HLB in Brazil: What's working and what Florida can use

By Evan G. Johnson and Renato Bassanezi

In February 2016, I (Evan Johnson) had the opportunity to tour citrus production areas in Parana and São Paulo states in Brazil as part of collaborations with researchers at Fundecitrus, a grower-supported research foundation. In addition to the fruitful discussions with research colleagues, I also had the opportunity to visit with growers in São Paulo and learn how they are successfully keeping HLB under control. While much of this success is dependent on the different conditions and architecture of the Brazilian citrus industry, there are potential lessons for Florida citrus growers for bringing replants and young groves into production. Renato Bassanezi, from Fundecitrus, has provided additional details and insight based on his regular interactions with these growers.

Through area-wide psyllid management and inoculum removal, São Paulo citrus growers have managed to keep the incidence of HLB down. However, they have not been universally successful. Even growers with large contiguous acreage originally faced difficulties in keeping HLB incidence to a manageable level. In the last few years, it became apparent that they needed to do more than just psyllid management and removal of symptomatic trees within their own groves to keep the epidemic under control. Many of these large growers saw a heavy toll of HLB on the edges of their groves and tried to develop strategies to reduce the influx of disease. With the assistance of Bassanezi and Marcelo Miranda at Fundecitrus, this observation led them to census nearby citrus trees, both commercial and backyard trees. They then worked to develop cooperative approaches to reduce the risk of inoculum coming from these sources.

CAMBUHY: A CASE STUDY

One of the grove operations I visited will be presented here as a case study to investigate what aspects of these growers' effective approach can be incorporated or considered by Florida growers. Bassanezi has previously presented information on this grove and another location at the last two International Research Conference on Huanglongbing meetings.

The case study comes from Cambuhy, a company with a large contiguous acreage of land, but with only portions planted in citrus. The property has a mix of large and small commercial groves and homeowner citrus on neighboring lands. From the initial discovery of HLB in Brazil in 2004 through 2010, the company managed HLB with aggressive psyllid control and inoculum removal; however, they suffered from continually increasing infection rates and appeared to be on course to reach the unsustainable 10 percent annual infection rate. At this point, it was apparent that their largest losses were at the grove edges, which were progressing inward with inoculum removal efforts. The role of infectious psyllids coming into the grove from elsewhere became apparent.

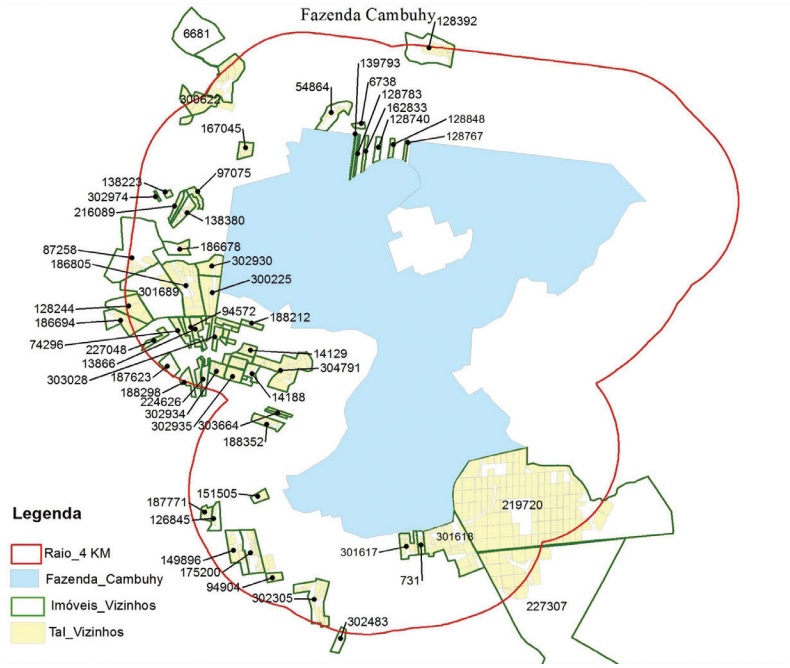

Figure 1. Map of the case study property referenced in this article and the 2.5-mile (4-kilometer) radius of cooperative psyllid management and homeowner tree replacement and spraying.

In response, Cambuhy began to coordinate with small growers in the vicinity and census homeowner trees. Through a cooperative effort with small growers and outreach to homeowners, the company began a psyllid control program beyond its grove borders, which included offering to replace homeowner citrus with other fruit trees or to spray homeowner trees monthly.

