Citrus production research at the UF-IFAS IRREC

By Barrett Gruber, Brian Boman and Arnold Schumann

The citrus research grove at the University of Florida-IFAS Indian River Research and Education Center (IRREC) in Fort Pierce was lost to the canker eradication program in July 2005. Several years of trying to re-develop a research grove at IRREC are finally starting to pan out with trials planned to address the needs and concerns of the commercial citrus industry. Due to the serious disease circumstances in the state, the trials being developed will focus on new-planting production systems. This brief article is intended to share the plans and experimental objectives made for these trials.

OVERVIEW

Currently, a 30-acre parcel of land is earmarked for citrus research trials at the IRREC. Our team has planned new experiments that will utilize approximately 20 acres of this parcel. Figure 1 represents the layout of these trials, with the relative position and size of each main experiment.

One of the priority goals in utilizing this property is to offer potential research opportunities for a variety of possible production situations. As such, the collection of production system experiments range from less- to more-complex, with each trial incorporating one or more new design components meant to achieve rapid and premium fruit yields in the face of HLB disease (huanglongbing, "greening") and canker. In all of these trials, HLB and canker progression and damage, Asian citrus psyllid abundance, tree growth and health, and fruit yield and quality will be monitored.

HIGH-DENSITY PLANTINGS: GRAPEFRUIT

This experiment is the least complex of the group, represented by the yellow-shaded area in Figure 1, and will total approximately 6 acres. The main focus is to evaluate planting density effects on fruit yield and quality. Ray Ruby grapefruit on one commercial rootstock will be planted at three different densities (116, 174, and 387 trees/acre) and irrigated with microsprinklers. We hope to eventually superimpose a comprehensive foliar nutritional trial onto this grapefruit planting as well.

ADVANCED CITRUS PRODUCTION SYSTEM: ORANGE

A 4-acre advanced citrus production system trial represents additional complexity by also incorporating different types of irrigation (Figure 1, red-shaded area). It will investigate potential effects of planting density and irrigation delivery method on fruit yield and quality. Valencia oranges budded to a commercial rootstock will be planted at two different densities (138 and 387 trees/acre). Three different irrigation deliveries will be assessed (microsprinklers alone,

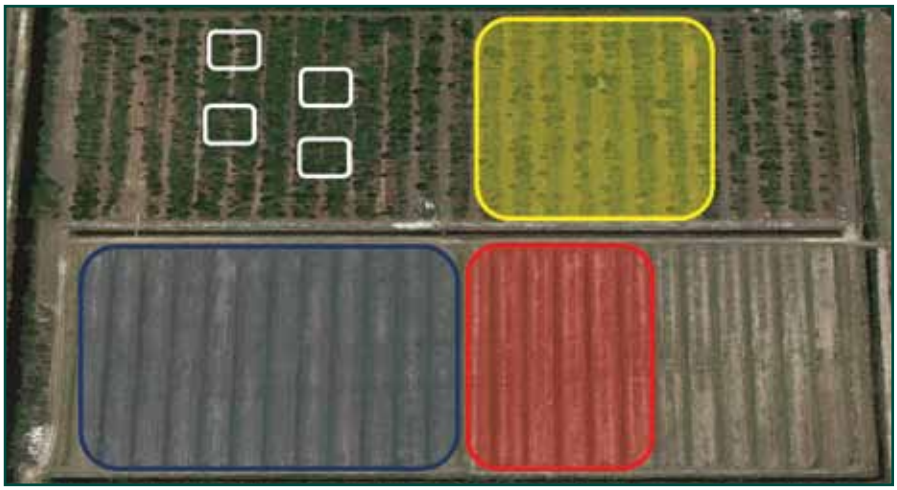

Figure 1. Layout of new-planting citrus trials at the UF-IFAS IRREC. Colored rectangles represent the relative size and position of each experiment. The entire property is about 30 acres (50-foot wide beds), moving clockwise from top-right: yellow-shaded area (~6 acres); red-shaded area (~4 acres); blue-shaded area (~8 acres); white-bordered rectangles (~0.28 acre/each). See text for a description of the trials.

Figure 2. One of the four anti-insect screen houses at the UF-IFAS IRREC (depicted as the white-bordered rectangles in Figure 1). Each structure is 14-foot tall. Note the inclusion of the pickup truck in the photo for scale.

microsprinklers plus liquid fertilizer, and drip plus liquid fertilizer).

ADVANCED CITRUS PRODUCTION SYSTEM: GRAPEFRUIT

This even more complex advanced production system trial is represented by the blue-shaded area in Figure 1. It is the largest trial (approximately 8 acres) of the group and will compare performance of Ray Ruby grapefruit on two different commercially available rootstocks (sour orange and US-897), planted at two different densities (138 and 387 trees/acre), and using three different irrigation methods (microsprinklers alone, microsprinklers plus liquid fertilizer, and drip plus liquid fertilizer). The choice of US-897 as a rootstock was based upon its potential to size-control canopy growth, augmenting a higher-density planting strategy.

CITRUS UNDERCOVER PRODUCTION SYSTEM: GRAPEFRUIT

The most complex experiment (white-bordered areas in Figure 1) aims to evaluate if covered cultivation is a viable strategy for rapidly yielding, high-quality citrus fruit, especially for the fresh fruit market. Preventing any contact between infectious psyllids and young trees will provide control of HLB. This will be accomplished by totally enclosing the trees within individual screen houses, each approximately 0.28 acre in area, of a pole-and-cable design utilizing nursery-grade anti-insect screen cloth (Figure 2).

Inside each screen house, Ray Ruby grapefruit will be planted at a density of 871 trees/acre and drip fertigated to supply the requisite water and nutrients. The goal of this trial is to demonstrate that the anti-insect screen will exclude any infectious psyllids and citrus leafminers, as well as act as a partial windbreak, leading to a reduction in incidence of canker and fruit wind-scar.

A similar covered cultivation trial is also being conducted at the UF-IFAS Citrus Research and Education Center (CREC) in Lake Alfred. Both trials will eventually incorporate and evaluate experimental varieties developed by the Citrus Improvement Program of UF's Fred Gmitter and Jude Grosser (UF-IFAS CREC, Lake Alfred) for their usefulness in covered production.

In closing, at the time of this writing, we are in the middle of making final preparations to the land, arranging it for planting. We look forward to providing future updates about these trials and welcome any feedback.

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