November 2023 Volume Seven Number 27

The Chubb Chronicle

Newsletter of the Lake Alfred Historical Society, Inc.

This edition of the Chubb Chronicle is dedicated to Betty Shinn (1928-2023), Past President of the Lake Alfred Historical Society.

Remembering Citrus Greening. History you will read no where but here.

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I promised to put a human face on Greening in my last installment on Citrus Canker (The ChubbChronicle, August 2023).

In 1974 there were 817,300 acres of producing citrus. In 2022 there were an estimated 375,302 Acres. In 2023 there are six major citrus packinghouses. These packinghouses also process juice from Brazil and Mexico. In 1974 there were an estimated 56 major packinghouses. The 2023 number is 10.7% of the 1974 packinghouses. In 2023 there were 17.45 estimated million boxes produced (all fruit). Compare that to 230.25 million boxes produced in 1974 (all fruit).
Based on boxes of fruit, 2023 production was just 7.6% of the production in 1974. Astounding! How in the world did it come to this?

Let's look at those numbers again. Acres: 817,300 vs. 375,302. 2023 percentage, 45.9%. Production: 230.25 million boxes vs.17.45 million boxes. 2023 percentage, 7.6%. Packinghouses: 56 vs. 6. 2023 percentage, 10.7%. Producing acres at 45.9% does not add up to the production decline of 7.6% comparing 1974 to 2023. And that's the point---Greening cut production, but freezes accompanied by development had an effect as well.

In 1989 there was a hard freeze. In Lake County 100,000 acres of prime citrus were destroyed by the cold. The developers moved in and within a few years most of those acres, particularly along US 27, were in houses. I worked in many of those groves. For example, as you drive north on US 27 you come to rolling hills around Clermont.

That was all citrus before 1989---as far as the eye could see. On a personal note, citrus is a beautiful vista compared to the cookie- cutter homes you see now. Development is a permanent change.

Florida citrus has withstood freezes, citrus canker, many imported insects, mites, diseases, and development. Then came Greening. There are many sources of information on the internet about greening. A good overview site is: https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests- and-diseases/citrus/citrus-greening.

For the rest of this article, I refer to Huanglongbing (HLB) as greening and the Asian Citrus psyllid as psyllid or the psyllid.
The psyllid which transmits greening was found in Boynton Beach, Florida in June 1998. The psyllid is a small insect that feeds on the new shoots. When your citrus tree puts out new leaves it puts out new stems (shoots) for those leaves. The psyllid is triangular and mottled brown.
They insert their mouthparts into the shoot to feed and thus do not generally fly away when you look for them. Easy enough.

While psyllids feed, they transmit the greening bacterium into the plant. That's when the trouble begins. That bacterium was not found in a citrus plant in Florida until 2005. That's important for our discussion. By 2005 the psyllid was found all over Florida. A logical assumption is that by 2005, about seven years, greening was all over Florida citrus.

I was in many of the original meetings (these were all internal meetings, not public) when thepsyllid was found in 1998. The first argument put forth by the administration of the University of Florida and the administration of the Florida Department of Agriculture and Consumer Services went like this. "The psyllid might be here, but maybe the psyllids that are here are not carrying the greening organism. If that is true, why should we try to eradicate this insect. It's probably widespread and the cost will be in the millions."

The first problem with this thinking is that there was no evidence that the psyllid was widespread in 1998 or, if the data were available, it was not presented.

The second problem is that an assumption that an organism which transmits a disease as devastating as greening is not carrying the greening bacterium, is wishful thinking at best. A protective approach would eradicate the transmitting organism before it becomes widespread.
Forget whether or not it carries the disease organism. Eradication was suggested by many scientists including this author. The administration decided to confirm the presence of the greening bacterium before spending millions of dollars on a perhaps unnecessary eradication effort. The eradication approach is not a "hindsight is 20/20" proposition. Eradication was clearly put forth as the best approach.

The hunt for the greening bacterium began. This hunt immediately ran into problems that were not understood at first.

