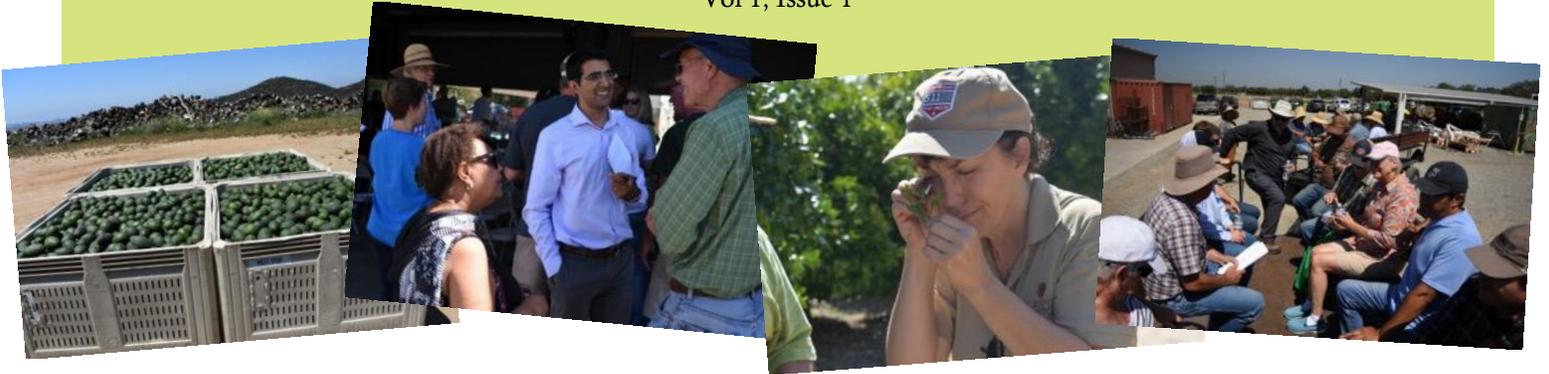


University of California Cooperative Extension Subtropical Horticulture News

Quarterly Newsletter for Subtropical Horticulture Growers in Riverside & San Diego Counties

Vol 1, Issue 1



Note from the Editor:

Hello Subtropical Horticulture Community! I would like to thank you for joining me in my first local quarterly newsletter specifically for Subtropical Horticulture stakeholders in Riverside and San Diego Counties. I have started this newsletter to keep in touch, share local news, summarize past events and announce upcoming events that will be happening throughout Riverside and San Diego Counties. Each quarter you'll also get informative articles about various themes in production.

As many of you know, the University of California Cooperative Extension has been going through many changes but we are still here to serve your horticultural questions and problems.

We want this newsletter to be valuable for you so *please* share your feedback and suggestions to help us improve. Don't forget to sign up for the quarterly newsletter, Topics in Subtropics (Please contact Lea O'Reilly, lboreilly@ucanr.edu, and request to be placed on my email list) and join the Topics in Subtropics Blog, to subscribe click on the link: <https://ucanr.edu/blogs/blogcore/subscribe.cfm>

Sonia Ros

Subtropical Horticulture Farm Advisor

Riverside & San Diego Counties

2019 Citrus Grower Seminar: Quick Recap

On June 25, 2019, Southern California had their annual Citrus Grower Seminar. The seminar is a collaboration of members from the California Citrus Research Board, UC Cooperative Extension, and UC Riverside. There were three grower seminars that were hosted at three citrus growing locations, Exeter, Santa Paula and this year's Southern California seminar was held in Palm Desert and had more than 75 people in attendance. Lunch was served this year to celebrate the Citrus Research Board 50th anniversary. A few speakers included: Sonia Rios, UCCE, Beth Grafton-Cardwell, UCR/UCCE, Ruben Arroyo, Riverside Agriculture. Commission, Melinda Klein, Citrus Research Board, and Casey Creamer, Citrus Mutual. We look forward to seeing everyone next year in June 2020.



