

## Notes from the CEO

By John Krist

In late January, a team of dogs and handlers traveled from Florida to Ventura County and spent four days inspecting citrus orchards, seeking evidence of infection by the pathogen that causes deadly Huanglongbing disease. It was the third such visit, previous scouting deployments having occurred in

July and November of 2019. And as before, the dogs detected the presence of the bacteria – *Candidatus Liberibacter asiaticus*, or CLAs – just about everywhere they looked.

The January visit marked the completion of a project, organized by Farm Bureau and the Ventura County ACP-HLB Task Force, to develop a baseline map of CLAs distribution throughout the county. It is by no

means an exhaustive effort – there was not enough time to visit every area we would have liked to – but it provides a good overview of where the bacteria has been detected (view the map, and reports on all three scouting missions, at [bit.ly/F1K9reports](http://bit.ly/F1K9reports)).

During the most recent visit, a team of four dogs and two handlers from F1K9 in Florida scouted 14 citrus ranches in Ventura and Santa Barbara counties on Jan. 27-28 and Jan. 30-31, 2020. The visit included a return to one ranch scouted during the November 2019 deployment, as well as numerous ranches in new areas, including Goleta. A total of 3,686 trees were inspected, and dogs alerted on 254 (7%). Alerts occurred at all but two locations. The percentage of scouted trees that triggered alerts at each ranch or block ranged from 0% to 17%.

The alerts in and around Goleta, where the dogs inspected three ranches, were unexpected. There are no packinghouses

in Santa Barbara County, so it has never been a destination for bulk citrus loads from other regions; all fruit flows out of the county (or through it from the north), not into it. This suggests a different mechanism has been responsible for introducing both ACP and CLAs there than in Ventura County, where truck transport of untarped fruit shipments to packinghouses is believed to have played a key role.

Several of the findings in January (like those in the first two deployments) raise interesting questions and possibilities.

The results from two ranches in the Saticoy area, for example, suggest that barrier plantings may be effective in reducing movement of ACP and CLAs into citrus blocks under certain circumstances.

At one ranch, there were no dog alerts in a 3.5-acre lemon block surrounded by border rows of 10-year-old avocados, which formed a tall and wide hedge, although dogs alerted on numerous trees in lemons outside the avocados. On another ranch, dogs scouted a perimeter row along a heavily traveled road. The row was divided by the entrance driveway, and trees on one side were separated from the road by a tall bougainvillea hedge, whereas the other side had no barrier. The percentage of dog-alert trees was lower along the barrier hedge (14%) than on the unprotected side (24%).

Natural barriers may also play a role. At one of the Goleta ranches, for example, the canine team scouted single edge rows on two blocks. The first was located at the end of a canyon along a dead-end rural road, where the dogs scouted 113 trees and alerted on 10 (9%). The other block was atop a bluff adjacent to a heavily traveled road (vertical distance between the road and the orchard was about 20 feet). The dogs scouted 134 trees along the road frontage and alerted on two (1%).

The low percentage of alerts in the orchard atop the bluff raises the possibility that vertical separation between movement corridors and citrus trees might hinder ACP movement. By contrast, one of the blocks on another ranch, catty-corner from the bluff-top block but on the flat across the road, had a 7% rate of dog alerts.

The results from two other locations indicate that there are areas in Ventura County, such as secluded inland valleys, where CLAs may be absent, or present only at very low levels.

One of these sites was the large rural campus of a private school in the Ojai Valley with scattered plantings of citrus and avocados. The dogs scouted 200 citrus trees – a mixture of oranges and mandarins – and did not alert on any of them. This brings the number of locations scouted in the Ojai Valley to nine (the others were scouted last July), with no alerts at eight of those sites and only one tree flagged at the ninth.

The other January site was a citrus and avocado ranch in a canyon north of Santa Paula. The canine team scouted the border of a lemon block and a mixed block (continued on page 2)

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# Plant health, critical to human survival, faces constant threats

By *Annemiek Schilder*

The United Nations has declared 2020 the International Year of Plant Health. The Food and Agriculture Organization (FAO) of the United Nations is using this opportunity to raise global awareness of the importance of plant health in the fight against hunger and poverty, in protecting the environment and promoting economic development (<http://www.fao.org/plant-health-2020/about/en/>).

Plants provide us with our most basic need – food – and the oxygen that we breathe. The latter is often forgotten as a critical benefit of plants. However, plant health is constantly under threat. Growers in Ventura County don't need to be reminded of this with invasive shothole borers and Huanglongbing (citrus greening) fresh in our minds.

At the same time, we should not forget endemic species, such as mites, thrips, lygus bugs and fungal pathogens that cause chronic losses year after year. I heard an organic grower say that he usually accepted some crop loss, calling it his "tithe to nature." However, the issue is that new/exotic pests and diseases are coming around at a much faster rate than they used to due to increased global shipping and travel as well as climate change. If you want to stay awake at night, study the list of current plant and animal diseases and pests, including weeds, currently being regulated by the USDA Animal and Plant Health Inspection Service (<https://www.aphis.usda.gov/aphis/resources/pests-diseases>) – not recommended for hypochondriacs.