First, let's discuss the symptoms of greening: mottled leaves, stunted growth, reduced fruit size, premature fruit drop, fruit orange at the stem end, green at the bottom, corky veins, and root decline. Sometime after five years, greening kills the tree. Mottled leaves generally show up first. But mottled leaves are caused by a variety of minor element deficiencies, so are not very definitive. Reduced fruit size is a production problem.
Remember that production was reduced more than acreage (see above). Reduced fruit size explains this discrepancy. Imagine if the tree was producing fruit the size of baseballs. It gets the disease and produces fruit the size of ping pong balls. Production is measured with a standard 90 lb. box. It takes lots more ping pong balls to fill the box compared to baseballs, so the number of boxes is reduced. Thus, production estimates are much reduced, but acreage is not reduced to the same percentage.

The definitive test is to find the DNA of the bacterium in the tree. I don't recall the exact year, perhaps in 2000 or 2001, a researcher at the USDA claimed to have found the greening bacterium with molecular techniques. Her results were immediately challenged by insinuating that perhaps the techniques were incorrectly applied, etc. etc. This was unfortunate because the disease was confirmed in Florida in 2005 and this researcher had most likely beaten that result by four important years.

Those years could have been devoted to controlling the psyllid and slowing the spread ofgreening. Unfortunate for certain.

It is important to note that a researcher was hired at the Citrus Research and Education Center to isolate the bacterium and grow it in a petri dish. Had this effort been successful, all sorts of tests could have been performed in a laboratory----chemical effectiveness, biological control with viruses, and so forth. The greening bacterium has not been grown in the laboratory to this day.

Let's return to 1998. The psyllid was here, and researchers were looking for symptoms and the DNA of the bacterium. They consistently found nothing. What the researchers did not understand was that the bacterium was not evenly distributed in the tree, was not present in sufficient numbers most of the time, could be present in sufficient numbers with the tree showing no symptoms, and symptoms could be present, but the bacterial count could be low. They also did not understand that greening symptoms could show up in one year or five years.

So researchers did not know when to sample, what part of the tree to sample, in which part of the tree to sample, how much to sample, which varieties to sample, and how to sample for the psyllid (though this came along quite quickly).

A 2012 University of Florida study estimated a $4.5 billion loss in revenue and 8,000 jobs in six
years of greening. This is low. If we look at the estimate of 76,000 jobs in citrus in 2023 with about 5,000 citrus harvesters (citrus is harvested by hand), 6.5% of the labor force is hand harvesters. Using this percentage and an estimate of 26,000 hand harvesters in 1974, about 400,000 Floridians worked in citrus in 1974. This is a 324,000-job loss or an 81% loss of citrus related jobs in Florida.

What about from 2013 to 2023? I estimate we've lost another $10 billion in revenue. I estimate we've lost another 20,000 jobs in citrus from 2013-2023. Whooping losses.
What about research costs to study greening? This is a difficult number to estimate. In 2015, the University of Florida received $13,544,458 for greening research. This is peanuts.
The Citrus Research and Development Foundation was created in 2009 with the cooperation ofthe National Academy of Sciences to fund field trials of greening management. Their websitelists 17 pages of previously funded projects and two pages of 2023 funded projects.

I know the CRDF received $25 million through congressional action by Congressman Adam Putnam. The CRDF does not provide the total money spent on previous projects. The CRDF does list 34 pages of projects with the funds listed in a font almost too small to read.

Here is a rough estimate for the money spent on greening research from 2005 until 2023. This includes all of the salaries of researchers, outright grants to study greening in the laboratory or green house and field research. It includes all agencies; that is, the University of Florida, Other northern universities like MIT got grants, USDA, APHIS, private researchers or service providers like nursery operations, additional personnel, agency internal budget increases and Private foundations like the CRDF and other State universities in Texas, Arizona and California.

There have been two rounds in the farm bill of $125 million each. The CRDF is most likely pushing $50 million. Then there are the ancillary monies in the previous paragraph.

