

“This disease is very destructive, it’s moving very fast — faster than in other countries.”

— said Dr. Mongi Zekri, University of Florida scientist

GREENING

From page 1

of citrus, which originated there more than 2,500 years ago. The Chinese call it *huang-long-bing* (HLB), or yellow-shoot disease. Now it has spread across the state of Florida.

“This is more dangerous by far than canker, partly because it kills the trees but before it kills them it ruins the fruit, and we don’t know how to stop it,” says Ron Hamel, director of the Gulf Citrus Growers Association, which represents between 500 and 600 farmers in five counties throughout the region — Lee, Collier, Hendry, Charlotte and Glades.

Together they grow citrus on about 165,000 acres, says Hamel — a startling 25 percent or so of the entire citrus industry.

The popular name, greening, bluntly describes the effects of the disease, which first deforms the fruit of the infected tree, causing it to grow green and bitter, making it useless.

The killer itself is a difficult-to-detect bacterium that arrives like a nearly invisible bomb borne by a bomber the size of a fingernail clipping, or smaller — a tiny insect called the Asian citrus psyllid.

The psyllid (pronounced with a silent p) prefers to eat the new leaves of young trees, which are the quickest to die.

When Columbus brought citrus to the New World, and a contemporary Spaniard, Pizzaro, first ferried oranges to Peru, leaving seeds the Spanish had inherited much earlier from the rise of Islam, none of them could envision the wealth oranges would represent someday, just on the North American continent alone.

The writer John McPhee reports that history in his book, “Oranges.”

But in spite of such historic precedent, experts from one end of Florida to another — scientists, university researchers and farmers typically not given to hysteria or hyperbole — all agree that if they can’t find a way to stop it, this disease will destroy the Florida citrus industry before today’s kindergartners have a chance to graduate from high school.

“The years this could take to finish us may vary somewhat — it may take less time or more than the decade they’re saying — but if they can’t figure something out, the Florida citrus industry as we know it will disappear,” predicts Jim English, whose family farms between 500 and 600 acres of citrus on the north bank of the Caloosahatchee River in Alva.

Lee County alone still supports about 12,500 acres of citrus, according to the Property Appraiser’s office.

“This thing has been around in other countries for a long time (a century in China),” says English. “But only recently has it been introduced here, and for some reason it seems to move around from one tree to another or one grove to another much more rapidly under conditions here in Florida, than in some other countries.”

As a result, says Hamel, officials here “are getting ready to launch the greatest initiative ever funded to attack something like this, with a comprehensive strategy, and more than \$20 million so far from a combination of grower taxes — they tax each other — state and federal and university money, and work from the National Academy of Science. It’s going to take all of that and



PHOTO COURTESY PHIL STANSLY, UF-IFAS

Ladybeetle feeding on a psyllid nymph. These insects may help control the psyllid that’s responsible for the greening disease.

more, a true cross-cultural approach, to stop this threat.”

To help with the effort, a University of Florida laboratory in Immokalee known as the HLB lab — an acronym for the Chinese name of the disease — has been devoted to greening, becoming one of only two greening labs in the state. And outside the lab, officials are trying to control the disease’s spread by “integrated pest management,” says Dr. Mongi Zekri, an Institute of Field and Agricultural Sciences scientist at the University of Florida.

So far, that isn’t working very well.

“This disease is very destructive, it’s moving very fast — faster than in other countries — and we’re just trying to control the psyllid, which is the insect vector (the carrier) of the bacteria,” he explains.

“You’re combining chemical, biological and even mechanical and horticultural controls. But we don’t have a chemical control for the bacterium itself, or the tools to manage it like we can manage other diseases. It behaves like a virus.”

The HLB lab now provides an invaluable service — or perhaps a discouraging service — to growers, while coincidentally searching for a way to stop the disease: It tests trees for infection. Even on the same tree, though, sometimes the test appears positive, and sometimes negative, so the disease in its early stages is difficult to detect.

“The psyllid is not that hard to kill, but we don’t know how thoroughly we have to do the job to actually stop the disease, and unfortunately experience is how you find that out,” says Dr. Phil Stansly, a professor of entomology at the University of Florida - IFAS, based at the HLB lab.

“There are a lot of repercussions to trying too hard, in terms of having to spray a lot and then creating problems with other pests. There are plenty of instances where you’re spraying for one pest and creating a problem with another,” he adds.

So Stansly and others have also focused on biological controls.

