



# FLORIDA GROWER™

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Pete Spyke  
*Arapaho Citrus*

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# Open To Change

In the era of citrus greening, one grower sees new production systems as the wave of the future.

By Frank Giles

Editor

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**P**ete Spyke is a third-generation citrus grower who has seen challenges come and go, but in greening he recognizes a threat that suggests a need for a fundamental change in the way citrus is produced in South Florida. Through managing his own groves and others with his company Arapaho Citrus Management in Ft. Pierce, Spyke is experimenting with pulse irrigation at high frequency (known as open hydroponics systems or OHS) and new production systems for citrus.

"What we are trying to do is push the production curve forward in time," he says. "Because of greening, we know that trees are not going to live as long, so we need earlier, heavier production to recoup our investments and make a profit before the disease takes the trees out. The conventional 15- to 20-year timeframe doesn't work anymore."

## Production Momentum

According to Spyke, there are two major components of the new production systems. First is the drip irrigation and fertigation that is pulsed or spoon-fed to the trees each day, which is called "open field hydroponics." The second component involves what he and Dr. Bill Castle, who is cooperating with him, are calling "advanced production systems," which

## Comparing Costs

**H**ere's a look at total costs for grove establishment between an open hydroponics system and a conventional system on a 40-acre grove. While the total costs for open hydroponics are higher, the cost per tree is only half the cost of a conventional system.

System	Total Cost	Cost Per Acre	Cost Per Tree
<b>APS/OHS</b> Row Spacing: 20 feet ♦ Tree Spacing In Row: 6 feet Trees Per Acre: 363 ♦ Total Trees: 14,520	\$266,920	\$6,673	\$18.38
<b>Conventional</b> Row Spacing: 25 feet ♦ Tree Spacing In Row: 12 feet Trees Per Acre: 145 ♦ Total Trees: 5,808	\$160,688	\$4,017	\$27.67
<b>Difference, APS/OHS vs. Conventional</b>	\$106,232	\$2,656	-\$9.29 or 51% additional costs for conventional

For a more detailed cost comparison, go to [www.arapahocitrus.com/ohs.html](http://www.arapahocitrus.com/ohs.html).



includes planting trees densely and managing them intensely to achieve early fruit production and high quality.

"The target is to produce your first significant commercial crop by the time the trees are three years old," says Spyke. "In one of the grapefruit plots in our demonstration grove, we produced a harvestable crop at 24 months that yielded 120 boxes per acre. That kind of yield doesn't usually happen in a traditional grove until it is about four years old."

To help bring trees into production quicker, Spyke says you can more closely manage trees and trigger certain types of growth with the drip irrigation.

"We can match our water and fertilizer rates with growth events of the tree," he says. "If we are getting into the fall of the year, we can change our mix to promote higher brix. With the drip, you also can help the trees with flower-bud induction — something that is difficult to do with microjets."

Spyke has observed what he calls "root balls," masses of roots that form under the drip emitters, which are the key to OHS. The rate of water and nutrient uptake by these root balls is much more efficient than roots on trees fed by traditional irrigation systems.

"If you have a big rain during a period when we want to water stress the trees, these root balls absorb the moisture in the space they occupy more quickly, even if the nearby soil is fairly wet," he says.

### Pumping Up Profits

Growers' first question will be, "How much is this going to cost me?" It depends on how you look at it, according to Spyke.

"If you look at it on a per-acre basis, it is more expensive than a conventional grove design," he says. "But, the cost per tree for establishment and annual care is much lower to the extent that your trees are considered your productive unit instead of the acre.

"The first year out of the box, we used much less water and fertilizer with the drip

## Hydroponics Pay Off

**P**ete Spyke says there are several benefits that can be achieved with open hydroponics in citrus. Here are a few:

- ◆ Reduction of time required to reach an annual profit
- ◆ Effective management of greening
- ◆ 30% reduction in water and fertilizer use over microjet
- ◆ Less nutrient leaching and runoff
- ◆ Higher per-acre yields
- ◆ Higher profits over the life of the grove
- ◆ Interesting and challenging approach to citrus production

versus microjet systems. Putting more trees on less ground that will produce earlier will increase your profit per tree, which offsets the impact of losing trees to greening.

"If you are going to replant a grove, you need to do it with a greening strat-

egy in mind, and that is where these production systems come in. Basically, we are trying to change the model from an unprofitable one to a profitable one, and the only way to do that is to increase the profit per tree in the early years of a planting." **LE**

## Putting It Into Practice

**T**o successfully produce citrus with advanced production systems/open hydroponics, a grower needs the following:

- ◆ Drip irrigation system
- ◆ Low-flow, pressure-compensating emitters
- ◆ Self-priming pumps
- ◆ Electric power (diesel power is possible, but more complicated)
- ◆ Automated fertilizer injection
- ◆ A minimum of two fertilizer-supply tanks
- ◆ Control systems capable of full automation of valve operations, and proportionate metering of fertilizer
- ◆ Capability to apply the proper amount of water to meet the needs of the trees during the available daily pulse period
- ◆ High-density plantings — 250 to 400 trees per acre
- ◆ Aggressive psyllid control to reduce tree losses to greening
- ◆ Plant growth, flowering, and fruit set management to achieve early production
- ◆ Intensive pruning practices designed to maintain dense tree canopy