Photo Left: Ruben Arroyo, Riverside Agriculture. Commission



Photo Above: Casey Creamer, Citrus Mutual



Photo Above: Elizabeth Grafton-Cardwell, UCR



Asian Citrus Psyllid Workshops Wrap Up

Sonia Rios



Photo above: Field Day participants learn how to scout for ACP eggs

The Asian citrus psyllid, *Diaphorina citri* (or ACP), is a tiny, mottled brown insect about the size of an aphid that poses a serious threat to California's citrus industry—including those grown in home gardens. The psyllid feeds on all varieties of citrus (e.g., oranges, grapefruit, lemons, and mandarins). The psyllid damages citrus directly by feeding on new leaf growth (flush). This feeding can burn back new shoots or cause leaves to twist or notch as they mature. More seriously, the insect is a vector of the bacterium *Candidatus Liberibacter asiaticus*, associated with the fatal citrus disease huanglongbing (HLB), also called citrus greening disease. The psyllid takes the bacteria into its body when it feeds on bacteria-infected plants. The disease spreads when a bacteria-carrying psyllid flies to a healthy plant and injects bacteria into it as it feeds. HLB can kill a citrus tree in as little as five years, and there is no known cure.

The Asian citrus psyllid is widely distributed throughout Southern California and is becoming more widespread in Southern California. HLB was found in March 2012 in a tree, in a yard, in Los Angeles County. The presence of HLB in pockets of Southern California means it is now even more important to keep the psyllid populations low so they don't find infected trees and spread the disease. The disease can also threaten both urban and rural landscapes as well as private gardens and commercial citrus groves. In an effort to manage and reduce the potential impacts of HLB in San Diego County, multiple stakeholders throughout the county should be informed of this pest, its potential impacts and strategy and resource options, specifically, stakeholders residing or with business operation near known HLB susceptible plants.



The UC Cooperative Extension - San Diego (UCCE) requested one-time funding to coordinate the establishment of ACP and HLB education and outreach program for San Diego County stakeholders. The University of California hosted several ACP Scouting workshops for growers, UC Master Gardeners, and homeowners throughout Riverside and San Diego Counties. The workshops in San Diego were possible by a grant given by the County of San Diego and there was a total of 275 participants throughout the year. During the field days, growers had the opportunity to scout and identify the psyllid. Dr. Monique Rivera, University of California, Riverside (UCR) gave a lecture on the history, biology, and California's current status of the disease, huanglongbing (HLB). UCR's Staff Research Assistants Geoff Hollenbeck and Tobias Moyneur shared scouting techniques.



Researchers from Florida Visit California to Update Avocado Growers on Laurel Wilt Disease

Sonia Rios



On July 30, 2019 there was seminar that discussed the potential invasion of the redbay ambrosia beetle and laurel wilt disease. In recent years, avocado growers had to deal with the Polyphagous and Kuroshio Shot Hole Borers, collectively known as the Shot Hole Borer complex (SHB). They spread a pathogenic fungus (*Fusarium euwallacea*) which can severely debilitate or even kill its host. Current research has determined that the SHB does not kill avocado trees, however, even this theory has its controversy since

in Israel where the Polyphagous Shot Hole Borer also exists, it has been known to severely debilitate avocado trees.

Another invasive ambrosia beetle, the redbay ambrosia beetle (RAB; *Xyleborus glabratus*), is currently spreading through the Florida avocado industry. This beetle has been slowly spreading across the southeastern United States and is currently found as far west as eastern Texas. Therefore, the California grower needs to be aware that this pest-disease complex may spread to California and cause severe problems to the state's avocado industry. RAB carries with it a fungal symbiont, *Raffaelea lauricola*, that causes the deadly, vascular disease, laurel wilt. Laurel wilt affects redbay (*Persea borbonia*) and other tree species of the Laurel family (Lauraceae), including avocado. *R. lauricola*, and is introduced into host trees when RAB colonizes a tree.

