FARM BUREAU
OF VENTURA COUNTY
THE INDEPENDENT VOICE FOR AGRICULTURE

MONTHLY • VOLUME XLVII, No. 12 DECEMBER 2015

Notes from the CEO

By John Krist

The deadly citrus disease making its way toward Ventura County presents a daunting challenge for local growers, but their willingness to face it head on – and with a unified strategy that involves contributions from every sector of the industry – gives them a good chance of surviving.

Ventura County can no longer afford to focus only on killing ACP. As the Dec. 2 workshop made clear, our real battle now is to keep HLB out as long as we can, find it as soon as it arrives, and remove sources of infection as quickly as possible.

That was among the messages delivered at a Dec. 2 workshop about huanglongbing (HLB) hosted by Farm Bureau and the Ventura County ACP-HLB Task Force. The half-day session at the Museum of Ventura County in Downtown Ventura was attended by nearly 200 people, making it the largest local citrus-industry gathering in at least a decade. The audience included growers, packinghouse representatives, pest control advisers and operators, and regulatory personnel from throughout California.

Titled "The Epidemic at Our Doorstep: Is Ventura County Prepared for HLB?", the workshop featured presentations by three distinguished guest speakers:

- "A decade living – and dying – with HLB: Lessons from Florida." *Mike Irey, director of research and business development, Southern Gardens Citrus.*
- "Understanding data from large-scale ACP-HLB survey efforts: Can we locate infected trees sooner?" *David Bartels, Entomologist, USDA APHIS PPQ, Mission Laboratory, Texas.*
- "ACP-HLB epidemiology in California." *Neil McRoberts, associate professor of plant pathology, Quantitative Biology and Epidemiology Lab, UC Davis.*

The information they shared was sobering.

Mike Irey, who works for one of the largest citrus producers in Florida, shared his company's experiences working with researchers to identify treatment and resistance strategies, while the Florida citrus industry reels from the devastating impact of the disease.

Despite a comprehensive control strategy that involves widespread removal of infected trees and frequent pesticide applications to suppress the Asian citrus psyllid, Florida has seen its citrus production fall dramatically. Since 2005, the year HLB was first diagnosed in the state, production has fallen from about 150 million 90-pound boxes of fruit to a projected 69 million boxes this year. Grower production costs have doubled, and tens of thousands of acres of trees have been either destroyed or abandoned.

Mike's message to California growers was blunt: Do not shrink from a full-scale ACP suppression campaign, because without it, the industry here will not survive the HLB epidemic. Growers and packinghouses may be tempted to think only about short-term costs and returns, he said, rather than undertaking the difficult, expensive activities that are necessary to ensure a long-term future for citrus in California. That, he said, would doom California to repeating Florida's disastrous experience.

Following Mike's presentation about the devastating consequences of failure to anticipate the arrival of HLB, Dave Bartels made the case that the epidemic will arrive sooner than many California growers believe. In fact, it probably is spreading already throughout Southern California.

Dave's work has focused on mapping the locations of ACP collected and tested for HLB as part of the California Citrus Pest and Disease Prevention Program's HLB surveillance project. Although most of those ACP test negative for presence of the HLB bacteria's DNA, a significant fraction produce "inconclusive" results – the test indicates bacterial DNA is present, but the signal is faint and does not reach the threshold state and federal regulatory agencies accept as reliably positive. Dave's analysis, however, shows that these "inconclusive" ACP tend to be collected in geographic clusters – a pattern that suggests the insects have been feeding and were trapped in an area that likely has one or more infected trees.

When this pattern was observed in Texas, it predicted fairly accurately the location where trees eventually would be confirmed positive for HLB through DNA testing of their stems and leaves – the regulatory gold standard for conclusively determining that the disease is present. Unfortunately, the significant lag time between infection of a tree and confirmation of that infection through DNA analysis of

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What's Inside?