$1.0 billion

A billion dollars. This is a big number, but Florida citrus is a $5-10 billion business. So is California plus Texas and Arizona. What the public got for this expenditure will never be accurately known. This is because any scientific discovery that doesn't look important today can turn out to be very important tomorrow.

There are two discoveries that are important now. Dr. Arnold Schumann at the CREC, University of Florida, Lake Alfred, proposed and was funded to grow citrus under a screen enclosure that would exclude the psyllid. This turned out to be a home run. He showed that you can grow high quality fruit under screen and make money. Several commercial companies now have 100-200 acres under screen. And they are making money growing high dollar fresh fruit.
Dr. Fred Gmitter at the CREC, University of Florida, Lake Alfred has a non-GMO tangerine variety that is resistant to greening. This variety has the disease but has quality fruit and no symptoms of greening. This variety is termed "bingo". This variety was developed using conventional breeding.

In other words, no fancy DNA techniques were used in its development. This is a huge breakthrough because the gene jockeys can take this plant apart and try to discover why it is resistant to greening. The value of this breakthrough is inestimable.

My opinion, having been in science a long time, is that the estimated $1.0 billion spent on greening will pay off at least 10X the investment. It's just the way things work. But you have to be patient for the payoff.

It is interesting to compare the administrative approach to Citrus Canker with the approach to Citrus Greening. Perhaps it was the previous experience with canker that the State of Florida immediately began eradication of canker (see the previous The Chubb Chronicle 7(26), August 2023). Canker had been eradicated several times so the machinery was in place. But canker is not lethal and other countries and now Florida, live with and control canker.

We hesitated with greening, a known devastating and lethal citrus disease. That is much different than non-lethal canker. The chance to eradicate the psyllid and thus eradicate greening was not taken in 1998. Scientists recommended greening be eradicated. Why was it not? This is the $64,000 question. I would like to give the bureaucracies the benefit of the doubt. Because of my experience with administrator "canker shenanigans", I cannot give the administrative types a break. I think their hesitation in eradicating greening was driven by the prospect of emergency funding.

This should be a lesson for the future. Don't mess around with a devastating disease and particularly with a lethal disease of any crop, or mammal for that matter. Eradication of the threat should be the first choice.

I end this article with a short discussion about conspiracy theories. Inevitably, since the genetics of the psyllids in Florida match the genetics of the psyllids in China, guess what? The Chinese must have brought psyllids to Florida to destroy the Florida citrus industry with greening.
Whew. This is a stretch.

China, eastern and southern Africa, the Indian subcontinent, Mauritius, Reunion, the Saudi Arabian Peninsula, and southeast Asia. California, Florida, Georgia, Louisiana, Puerto Rico, South Carolina, Texas and the U.S. Virgin Islands China, India, Sri Lanka, Malaysia, Indonesia, Myanmar, the Philippines, Pakistan, Thailand, the Ryukyu Islands, Nepal, Saudi Arabia,
Afghanistan, Réunion, Mauritius, Brazil, Paraguay, Mexico, Madeira, Portugal, and Ymen.
These are the countries that have greening. Not all have the China strain according to the latest data. My point is that greening is widespread, probably also in Cuba (not in the list above).

I would guess greening came to Florida like all the other exotic pests we have here, by someone sneaking in a seedling or a cutting that harbored the psyllid. No conspiracy necessary.

Sources:

https://www.thepacker.com/news/produce-crops/florida-citrus-acreage-contracts-8-2022

https://www.thejaxsonmag.com/article/floridas-disappearing-citrus-processing-industry/

cit0523.pdf (usda.gov) citrus summary-1974.pdf (usda.gov)

A healthy citrus tree, free of Greening signs.
Photo courtesy of Florida Memory,
State Library and Archives of Florida

Decaying citrus trees

Donations Accepted

Artifacts

The Lake Alfred Historical Society relies upon the city's residents and former residents for artifacts and memorabilia to be displayed in the Historical Museum. We welcome all Lake Alfred related items. Items may be donated, or loaned for your specified length of time. You may call to arrange for pick-up or bring your items to the museum during regular hours. Receipts are gladly given.