Native to Southeast Asia, RAB carries spores of *R. lauricola* in specialized mouthparts called mycangia. Trees become infected when female beetles attack host trees and introduce the pathogen into the xylem while boring their galleries. The infection restricts the flow of water in the tree, induces a black discoloration in the outer sapwood and causes the leaves to wilt. The tree dies so fast that it doesn't even have a chance for the leaves to fall off the dead branches. Adult RAB are very small (~1/16-inch-long), dark brown to black in color, slender and cylindrical in shape and spend most of their life within the tree. Larvae are white, legless grubs with an amber colored head capsule and are found within galleries throughout infected trees. Female beetles can produce flightless male offspring without mating, but females may mate with their male offspring or sibling males to produce males and females. Females greatly outnumber males in populations. In the Southeast, the RAB's lifecycle from egg to adult appears to take 50- 60 days, and there appear to be multiple overlapping generations per year (Hanula et al. 2008). Female beetles emerging from galleries may re-infest the same tree or disperse in search of new hosts. Host trees can remain standing for years and may continue to serve as host material for the beetles for several months after initial colonization. Their flight activity is highest in the late afternoon and early evening. It is known that ambrosia beetles are notoriously difficult to control because they are inside the tree most of their lifecycle versus being outside the tree.



Photo Below: Adult Redbay ambrosia beetle (Photos: Daniel Carrillo)



RAB can fly short distances, but laurel wilt disease spreads more quickly through the movement of infested plant material such as firewood. The pathogen has also spread to other ambrosia beetle vectors. This happens when beetles feed on infected diseased trees and become contaminated with spores of *R. lauricola*. Sanitation is the most effective way to manage this problem. Scouting for wilted branches and their rapid removal has been the key to early

intervention and eradication. It is suggested to remove symptomatic trees immediately upon their identification. By the time you see frass and streaks in the wood, the tree is already infected and has been for some time. As soon as a grower sees the wilt in the branches, it's time to move quickly. This disease may be mistaken for *Verticillium* wilt or *Phytophthora* and can spread throughout the grove through root grafts.

Contact insecticides will not work, because the insects are primarily inside the tree. One of the first goals to avoid infection, is to keep your trees healthy. A sick tree is more attractive to beetles. They like dense canopies, non-pruned trees with overlapping leaves and branches. Chipping infected trees is effective in reducing the spread of the disease. Chips should be as small as possible and spread so that they dry out quickly. However, beware, the smell of the chipped wood can attract other wood boring insects. The researchers are currently working with different commercial formulations of insecticides that still need more testing.



Guest Researchers included:

- Mr. Jeff Wasielewski, Tropical Fruit Crops Agent, UF/IFAS Miami-Dade Extension
- Dr. Romina Gazis, Plant Pathology Director, UF/IFAS Tropical Research and Education Center
- Dr. Bruce Schaffer, Ecophysiologicalist, UF/IFAS Tropical Research and Education Center
- Dr. Daniel Carrillo, Entomologist – Tropical Fruits, UF/IFAS Tropical Research and Education Center
- Mr. Fredy Ballen, Data Management Analyst, UF/IFAS Tropical Research and Education Center
- Dr. Jonathan Crane, Tropical Fruit Crop Specialist, UF/IFAS Tropical Research and Education Center

Fire Season is Here: A Review

Sonia Rios and Gary Bender



Drought has brought more challenges to growers that are trying to water their orchards. Some growers are forced to water very little causing the avocado trees to remain stressed, which reduces their fuel moisture and results in an increased fire risk. A large sector of the agriculture industry in southern California is supplied by the Metropolitan Water District and receives water through the Interim Agricultural Water Program in a deal that secures slightly reduced rates in return for concessions during periods when supplies are short.