“There are ladybugs, and a little parasitic wasp that lays its eggs under the psyllid, then the eggs hatch into larvae that eat the psyllid and then they go out and get more. We’ve been successful

greening

- >> **THE DISEASE:** Popularly called greening, it kills orange and grapefruit trees after causing them to produce green and bitter fruit that is commercially worthless.
- >> **THE INSECT:** Known as the Asian citrus psyllid (*Diaphorina citri*), it eats citrus leaves, especially those of young trees, leaving a tree with a deadly bacterium.
- >> **THE BACTERIUM:** Called scientifically *Candidatus Liberabacter asiaticus*, this bacterium behaves like a virus, ultimately killing the tree.
- >> **TIME LINE:** Scientists and industry experts agree the disease will destroy Florida’s citrus industry by roughly 2015 or 2020 if they cannot devise methods to stop it.
- >> **THE INDUSTRY:** Worth \$9 billion in Florida — by far the largest producer of citrus in the United States — it includes about 165,000 acres of citrus production in the five counties of Southwest Florida (Lee, Collier, Hendry, Charlotte and Glades). That’s about 25 percent of the total industry.

releasing one species like that.”

Now, as research really begins to get underway, entomologists may try mass releases of psyllid predators at critical times.

“There’s not a downside to that, in my view,” explains Stansly.

“Every time you release something everybody thinks these things are going to turn into monsters, but there are no cases of that in the kind of biological control that we do, historically. You’re really hard put to find a case of an insect brought in on purpose that devastated the environment in some way. This is not bringing in mongooses or something.”

Meanwhile, greening just keeps spreading.

Paul Julian, who manages the HLB lab, says that the ratio of infected trees to those that remain healthy in lab tests has risen to about 50-50 now, with infected numbers steadily increasing.

“So we’re in full swing now, from trying to map the complete genome for the greening bacteria, to working on treatments so we can kill it or keep it at bay, at least.”

One big problem is that the disease has federal agricultural officials

so worried they’ve listed it as a possible tool of bioterrorists. Thus, only carefully scrutinized researchers are allowed by the F.B.I. to seek solutions and share information.

For that reason, says Julian, “We have our hands tied in research — the people actually trying to culture this are limited. But they’re very smart, very good.”

Among some other approaches that have showed promise, he adds: the use of tetracycline, an antibiotic that might reduce the amount of greening in a tree, and another approach using potent nutritional sprays.

“They spray multiple nutritional sprays with essential nutrients, and there’s a grove we manage or oversee the research in, where they’ve been spraying for six months. Before, those trees looked sickly, but now they’re bouncing back to look a lot better, and producing fruit we can use. The downside is the labor required to spray like that.”

In China and other countries, the disease has been managed (but not stopped) in other ways over time — but American citrus growers and even researchers aren’t completely familiar with how the Chinese have handled it.

“We don’t know too much about what goes on in China — but I was there myself, last year at this time, visiting citrus growers in the south, where it’s a problem,” says Stansly, the Florida entomologist.

“There are a number of ways they deal with it — one is they don’t keep trees around for 100 years, like we used to like to do.

“Also, they use various means to suppress new foliage growth during summer. Since the new psyllids need new foliage, if there’s no foliage, there are no psyllids.

The Chinese think they’re better off putting growth energy into the fruit, not the foliage, by using plant hormones, which would be an option for us.”

For growers like Jim English, veterans of other devastating disease attacks on their trees, the prospect of having to endure ravages again is daunting.

“We’ve been here in the grove business for 130 years,” he says. “Most of our early citrus was on sour orange root (sour orange root was successfully brought into Florida in the mid-19th century, and used predominantly until recently).

“In the 1980s and ‘90s we let a disease get in here called tristeza, and it affects sour orange root. It was in the process of wiping our groves out. So a lot of people just replaced trees as they became affected, and over a number of years they had a ragged looking grove that didn’t produce evenly.”

The Englishes tried something else — they removed all their trees and started afresh.

“It was more than painful, it was extremely expensive, plus we had to take care of the little trees until they got big enough to produce,” English says.

That’s not something he ever wants to try again — nor does any other grower, which is why all of them are putting their hopes in the new, big research.

Stansly holds some confidence that the industry can be saved.

“I doubt (greening) can be eradicated, but I think we’ll find ways to live with it,” he says. “A lot of these citrus groves are in the third generation, too, and in many cases the grandkids may not be interested in them.”

But that’s another story. ■