

## What lies ahead for Florida citrus?

By Tom Nordlie

Although it's difficult to predict future events, directors of the University of Florida Institute of Food and Agricultural Sciences Citrus Research and Education Center (CREC) are often asked to do so, because they oversee a broad array of cutting-edge scientific activities and serve an industry that has faced so many unexpected circumstances and reversals of fortune over the years.

Current CREC Director Michael Rogers is no exception, and below he shares his insights about the potential next chapters in Florida citrus history for this special 100th anniversary publication.

### HLB

Despite the heavy toll HLB has taken, Rogers is confident that the crisis will be resolved relatively soon with resistant scion or rootstock varieties produced via transgenic processes or gene editing such as the CRISPR (clustered regularly interspaced short palindromic repeats) process. "We're close on a number of these issues. And once we perfect these varieties and get them to the market, the HLB crisis goes away," he said.

Resistant scions produced via gene editing could reach growers sooner than transgenic varieties, Rogers said, because less government approval is needed to launch commercial production of crops developed with gene editing. Unlike transgenic processes,



Laboratory work on HLB will continue until a cure is found, Michael Rogers vows.

gene editing does not involve the transfer of genes from one organism to another. Instead, this technology "shuts off" genes that would otherwise render a citrus tree vulnerable to disease.

Plant pathologist Nian Wang,

an associate professor at CREC, has already used CRISPR to produce a grapefruit variety resistant to citrus canker. This effort was undertaken mainly to provide proof-of-concept that CRISPR can be used to produce disease-resistant citrus, but the variety was also released by UF. Other CREC faculty are successfully using CRISPR to disrupt the biology of the Asian citrus psyllid, the insect spreading the HLB pathogen.

One reaction to the HLB crisis that may have a long-term effect is heightened grower interest in overall tree health. This has proven to be a significant factor in the survival and continued productivity of HLB-infected trees and merits further research, Rogers said.



Citrus breeder Fred Gmitter is working to develop new varieties.

### CITRUS VARIETIES

Consumer demand for easy-peel, seedless mandarins has skyrocketed in recent years, and CREC citrus breeders have responded by developing numerous new varieties, some of which have already been released. Two of these new mandarin varieties have also shown remarkable tolerance to HLB, leading many growers who specialize in juicing oranges to consider devoting a portion of their new plantings to these promising varieties. Rogers predicts that this trend will contribute to an overall resurgence of grower interest in producing citrus for the fresh market.

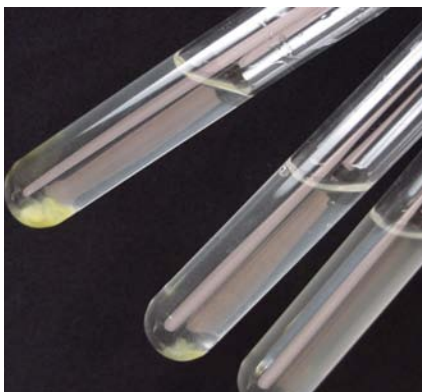
"I believe we'll see growers trying out some varieties we haven't had in Florida before," Rogers said. Nonetheless, he expects juicing oranges

will continue to be Florida's dominant citrus crop. Accordingly, CREC breeders have released two early-season Valencia oranges that can be harvested in December, three months before other Valencias. "I think we'll see a shift to better early-season juicing varieties," Rogers said.

Mandarins have also helped renew interest in citrus production in North Florida because relatively cold-tolerant varieties are available. Rogers said he expects to see additional mandarin acreage in the area, assuming that market demand supports it.

## NEW DISEASES

Rogers is quick to point out that Florida's struggles with citrus diseases will not end when HLB is conquered. CREC researchers are watching several citrus maladies not currently found in the state, including citrus variegated chlorosis and citrus leprosis, a viral disease that is transmitted by the mite *Brevipalpus phoenicis* and is also known as "nailhead rust." Though present in Florida citrus in the early 20th century, the disease seemingly disappeared in the 1960s. However, recent leprosis outbreaks in Mexico have raised concerns that the disease may reappear in the Sunshine State.



Even after the HLB crisis ends, the Citrus Research and Education Center expects to confront new pests and pathogens.

## LABOR

With the defeat of HLB, the industry may see a return of labor woes of the sort that shook growers in the 1990s, when a combination of high wages and low farm-gate prices



Interest in mechanical harvesting may return if labor costs increase.

sometimes made it more economical for growers to leave fruit on their trees rather than harvest and sell it. If this situation returns, interest in mechanical harvesting may return with it, Rogers said.

## PESTS

As with disease pathogens, non-native citrus pests are an ever-present threat, Rogers said, noting that "there's always something on our doorstep." One example is the scale insect *Orthezia praelonga*, present in parts of the Caribbean. It damages trees by feeding on their sap and also by promoting growth of sooty molds. The pest has impacted Brazilian citrus production for decades, partly because sooty mold growth covers tree leaves and impairs photosynthesis, causing yield reductions and dieback.

Rogers said he expects to see more CREC faculty members launching overseas studies on citrus pests and diseases that are not yet found in Florida, for purposes of gaining advance knowledge about their biology and management. "That's a lesson we learned from HLB and our efforts in Brazil," he said.

When the HLB crisis passes, Rogers expects to see more biocontrol research at CREC, aimed at blunting the effects of both current and future invasive pest outbreaks. "The citrus industry actually pioneered biological control in agriculture," he said. "It's helped resolve many pest issues, it's environmentally friendly and it's cost-effective. I believe we will make greater use of it again, once HLB is resolved." 🍊

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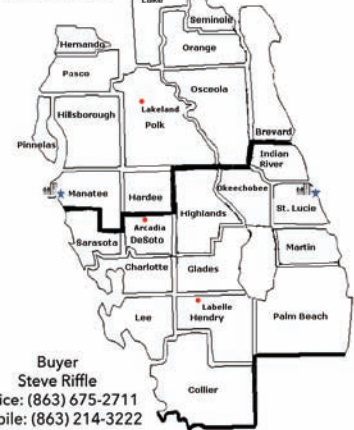
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