Vegetation weed management

Vegetation weed management is something CAL FIRE feels strongly about, especially during these times of drought. CAL FIRE interprets this type of weed management as a fuel reduction or fuel modification practice which helps growers create defensible space around their habitable structures or groves. Defensible space reduces the fire risk and creates space that firefighters can use as a tool to work and suppress a wildfire to protect a structure or other private property in the event of a wildfire. Fuel modification/reduction projects include defensible space around structures, fuelbreaks along roads and groves, ridge tops, or around property lines and other fire fuel reduction activities that lessen the risk of wildfire to communities. Fuel reduction projects usually remove cut vegetation from the site either through burning or haul-away methods. Fuel modification projects usually leave the cut vegetation on site in the form of wood chips or scattered material. Pruning's piled in draws within or around the groves can also be particularly damaging.

How to keep our growers safe

Perennial crops like avocados are not easily replaced and if lost the effects would be lasting.

Preventative Measures:

These preventive measures can be suggested for groves in areas of high fire hazard (Goodall 1965):

1. Remove all combustible material from around the trunks of the trees for a distance of two to three feet.

2. Prune off low-lying limbs, those that are low enough to accumulate more than the normal inch or so of leaf mulch.
3. Remove from the orchard all broken limbs, deadwood and other combustible debris.
4. Clear brush, trees and other heavy vegetation away from edge of orchard for a distance of at least 50 feet.
5. Do not pile brush or other combustible material in draws or canyons, or around the edges of groves.
6. Apply sprinkler water for as long a period in advance of the fire as possible so as to have everything wet down. Water during the fire would obviously be desirable but often is lacking because of lack of pressure or speed of the movement of the fire.
7. Use steel pipe and risers for above ground sprinkler systems.

Growers can also look for other tips on preventive measures on the Cal Fire website:

http://calfire.ca.gov/fire_prevention/fire_prevention.php.

After a Fire

It is nearly impossible to determine the extent of damage to the wood of the tree immediately after the fire. The most critical part of the tree is the trunk. The bark from just above the ground to about two feet high can become so hot as to kill into the cambium, the layer between the bark and wood. When the cambium is killed, the tree is girdled and will die (Goodall 1965). Suckers will eventually grow from below the graft union of these trees; these suckers can then be grafted to an appropriate variety. However, many trees in the grove may still be alive internally because there was a quick burn through the grove, or the leaves merely died from heat generated by burning surrounding trees, vegetation and mulch (Bender 2012).

According to Bender (2012), fire damaged trees that have leaves that are completely brown do not use water, but there may be trees that have escaped the fire in the irrigation block and these need to be irrigated as soon as possible. The first thing to do is to repair the irrigation system. Risers, sprinklers, pressure regulators and poly-hose on the ground are probably melted and should be replaced as soon as possible. PVC pipe that is buried underground is usually fine. If part of the trees in the irrigation block are alive and partly damaged, it would probably be best to roll out poly-hose onto the damaged trees and set up a



separate irrigation block. As the trees recover and start using water, you can eventually go back to the permanent system. Trees that are heavily damaged do not use water (transpiration), but the feeder roots need to be wetted and short irrigations should occur to replace water evaporating off of the soil surface. Start with a one hour irrigation and monitor the soil closely, irrigating to heavily could cause the onset of root rot. Do not irrigate damaged trees normally; a ten hour irrigation will not “force” the trees to grow, and roots could easily be damaged by lack of oxygen in the lower soil profiles.

Every fire is different, so experiences vary. It may take several months to be able to observe whether the bark is killed all the way to the cambium or not. Thus, we recommend against pruning until new growth appears to indicate where the wood is alive. According to Bender (2012), as an alternative

method which is rather unique to the avocado industry, the burned trees can all be stumped immediately and allowed to re-grow. “Stumping” is a normal practice in the industry when avocado trees have reached such heights that fruit is high off the ground and picking becomes difficult. In many of the groves that were burned, stumping was probably needed anyway; therefore after a burn stumping would be a reasonable alternative for many growers.