Organic herbicides show effectiveness in trials

By Oleg Daugovish

The forecasts call for a rainy winter and that means a lot of weeds. During dry times, perennial weeds tend to grow better than annual weeds, since perennial structures such as underground rhizomes or tubers can support them and give competitive advantage. Seeds of annual weeds in dry soil may have been losing viability, senescing or were eaten during this time, but many have remained dormant and look forward to the wet winter as much as the rest of us.

Controlling weeds "organically" is always an extra challenge whether you are in a certified field or in an area where synthetic herbicides are not desired. Hand-weeding, already expensive, is even a greater burden with limited labor availability, and frankly not much fun either. Of course sanitation and prevention, mechanical and cultural management are essential in organic systems. That requires time and commitment, and can quickly become your not-so-favorite pastime.

Organic herbicides have traditionally been contact materials with no systemic activity. This means that they only affect tissue that they contact and do not translocate through the plant like most synthetic herbicides. Thus, good coverage is critical for these contact materials. Many years ago the first herbicides were sulfuric acid and diesel fuel; current organic materials are often acids or oils too, although a lot more benign.

Recent trials by University of California weed scientists showed that several organic herbicides provided decent control of easy-to-control pigweed and nightshade when they were small. When weeds were 12 days old, a mixture of 45 percent clove oil and 45 percent cinnamon oil, 20 percent acetic acid and d-limonene, gave 61 percent to 89 percent control. However only d-limonene controlled 19-day old weeds and none was effective on one-month-old ones. As weeds get bigger they also develop a protective cuticle that minimizes efficacy of these herbicides.

This year we conducted trials with a recently approved herbicide for row crops, trees and vines that is a mix of caprylic and capric acids. It disrupts cell membranes of plants, causing the contents to leak and plants to desiccate. It worked well at 6 to 9 percent by volume in a mixture with water, and gave 90 percent control of little mallow and greater than 95 percent control of annual sowthistle, compared to untreated checks. We have also tested it in organic strawberry furrows before planting the crop to prevent potential injury from drift. Furrow cultivation does not get close to the plastic mulch that covers the beds to prevent tears, so the weeds in that zone are good target for the herbicide.

This fatty acid herbicide provided excellent control of common lambsquarter, reduced the growth of common purslane but didn't do much for yellow nutsedge – one of our notoriously difficult-to-control perennial weeds. The bigger weeds need higher rates (9 percent is the maximum labeled rate) and better coverage. When you have multiple layers of weed leaf canopy and diverse architecture, some plants or their parts may be protected by others that intercept the deposition of the herbicide. When on target, this contact material acts fast – you can see results within 2-3 days – but it does nothing to weed propagules in soil and has no residual activity against wind-dispersed weed seeds that fly in after application. This means the control does not last and you will need additional applications or other control measures. Repeated application is not a problem in a non-crop area and is a great way to deplete your weed seedbank, but crop protection from drift, such as shielded sprayers, is necessary to avoid off-target plant injury.

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plant material makes this protocol useless as a tool for stopping or slowing the spread of HLB. By the time the test proves the tree is infected, it has had the disease – and has been spreading the bacteria via infected psyllids – for two to three years or more.

Dave suggests that these "inconclusive" ACP present an opportunity for early detection of HLB, allowing growers and regulatory authorities to more accurately target their survey efforts and identify infected trees. And the need for early detection is acute: His analysis indicates that there are dozens of likely HLB infection sites scattered throughout Southern California, including areas such as the desert, San Bernardino and Riverside where some fruit processed in Ventura County packinghouses originates. Given the ease with which ACP can be transported in loads of bulk citrus, this means Ventura County production areas are just one short truck ride – one hitchhiking "hot" psyllid – from the epidemic.

Mike made it clear that failing to wage an effective campaign against ACP and HLB will devastate the industry, and Dave emphasized the imminence of the threat. UC Davis epidemiologist Neil McRoberts followed with a presentation making clear just how difficult it is to manage an HLB epidemic – particularly in a landscape as fragmented as Ventura County's – without a comprehensive and cooperative strategy of ACP suppression and HLB detection.

