily result in a small or slow-growing tree and vice versa.

Since a common response to leaf removal is bud growth, in another study we tested whether removing leaves from budsticks prior to harvesting the budwood would influence bud survival or growth by preconditioning buds to grow. Leaves were stripped from budsticks from 0 to 10 days prior to cutting the budstick from the scion trees. Although the buds on the budwood whose leaves were stripped six to 10 days prior to budding were visibly swollen at the time of budwood harvest and budding, this appeared to have no effect on bud growth. There was no measurable difference in the time when trees started to grow after unwrapping based on the budwood treatment and bud take was good for all treatments (90 percent to 96 percent).

Recently the Citrus Nurseryman's Association has funded two research projects to study the effects of container media temperature and water stress on nursery tree growth. Components of these projects are being conducted at the Citrus Research and Education Center in Lake Alfred as well as with various citrus nurseries.

Root temperatures have a tremendous influence on plant growth, primarily through limitation on root growth and water/nutrient uptake when temperatures are too low in winter or too high in summer. The study will examine the effects of root/media temperatures on plant growth under two different day lengths, determine the natural variability that exists in root/media temperature in at least one commercial nursery, and will correlate root/media temperature with plant growth in at least one commercial nursery.

The second part of the research relates to drought stress and examines the effect of soil and plant water status on liner growth, bud take and bud growth. Currently, most nurseries use overhead irrigation for watering. This method of irrigation is inherently non-uniform and may be made more variable by factors such as close pot spacing and large tree size. Since water is very influential in regulating plant growth, growth of an individual tree may be reduced even though that tree never appears to wilt. This study will strive to reach a better understanding of drought-induced growth limitations in the commercial citrus nursery.

These research projects will answer questions about the importance of root/media temperature to tree growth in the nursery and what variations exist in nurseries, and will provide data for nurserymen to decide whether or not it is worth their investment to alter root/soil temperature. Ad-

ditionally, this research will be directly applicable to citrus nurseries for understanding the variability in water application that exists in their greenhouses and what effect it has on tree growth.

The Florida citrus nursery industry has made tremendous changes and investments in the past couple of years to ensure that Florida's citrus growers continue to receive the highest quality disease-free plants possible. The nurserymen are protecting their investment in new nurseries by investing in

critical research to solve key problems. While we haven't been able to find that magic bullet yet which will solve all of our problems, the nursery industry is making great strides in the right direction. This research will not just benefit the nurserymen, but all of Florida's citrus industry by guaranteeing strong, healthy trees to regrow our industry.

*Timothy M. Spann is an assistant professor at the UF-IFAS Citrus Research and Education Center in Lake Alfred.*