MUSEUM DATES

Your Lake Alfred Historical Museum will be open on the following dates:

Nov 4th	Dec 2nd	Jan 8th
Nov 11th	Dec 8th	Jan 13th
Nov 18th	Dec 16th	Jan 20th
~~Nov 25th~~	Dec 23rd	Jan 27th
	~~Dec 30th~~	

Scheduled hours are 11:00 am - 2:00 pm

Appointments may also be made by calling 863-224-2792 or 863-287-3093

BOARD MEMBERS

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MEET THE AUTHORS

Florida: A History in Pictures

NOVEMBER 4TH

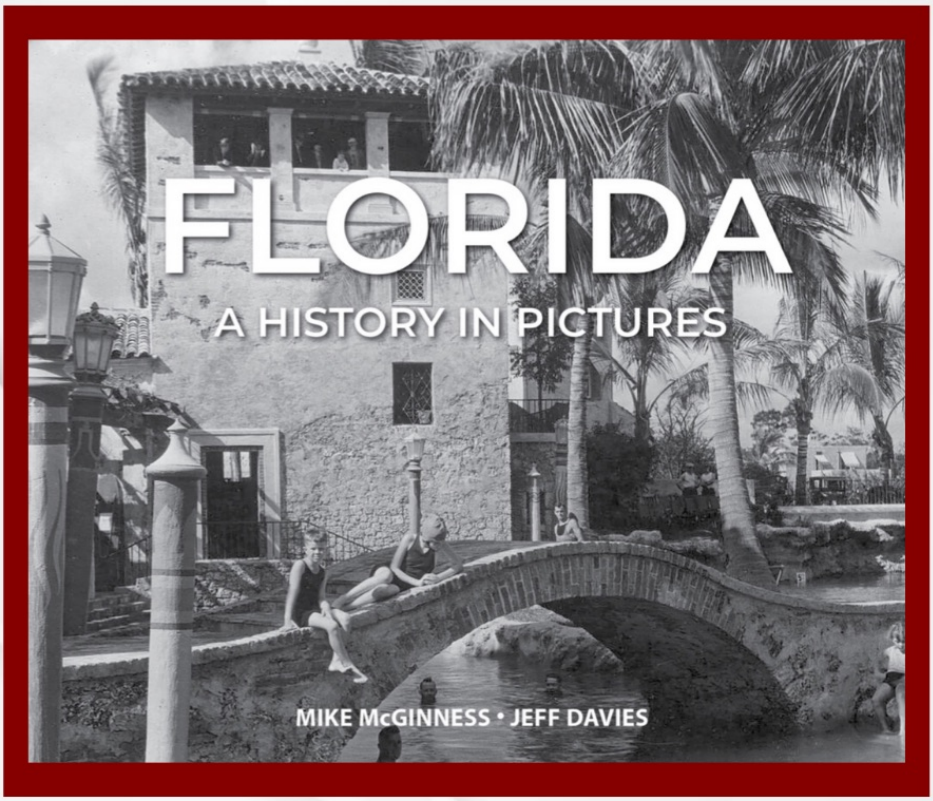
3:00 PM

Mike McGinness

Jeff Davies

GARDNER HOUSE
275 N ROCHELLE AVE.
LAKE ALFRED

With more than 130 photographs, many of them seen for the first time, Florida: A History in Pictures offers a stunning portrait of this one-of-a-kind state. From the stone forts at St. Augustine, to the Everglades, to Bok Tower Gardens in Lake Wales, the Fort Myers Beach arches and Jupiter Inlet Lighthouse, it is all here! Mike McGinness and Jeff Davies have put together the definitive photographic account of the Sunshine State.



Copies of the book will be available for sale.

LAKE ALFRED HISTORICAL SOCIETY