



Does reducing psyllids help when HLB is present everywhere?

By Freddy Ibanez, Nabil Killiny, L. Gene Albrigo and Lukasz L. Stelinski

With both Asian citrus psyllids (ACP) and huanglongbing (HLB) distributed throughout Florida groves, there is no longer a need to slow the spread of the disease. So, it is logical to ask whether reducing vector numbers is still something that is worth pursuing, given the investment needed in such practice.

All current research data suggest that minimizing the presence of resident psyllid populations in citrus groves appears to help maintain tree health, even if the grove is periodically infested by ACP. This may be good news, because HLB is likely here to stay.

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USE SEVERAL STRATEGIES

An integrated approach including insecticides as well as cultural and biological methods will likely produce the best results. Successful management of HLB has relied on suppressing the vector. Although managing psyllids with biological agents such as entomopathogenic fungi, parasitoids and natural predators has been attempted, these tools have proven ineffective to stop the spread of HLB. Disease management has heavily relied on insecticides, which by themselves have not slowed disease progression.

Integrating insecticide use into a more comprehensive management system that involves cultural and biological control will likely reduce the possibility of insecticide resistance and increase overall sustainability of vector management. This approach likely also will provide protection of newly planted trees and reduce the number of times a tree gets reinoculated with the HLB pathogen.

INOCULATION AND INFECTION

In areas where HLB is widespread, the occurrence of disease can reach 90



to 100 percent within citrus groves. A single initial inoculation of the bacteria during ACP feeding can cause a tree to become infected. Despite this, disease progression is likely hastened by multiple, repeated inoculations that causes a state of “super-infection” throughout the plant.

Initial greenhouse experiments were conducted to determine if the number of infected psyllids inoculating a tree correlated with frequency and intensity of infection. As expected, as the number of infected psyllids allowed to feed on young trees was increased, HLB symptoms were detected earlier and the onset of tree decline was observed sooner.

In early 2018, an investigation, funded by the U.S. Department of Agriculture’s Animal and Plant Health Inspection Service HLB Multi-Agency Coordination, was undertaken to understand how varying levels of ACP infestation and *Candidatus Liberibacter asiaticus* (CLas) inoculation affect HLB progression. The central aim of this study is to evaluate the necessity of continued use of insecticides for HLB management.

Citrus plants were exposed to

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three different frequencies of CLAs inoculations:

- 1) One-time inoculation in which CLAs-infected psyllids fed on trees for seven days
- 2) Pulsed inoculations where CLAs-infected insects feed on trees for seven days every month
- 3) Continuous inoculations where CLAs-infected insects (nymphs and adult stages) are constantly reproducing and feeding on trees.

RESEARCH RESULTS

Overall, the experiment supports the concept that reducing plant exposure to psyllids does appear to help maintain plant health. Those plants with continuous exposure to ACP feeding damage and CLAs have declined the most. Trees that have been infested monthly with infected ACP for an entire year (repeated pulsed inoculations) are healthier and have lower titers of CLAs bacteria than trees that have been constantly infested with infected ACP or those that were inoculated only one time. Overall, the combined effects of psyllid feeding damage and CLAs

infection have a greater negative impact on plant health than either factor alone.

Overall, fewer psyllids were counted in plots where sprays were applied prior to flush than in areas where sprays were not well coordinated with flushing.

An investigation by Cesar Monzo and Phil Stansly in 2017 showed improved yield in citrus plots where psyllid pressure was reduced with insecticide sprays compared with neighboring areas where ACP populations were not reduced. This experiment was conducted in groves where HLB infection approached 100 percent.

Researchers have followed up on this initial field investigation by monitoring citrus groves where insecticide applications were either coordinated

with feather flush or not applied as rigorously for ACP suppression. Overall, fewer psyllids were counted in plots where sprays were applied prior to flush than in areas where sprays were not well coordinated with flushing. Trees exposed to more ACP during the spring flush had lower yield compared with those where ACP were not as rigorously managed.

Periodic invasions of groves by psyllids will likely continue to be the norm. It appears that trees can survive these periodic invasions, if growers can prevent a standing long-term population from continuously causing both feeding damage and recirculation of bacteria. The combination of these two forces appears more destructive to trees than either alone. 🍊

Freddy Ibanez is a postdoctoral researcher, Nabil Killiny is an associate professor, L. Gene Albrigo is an emeritus professor, and Lukasz L. Stelinski is a professor — all at the University of Florida Institute of Food and Agricultural Sciences Citrus Research and Education Center in Lake Alfred.

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