The rate at which HLB spreads through a citrus production area follows a predictable mathematical pattern, he said. The key variables are the rate at which bacteria are introduced from the outside, the rate at which they spread among trees in a grove once they've been introduced, the rate at which infected trees are removed, and the degree to which infected and healthy groves can be isolated from one another.

In the early stages of the epidemic – the situation in which California now finds itself – the most important factor is controlling the introduction of HLB into production areas from external sources. That means the best management strategies are those that minimize the movement of ACP around the state, and which suppress the psyllid population in orchards and residential landscaping. The objective is to make it as hard as possible for ACP to find the HLB-causing bacteria.

On this front, there's good news and bad news. The good news is *(continued on page 3)*

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that Ventura County's area-wide management program is achieving high levels of participation, which means a high level of local ACP suppression is possible, at least in theory.

The bad news is that California's existing quarantine regulations make it nearly impossible to inhibit the movement of ACP throughout most of the state. They certainly make it impossible to prevent transport of potentially infected psyllids from Southern California orchards to Ventura County in loads of fruit headed to local packinghouses. That's because nearly the entire southern half of the state is one huge quarantine zone, within which fruit is free to move without restriction. And unfortunately, there is abundant local data – traps inside Ventura County packinghouses that collected numerous psyllids last year – demonstrating that ACP moves in bins of fruit.

It is almost certain that within a few weeks, the contiguous quarantine zone will also encompass much of the citrus production in the San Joaquin Valley. All of Tulare County is already a quarantine zone, and the pest is increasingly widespread in Kern County, where numerous small quarantine zones have been established. When all of Kern County becomes a quarantine zone, it will in effect create one enormous contiguous quarantine zone encompassing 10 counties. Basically, there will be no restrictions on fruit movement across a vast swath of the state, reaching from the Mexico border to Visalia and encompassing most of California's citrus acreage.

In the later stages of the HLB epidemic, removing infected trees and minimizing the rate at which HLB spreads within a grove become the most important factors in determining whether the disease can be managed effectively, according to Neil's epidemiological modeling. Here again, the news is sobering.

Because most Ventura County orchards are relatively small, they have a lot of edge relative to their total area. And edges are where ACP – and HLB – make their first inroads into an orchard. Commercial groves here also are frequently in close proximity to citrus in urban landscaping, which is typically not managed well for pests and where cooperation with the voluntary spray program can vary widely. That means the industry here is much more vulnerable, and faces much more difficult management challenges, than places such as Florida or even the San Joaquin Valley, where plantings tend to be larger and more isolated from urban influences.

But perhaps the biggest challenge to be overcome is related to the speed at which HLB-infected trees can be identified and removed. Clearly, waiting three or more years after infection to confirm the presence of HLB via government-approved DNA technology is too long. Yet despite years of testing, it is unclear whether any of several alternative early detection technologies are ready for deployment, or under what circumstances they could be used to guide grower decisions about which trees to remove and when.

This will be the focus of the Ventura County ACP-HLB Task Force strategic planning for the near future. Given the high risk that infected ACP will be transported into our production areas in loads of fruit, we need to develop policies to reduce this hazard, while also mounting an intensified local HLB surveillance effort utilizing psyllid trapping and testing, and deployment of other early detection tools.

Ventura County can no longer afford to focus only on killing ACP. As the Dec. 2 workshop made clear, our real battle now is to keep HLB out as long as we can, find it as soon as it arrives, and remove sources of infection as quickly as possible.

Speaker presentations from the Dec. 2 workshop are available online at bit.ly/HLBworkshop.

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Farm Bureau of Ventura County: The Independent Voice for Agriculture (ISSN 2159-7022) is published monthly by Farm Bureau of Ventura County, 5156 McGrath St., Suite 102, Ventura, CA 93003-7305. Subscription price is included in membership fee. Subscriptions for non-members are $10 per year.

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