Being located near a shipping port and large population centers puts Ventura County at greater risk, although nowadays no region is immune from invasive pests as demonstrated by the rapid spread of the spotted wing drosophila (*Drosophila suzukii*) across North America over the past decade. However, if you look at major pest invasions in the United States, you'll notice that most seem to start on the East or the West Coast, near (air)ports or large population centers. Wood-boring insects, such as the Asian long-horned beetle and the emerald ash borer, which is responsible for killing millions of ash trees in North America, are thought to have made their way to New York City and Detroit, respec-

tively, in infested wood shipping crates from China.

Other examples are the brown marmorated stinkbug, Japanese beetle, and spotted lantern fly, which were likely stowaways in packing material from Asia. If you calculate the billions of dollars spent on containing and managing invasive pests and diseases resulting from international trade, not to speak of the environmental footprint of long-distance shipping, those inexpensive consumer products are not that cheap after all. These costs should really be considered to reflect the true cost of international trade.

The FAO estimates up to a 40 percent loss of food crops annually due to plant pests and diseases worldwide, and, surprisingly, this estimate has not changed much over the past 50 years despite a significant increase in the use of pesticides. This apparent anomaly could be partially due to cropping system intensification during the same period with concomitant increases in yields and pest pressure. Post-harvest food loss across the supply chain, including by consumers, contributes to an additional 30-40 percent loss. The United States and Australia lead the world in the amount of food wasted per capita (<https://www.usda.gov/foodwaste/faqs>). According to the FAO, "food loss and waste amount to a major squandering of resources, including water, land, energy, labor and capital and needlessly produce greenhouse gas emissions, contribut-

ing to global warming and climate change." Considering that most of the food being thrown away ends up in landfills, this is a major loss of nutrients that could and should be diverted to enrich soils on American farms and reduce the need for synthetic fertilizers.

In general, prevention is the best way to keep plants healthy. In that vein, I would like to highlight the National Clean Plant Network (<http://nationalcleanplantnetwork.org/>), which was created to protect U.S. specialty crops such as grapes, fruit trees, citrus, berries, roses and sweet potatoes from the spread of economically harmful plant pests and diseases. I am a member of the Berry Clean Plant Network second tier board. This is a group of virologists, plant pathologists, plant breeders, nursery representatives, state and federal regulators, and growers working together to support "Clean Plant Centers" in Oregon, California and North Carolina. With nurseries having access to virus-free foundation plants, they produce certified virus-tested planting material for berry growers in the US. We are reminded of the value of clean planting stock during outbreaks of viruses or other pathogens introduced with planting material. Always remember: Start clean, stay clean!

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## Notes from the CEO (Continued from page 1)

of mandarins and other citrus, along the edge of a broad streambed with rural housing on the other side. The dogs investigated 118 trees and did not alert on any of them.

A newly published paper by Dr. Tim Gottwald ("Canine olfactory detection of a vectored phyto-bacterial pathogen, *Liberibacter asiaticus*, and integration with disease control," *Proceedings of the National Academy of Sciences*, Feb. 3, 2020) indicates many – but not all – of the sites scouted during this project are good candidates for recurring canine scouting and removal of suspect trees. Gottwald is a USDA researcher who oversaw development of the canine detection program.

"One limitation in the deployment of the detector canines is infected host incidence," Gottwald wrote. "Low CLas prevalence (i.e., 5 to 10%) is optimal. As CLas incidence increases, the canines begin to alert on a high proportion of targets, requiring more reward time, which substantially slows down the search pattern."

Nine of the 14 ranches scouted during the January deployment, fall below the 10% cutoff recommended in the passage above, as did 10 of the 20 sites scouted during November 2019, and five of the 20 scouted in July 2019 (seven of which had no alerts).

Gottwald's paper, which details the science behind the dogs' detection capability

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## Notes from the CEO (Continued from page 1)

and their use as part of a disease management strategy, is also available at [bit.ly/F1K9reports](http://bit.ly/F1K9reports).

### What does the future hold?

There are still production areas in Ventura County that have not been inspected by the detection canines, such as the foot of the Santa Monica Mountains, the central and south Oxnard Plain, north of the Santa Clara River in the Fillmore area, and the west end of the Ojai Valley. The Task Force will consider submitting another grant application to the UC Thelma Hansen Fund – which underwrote a significant share of the cost to transport and house the dogs and handlers for this project – to support a strategic, organized effort to investigate these areas so the baseline distribution mapping can be extended.

One piece of good news is that this will soon be easier and cheaper. The F1K9 team plans to locate eight dogs and two handlers full time in Ventura County beginning in March. Once they're here, individual growers will be able to contract directly with the company to have their groves scouted.

There are other positive takeaways from the survey. At no sites, even those with the highest percentage of dog alerts, did we encounter solid rows of exposed trees. All the detections were scattered; it was rare for the dogs to alert on even two adjacent trees. This pattern suggests we are still in an early stage of the epidemic, and that detection and removal – combined with an ironclad ACP suppression effort – may render the epidemic manageable for many years.

