



Florida citrus industry members visited Brazil in June.

# HLB management in Brazil

Observations and lessons learned from a recent citrus grower tour

By **Stephen H. Futch**

In June 2016, a group of Florida citrus growers and industry representatives embarked on a trip to tour the Brazilian citrus industry. The primary purpose of the trip was to learn more about how huanglongbing (HLB or citrus greening) is being managed in Brazil and how it could aid Florida in battling the disease.

The group departed from Fort Lauderdale on June 18 for the 8-hour, 4,116-mile flight. We were traveling south of the equator, so we were leaving Florida's hot summer for a winter climate. We arrived at the Viracopos airport, which is in Campinas, about one hour north of downtown São Paulo. The population

of the greater metropolitan area of São Paulo is roughly 21 million people, making it the largest city in Brazil and the second largest city in the Americas, only surpassed by Mexico City (22 million people) and slightly ahead of New York City's 20 million people.

Upon arrival in Viracopos, we boarded a bus to travel north to Araraquara, which used to be one of the larger citrus-producing areas in Brazil. However, the ravages of HLB have caused this area to decline in citrus production. As citrus declined, much of the acreage transitioned into sugarcane production.

Visits began at Fundecitrus, which is a non-profit institute supported by growers and industry in a partnership

to aid in addressing citrus-related issues. Fundecitrus does basic and applied research to provide solutions to a diverse set of citrus issues. It also conducts yearly production crop forecasts, pest surveys, online postbloom fruit drop (PFD) alerts, citrus variegated chlorosis (CVC) diagnosis, and research to provide growers with biological and ecological solutions to a wide variety of citrus pests and diseases. Fundecitrus has been very active with the University of Florida and Citrus Research and Development Foundation in many cooperative efforts to find solutions for citrus growers worldwide.

Fundecitrus has many short- and long-term projects, some of which are traditionally based while others seek to use genetic transformation to create varieties resistant to diseases — for example, black spot and fruit flies. Similar to Florida, GMO-based solutions face both governmental and regulatory issues as well as consumer acceptance concerns.

## YIELD ESTIMATE

In an effort to provide timely and accurate crop information, Fundecitrus started forecasting citrus yield estimates as well as publishing data on



**After fruit bags are filled in the field, they are raised by a loader and the fruit is poured into a trailer.**

the number of trees in the state of São Paulo back in 2014. Prior to that time, an official, independent forecast was not available. The data is only available for the state of São Paulo and adjacent Minas Gerais to the north. The report encompasses about 76 percent of the total citrus production in Brazil.

An interesting statistic from the report is that much of the industry is transitioning to irrigation. Today, approximately 24.6 percent of Brazil's industry utilizes irrigation, which is up sharply over the last 10 years. The reason more land is not irrigated is shortage of water and the high cost of drilling wells to a sufficient depth to obtain water of acceptable quality for irrigation.

For more information on the São Paulo citrus production forecast, visit the Fundecitrus website ([www.fundecitrus.com.br/pes/estimativa](http://www.fundecitrus.com.br/pes/estimativa)). The report is in both Portuguese and English.

## CITRUS GREENING

It is now estimated that 17.9 percent of Brazil's citrus trees would test positive for HLB, with the number nearly doubling each year since 2009. The HLB incidence by tree age group in 2016 is as follows: 0 to 2 years, 2.1 percent; 3 to 5 years, 10.6 percent; 6 to 10 years, 18.1 percent; and greater than 11 years, 27.2 percent.

HLB is not evenly distributed throughout Brazil. In the hotter area (more northern parts of São Paulo and adjoining Minas Gerais), there seems to be less HLB than in the cooler, more

southerly areas of São Paulo. New shoots from high-temperature areas seem to have lower concentrations (titer) of the causal bacteria and thus milder HLB. High temperatures seem to reduce HLB bacteria in new shoots, which would also reduce acquisition rates by the psyllids.

A "psyllid alert" system has been developed to help growers manage HLB and psyllid populations. The alert

is based upon growth of new flush and on psyllid numbers caught on yellow sticky traps located in cooperating groves. An alert is issued if the trend in psyllid number is upward. The purposes of the alerts are to better coordinate spray applications, more effectively reduce psyllid populations and thus slow the spread of HLB. However, note that the level of psyllids found in Brazil always seems to be lower than what we have experienced in Florida.

For HLB management, Brazil uses a triangle concept with each of the three points representing a different control factor: plant health, psyllid control and removal of infected trees. It is believed that effective management requires targeting all three points. In many areas, infected trees are still removed to reduce inoculum and ultimately slow the spread of HLB. To identify infected trees, many growers inspect the grove four to six times per year for visual

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HLB symptoms. The border and areas with higher infection rates are typically surveyed more frequently than the areas within the grove that have lower levels of HLB infection.

