



Psyllid control for HLB management in Guangxi, China

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Photos 1 and 2: Examples of healthy, productive groves starting with clean nursery trees and using appropriate psyllid control in Guilin, Guangxi; Photo 1 – Nanfeng Miju in an open area; Photo 2 – Satsuma mandarin surrounded by hills and mountains that are said to help block outside psyllids and reduce transmission incidence.

Following our visits in Guangdong and Guangxi provinces of China in April 2008, we summarized some general measures to manage citrus Huanglongbing (HLB), and reported on localized approaches to maintain profitability in the areas where HLB was rampant (Citrus Industry magazine, December 2008). Focusing on abandoned or severely infected groves in our search for “survivors”, we also observed substantial differences in tree health and HLB incidence among adjacent family-owned, small groves.

To learn concrete details on how management makes the difference and to continue our search for survivors, we took the opportunity of the 11th International Citrus Congress in China in October 2008 and revisited the same areas in Guangxi and Guangdong (October and November of each year is said to be the most HLB symptomatic and suitable for field survey and tree removal). Our new theme was “Not Just Bad Groves, Let’s See the Good Ones”, with the thought that there may very well be good lessons for us and for Florida growers from such locations in the midst of HLB devastation. What we have seen and learned gives us hope for the future of our own industry!

Our colleagues in Guangxi showed us several healthy, productive groves (Photos 1 and 2), in the midst of varying

degrees of nearby HLB infection (Photo 3). We asked many questions, and we heard detailed answers from our co-author Deng Mingxue in his own grove — the first of several such groves we visited (Photo 1). It was a 7-year-old Nanfeng Miju block; Nanfeng Miju is a “honey mandarin” (English translation of Miju), and it bears small sweet seedless fruits. Other

varieties observed in production include Satsuma mandarin (Photo 2), Navel orange and Shatangju mandarin.

It is worth noting that Deng is an extension entomologist from the Guangxi Citrus Institute primarily focused on citrus psyllid research and management. However, he also manages several small citrus groves in the region, which made our conversations even more interesting as we could view psyllid control from both the scientific and grower perspectives. As he pointed out, the devastating HLB epidemic (called “cancer” of citrus in the local dialect) forced many small farmers out of business over the past years, eliminat-

ing what once was a main source of family income.

A motivation to manage these groves well, in addition to the expectation of profitability, is to demonstrate to skeptical and suffering farmers that HLB is controllable if pathogen-free nursery trees are planted, psyllid control is



Photo 3: A sweet orange grove adjacent to the Nanfeng Miju grove and owned by another farmer, where about 5 percent of trees are HLB symptomatic. Note resets in spaces from which infected trees were removed previously; however, the spread of HLB to surrounding trees continued radially as the advice to spray before removing trees likely was ignored.

properly done, and integrated management strategies are implemented. The success of his management strategies and extension program was evident, as several neighboring plots are newly replanted with citrus trees, replacing underperforming pear, apple and field crops previously planted to replace income lost to HLB-devastated citrus.

PSYLLID CONTROL IS KEY

“The key is psyllid control,” Deng stated, “but a pathogen-free nursery tree is the foundation, and integrated management to maintain tree health is very critical.” Three to four key psyllid-targeted sprays are essential to maximally prevent disease spread, although the timing of application varies depending on monitored psyllid population levels.

The first application is immediately before spring sprouts emerge (late February or early March in the Guilin area), which kills adults surviving the winter and ready to feed on new tender shoots that exclusively are their food source and egg-laying location. A high proportion of overwintering psyllids carry the HLB pathogen, likely resulting in a transmission peak. Tree replanting can be done after this spray.

The second spray is during spring shoot growth (April), to suppress the remaining psyllids and minimize the next generation’s infestations of the young spring shoots. The third critical spray is in October and November after early maturing citrus fruits are harvested. This is the time to identify infected trees and to prune or remove them. Removal and pruning is only done after this spray to avoid driving highly-pathogenic psyllids to other healthy trees; after an entire growing season, more psyllids are observed

to carry the pathogen which likely increases the transmission rate.

On most of these small farms, summer shoots are removed to minimize food sources as well as the total psyllid population. Likewise, if there are many vigorous summer shoots, the removal must be done after an optional fourth psyllid-targeted spray.

According to an extensive pesticide field screening trial, the adult psyllid control efficiency of dichlorvos, dimethoate, phoxim, malathion, acephate, abamectin, or diafenthiuron was all less than 80 percent, while that of imidacloprid was about 86.6 percent, and fenpropathrin or beta-cypermethrin above 90.0 percent. Some mixed formulas such as fenpropathrin plus triazophos, profenofos, or isocarbofos, and beta-cypermethrin plus chlorpyrifos, also performed above 90.0 percent efficiency. Worth noting is that some of these pesticide labels may not allow use on citrus in Florida, although they are legally used in China and other countries.

Effective psyllid control is based on years of accumulated knowledge and field observations on psyllid behavior, as well as monitoring populations in treated groves. For example, more psyllids are frequently found at grove edges than in the center, coinciding with observed rates and distribution of infected trees. The mobility of most psyllids on their own seems limited to adjacent branches or trees, although exceptions always exist; this idea is supported by the often seen radiating pattern of disease spread (Photo 3). However, their travel on wind currents can be significant. Substantially lower HLB incidence is observed in citrus plots isolated by surrounding hills or mountains (Photo 2); such geographic barriers could be helpful.

As we wrote previously, high-density planting (some up to 960 trees/acre), often used in the healthy, productive groves, allows earlier high yield and financial returns, maintains a profitable level longer even though tree loss may accrue, and also reduces transmission rate. It is speculated that high density may be unfavorable for psyllids (low light) and inconvenient for their movement. However, these simple observations and speculations, along with local experiences and practices, require systematic investigation prior to adoption in Florida, which is different from Guangxi in many perspectives, including established citrus plantation and management system.

There are no simple solutions or cures, but with psyllid-focused integrated management, the Guangxi industry is surviving and maintaining profitability. HLB management is a costly battle against a deadly enemy. An idiom from Sun Tzu’s Military Strategy seems relevant here: “If you know both your enemy and yourself, you can come out of hundreds of battles without danger.” As scientists continue their best efforts to uncover the enemy, accumulate knowledge and find solutions, likewise working together, Florida growers on the front-line of the HLB battle can find and practice a cost-effective, environment-friendly way to maximize suppression of psyllids — currently the most easily controllable factor in the disease chain.

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