Currently, psyllids are being controlled on almost all citrus within a 4-kilometer (2.5-mile) radius of the farm (see Figure 1). This led to an immediate decline of new HLB finds in Cambuhy groves, dropping from a rapidly climbing peak of 3.5 percent per year to a steady infection rate of less than

2 percent per year (see Figure 2). This external inoculum management still amounted to less than 10 percent of the company's HLB management costs and returned $30 U.S. to each dollar spent in the first two years of the program. At this point, there were still some large blocks with relatively high HLB incidence in the vicinity, which suggested that additional benefit from neighbor inoculum reduction could be achieved.

When the HLB incidence in these neighboring blocks became too high and the yield declined, trees were removed without an insecticide spray and replaced with sugarcane. This led to a spike in yearly HLB incidence the following year in the adjacent areas of Cambuhy that was probably due to the migration of the infectious psyllid population to the closest available host material. While the psyllids were quickly eliminated with the aggressive insecticide program, this did not occur before the infectious psyllids had the chance to inoculate trees near the edge of the removed block.

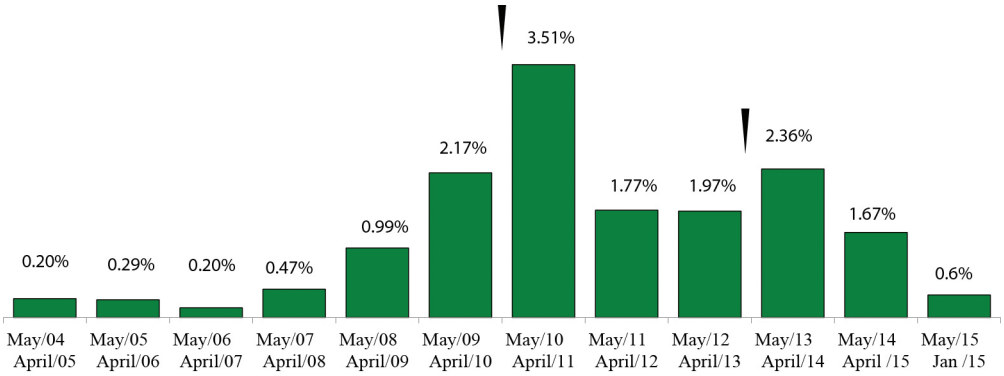

Figure 2. Annual incidence of new infections (trees removed) in the Cambuhy grove. The first arrow designates when aggressive psyllid management in the 2.5-mile radius began, and the second arrow designates when a neighboring grove with less aggressive psyllid management and high HLB incidence was removed without spraying insecticides first.

However, the long-term benefit of this removal became clear when the yearly rate of infection dropped below 1 percent per year (see Figure 2). While the final drop and its consistency is not yet known, other groves with fewer problem neighbors and the 2.5-mile radius of aggressive psyllid management beyond the grove have as low as 0.1 percent HLB incidence per year.

LESSONS LEARNED

All of these observations point to the value of inoculum control in managing HLB. While the inoculum pressure and size of groves are different in Brazil than Florida, there are lessons that can be learned from these observations. While it is no longer feasible to eliminate infected trees from commercial groves in Florida, these observations from Brazil indicate there is more that can be done to manage inoculum, which will be needed to protect replants and new plantings long enough to keep Florida citrus groves productive.

The first lesson is not new. Area-wide management works and is still the best tool to reduce psyllid inoculum pressure and protect replants and new plantings. Following from this, when considering new plantings or replanting in an existing grove, it is important to consider the neighborhood. In Brazil, the neighborhood of concern has been established as 2.5 miles around a grove. The best distance in Florida may vary somewhat based on factors such as wind patterns, but it provides a ballpark figure to look at. This is especially true when considering the impact of homeowner and minimally managed groves that could support a significant population of psyllids.

Awareness of the psyllid management practices in the area and good communication with your commercial and homeowner neighbors are essential. Brazilian growers stressed that this communication has to be friendly and open with an aim at problem-solving. They found that any negative or accusatory interaction only made the situation more difficult to resolve.

The other take-away lesson for Florida is that removal of unproductive trees that act as a source of infectious psyllids is also a key component in reducing new infections. In the cases observed in Brazil, these were whole blocks, but it likely also holds true for individual trees in a grove or backyard. The spike in infection observed when a neighboring infected block was removed stresses the importance of knocking back the psyllid populations before pushing a block. This should greatly reduce the influx of infectious psyllids to neighboring replants or new plantings. When considering pulling individual trees in a grove, the best practice would be to do it as soon after an insecticide spray as possible to reduce the risk of psyllids dispersing from the pulled tree.

The take-home message is that, even though an aggressive inoculum removal strategy is no longer viable in Florida, there are multiple approaches that can be used for inoculum suppression. Protecting replants and new plantings is essential for the long-term viability of the Florida citrus industry, and with aggressive management of the inoculum pressure within at least 2.5 miles of these new plantings, this might be possible.

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