We visited a number of what we would call medium-size growers (700 to 1,000 acres), and they professed to be managing HLB with the above three-point plan.

## PSYLLID MANAGEMENT

Many growers monitor for psyllids using yellow sticky traps that are checked every 15 days. Sticky traps are often placed in the upper third of the citrus tree canopy, with more along the border some 1,600 feet apart. Sticky traps are good for detecting psyllids at



Field equipment, similar to a goat, is used to transport fruit to the truck or trailer at the edge of the grove.

the numbers typical in many groves in Brazil. Psyllid numbers along the border are usually higher than inside the block, where HLB-positive trees are still being eradicated.

When managing psyllids, Brazilians generally use various imidacloprid formulations as a trunk/

soil application combined with foliar sprays on young trees. They rely solely on foliar sprays for mature trees. For young blocks, they feel that they have 60 percent less plants affected with HLB up to 4 years of age when they combine both soil/trunk applications with foliar sprays than just relying on the soil/trunk application. Young groves require more frequent sprays due to frequent growth flushes. Border sprays are required to control psyllid movement, which is believed to originate from adjacent properties.

As in Florida, the average number of sprays has increased over the years. In the 1980s, many Brazilian citrus growers sprayed approximately four times per year and increased to eight

sprays by the mid-1990s due to CVC and to 12 sprays by 2004 for citrus leafminer and HLB. Today, it is not uncommon for up to 18 to 24 sprays per year depending on tree age, psyllid numbers and HLB pressure in surrounding areas. Border areas always receive more frequent sprays and are timed at seven- to 10-day intervals, thus approaching 36 sprays per year.

## NEIGHBOR IMPACT

We heard a lot about some Brazilian growers doing external actions to keep psyllid populations low, especially where HLB-positive trees were still being removed. These external actions include surveying the surrounding areas and working with neighbors to either remove citrus trees (when possible) or to allow the grower to treat nearby citrus with pesticides on a monthly basis to keep psyllid populations low. Areas targeted



A Brazilian fruit picker wears protective clothing from top to bottom.

for external actions could be up to 4 to 5 miles away from the border of the grove. *Tamarixia radiata* is also being released in many urban areas to suppress psyllids. One grower even went as far as saying that for every dollar he spent in external action, that it would save up to \$8 in internal costs for HLB control.

## HORTICULTURAL MANAGEMENT

In newer blocks where irrigation is present, approximately 50 to 70 percent of the nutrient requirements may be applied via the irrigation system and the balance via standard dry broadcast application to the soil surface.

When planting new acreage or renewing existing blocks, growers try to plant as large an area as possible to minimize borders. Growers are also planting trees closer together — both in-row and between rows. It is not uncommon to see new groves planted at a density of 230 to 350 trees per acre.

Just like in Florida, Brazil has PFD issues. PFD was more severe this past year due to frequent rains during bloom, similar to Florida this past spring. Some growers sprayed up to five times and up to eight or nine times at seven- to 10-day intervals when frequent rains occurred during bloom period and where groves had a history with PFD.

In areas where eradication of HLB trees has not worked in controlling infection rates, growers are instituting

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practices that minimize tree stress. Stress reduction is instituted in an effort to keep the trees productive as long as possible. A combination of nutrients, plant growth regulators and hormones is being studied. These tools seem to increase fruit size and yield while reducing fruit drop. Growers stressed that they must continue to apply pesticides for psyllid control as these products do not replace good psyllid management.

In conclusion, the lesson learned is that with effective HLB-management programs, growers can manage HLB and remain productive and profitable. When growers establish new groves in Florida, consideration should be given to planting larger tracks of land and forming a management group that collectively works together in controlling psyllids and HLB. Planting as large an area as possible — instead of planting small blocks intermingled in areas with acreage where psyllids and HLB are not effectively controlled — may prove more successful. Managers of these new plantings should work with surrounding property owners to suppress psyllids in adjacent property, as this has been shown to work well in Brazil to reduce HLB infection rates. Remember the example about a grower who stated for every dollar spent on external actions (managing psyllids outside his property), the return can be as high as \$8 in internal actions.

We, the Florida citrus industry, must aggressively look at options and programs that are working in Florida and other parts of the world that give us the best opportunity to rebuild our industry and remain competitive in the United States as well as the international market. We, the Florida citrus industry, can and will develop new strategies that will enhance our ability to manage HLB and remain profitable. 🍊

*Stephen H. Futch is a University of Florida multi-county Extension agent at the Citrus Research and Education Center in Lake Alfred.*

# 2016/17

  
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