Another positive takeaway from the project – from the entire Ventura County response to the threat, really – is this: No citrus community anywhere in the world has ever had a better chance to survive the HLB epidemic than this one.

Epidemics are not purely biological events. As we are seeing now in the news, with the coronavirus spreading around the globe, epidemics occur within a socioeconomic context. How human beings, and the institutions they build, prepare for and respond to the threat of a deadly disease can greatly influence the severity of the epidemic when it occurs.

Led by the Ventura County ACP-HLB Task Force, our citrus community has been prepar-

ing for this and taking aggressive action for a decade.

- We were the first in the state to develop and execute a countywide public outreach effort about the threat of ACP and HLB, launched a year before the vector arrived.
- We were first in the state to hire a liaison to coordinate grower responses to new ACP finds during the eradication stage of the battle.
- We were the first in the state to develop and implement a comprehensive area-wide ACP suppression strategy, one that remains the largest and most complex in California, once the pest became established.
- Our packinghouses were the first in the state to adopt policies to reinforce that suppression campaign by requiring proof of participation before picking and packing fruit from individual orchards.
- We are now the first (and only) area in the state to deploy an early HLB detection technology – the canine teams – in commercial orchards, and to remove trees with early signs of infection.

The pace of progress toward a scientific solution to the ACP-HLB problem is increasing exponentially, thanks to the availability of powerful new tools to manipulate the genomes of vector, pathogen and host. Every year our citrus community can buy through these efforts increases the odds we will still be standing when that turning point arrives.

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#### Aquarium of the Pacific — Long Beach; One Day Ticket.

Adult (12 yrs+) \$25.95 (save \$9); Child (3-11 yrs) \$22.95 (save \$2). Valid thru 12/31/20.

**Cinemark Century & Rave Theatres** — All Cinemark, Century & Rave locations. Platinum Super Saver Ticket, valid any regular movie anytime. Regular price up to \$12, you pay \$10. Additional premiums may apply for specially priced films and/or events priced higher than normal box office. No expiration. Physical tickets only.

**Dinner Detective Murder Mystery** — Ventura County/ Thousand Oaks; Adult (13 years+) Dinner & Show \$58.95. Save up to \$12.50 with tax/gratuity. No expiration dates. E-Tickets only.

**Knott's Berry Farm** — Buena Park; General One Day Admission (3 yrs+) \$45.00 (save \$37.00) Valid thru 3/19/20.

**Legoland California Resort** — Carlsbad; Valid thru 3/31/20. E-Tickets Only. Resort Hopper – Includes 1 Day at Legoland, Including Seasonal Waterpark\* and Sea Life Aquarium, and Free 2nd Day. \$68.95 (3 Yrs+) Save \$52.04. Both visits must occur by 4/30/20. Water Park requires same-day admission to Legoland & is open seasonally between March & October.

**Medieval Times Dinner and Tournament** — Buena Park; Reservations Required. Dinner and Show. Adult \$45.75 (save \$22 w/tax). Child (12 yrs & under) \$34.50 (save \$7.20 w/tax). "BOGO Birthday Special" during your Birthday month. Valid thru 12/30/20.

**Pacific Park** — Santa Monica Pier; 1-Day Unlimited Ride Wristband Voucher \$23.95 (save \$9 per person over 7 years). Valid thru 12/31/20.

**Regal Entertainment Group** — All Edwards and Regal locations. Premiere Unrestricted Ticket, valid ANY showtime, \$9.75. (Surcharge for IMAX, RPX, 3-D films & 4DX films, premium or Luxury Seating locations or select theaters.). Ultimate Movie Pack-2 Premiere Unrestricted Ticket & \$10 Gift Card \$29.50. No expiration dates on physical tickets. Physical tickets only.

**San Diego Safari Park** — Escondido; Adult (12 yrs+) \$49.00 (save \$9); Child (3-11 yrs) \$41.00 (save \$7). Valid thru 5/25/20. E-Tickets Only.

**San Diego Sea World** — San Diego; E-Tickets Only. Single Day Tickets: (3 yrs+) \$67.95 (save \$24.04); Valid thru 12/31/20.

**San Diego Zoo** — San Diego; E-ticket 1. Day Pass Adult (12 yrs+) \$49 (save \$9); 1 Day Pass Child (3-11 yrs) \$41 (save \$7). Valid thru 05/25/20. E-Tickets Only.

**See's Candies** — One Pound Candy Gift Certificate & gift envelope \$18.50 (save \$2.50). No Expiration Date. Physical Tickets Only.

**Six Flags Magic Mountain** — Valencia; General Admission (3yrs+) \$63.95 (save \$29.04). Valid 1 operating day thru 9/13/20.

**Universal Studios Hollywood** — Universal City; E-tickets only. Season Pass (3yrs+) \$129 (save \$30). Unlimited visits thru 5/31/20. Valid 9 months after your first visit. View blackout dates apply after 1st visit.

# FARM BUREAU OF VENTURA COUNTY

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