Stripped trees should be whitewashed on the south side of the limbs. Goodall (1965) also suggests to save expenses, fertilizer and pest control can be postponed for a year or so. Since the burned areas may be seeded by air and many weed seeds survive fires, a sprinkler irrigation will start the ground cover growing to minimize erosion the following winter. You may want to ground broadcast annual ryegrass, soft chess, or barley in critical areas before irrigating.

According to Bender (2012), if the goal of the grower is to bring trees back into production as soon as possible, the avocado tree will usually recover production faster if the grower is patient and prunes only the dead wood three months after the fire. Unfortunately, this practice creates a permanent problem in the grove as far as irrigation scheduling and application. Mixing full-grown trees (untouched by the fire) with partially pruned trees (and stumped trees) in an irrigation block means that some trees will be over-watered, or under-watered, depending on their size. Adjustments can be made in the sprinkler sizes, but generally this is an undesirable cultural practice.

If the goal is to reduce the size of all trees in the irrigation block to a manageable size, then stumping the block immediately after the fire is the best solution. Trees will be out of production for two years and have about 50% production in the third year, and some re-grafting may have to be done, but fertilizing and watering properly is manageable.

A third option could be to scaffold all trees in an irrigation block to 12’ in height. This would get rid of a lot of dead wood immediately, and might allow the trees to come back in production faster than the stumping the trees.

It is helpful for growers to know the value, for insurance purposes, of trees that are lost due to fire. According to the Growing Avocados in Ventura County Reference Book, determining the value of a tree in an orchard is not a simple matter because one must take into account the income lost if the tree had been producing, as well as the costs of planting and maintaining the new tree. Also, the income from the new tree, once it comes into bearing, helps to defray the costs involved in bringing the tree to maturity. Examples can be seen here at the UCCE website:

http://ceventura.ucanr.edu/Agricultural_Threats/Fire_Information/.

Record-low rainfall, extreme heat and a statewide drought has caused a significant increase in wildfires and need for Californians to participate in fire-prevention tactics, including growers. According to CAL FIRE, in order to prevent wildfires and property damage, homeowners were asked to maintain a “defensible space” around their house and not use powered equipment outdoors when it’s hot, dry or windy.

Work Cited

Bender, Gary. 2012. Recovery from Fire Damage in Avocado Groves. UCCE San Diego Website: cesandiego.ucanr.edu/files/54279.doc. [Accessed June 16, 2015].

Goodall, G. E. Avocados and the Coyote Fire. California Avocado Society 1965 Yearbook 49: 81-83.

Ventura Co UCCE publication. Calculate Cost of Fire Damage to Avocado and Citrus Trees. Growing Avocados in Ventura County Reference Book. UCCE Ventura Website: http://ceventura.ucanr.edu/Com_Ag/Subtropical/Avocado_Handbook/Economics/Calculate_Cost_of_Fire_Damage_to_Citrus_-_Avocado_Trees/. [Accessed June 16, 2015].

Announcements for Upcoming Events:

UCCE San Diego Pitahaya Field day September 14, 2019

The pitahaya festival and fruit tasting at UC South Coast Research Station in Irvine will be hosted on Saturday September 14, 2019. To view agenda:

<https://files.constantcontact.com/e4686383101/cfdec194-a107-401a-a2ea-64f068fa1c33.pdf>

\$40.00 per person if paid online or postmarked by Monday, September 9, 2019. The price will be \$50.00 after this date or at the door, *if space allows* (checks only at the door). Register early as attendance is only limited to 100 participants.

Registration at: <https://ucanr.edu/survey/survey.cfm?surveynumber=28219>

Registration Questions: Erin Spaniel, 858-822-7919

Program Information: Ramiro Lobo, 858-243-4608

Macadamia Field Day, September 21, 2019

Cost: \$20.00 per person if you pre-pay by 10 September 29, \$25.00 per person after that.



Visit www.macnuts.org/fieldday.htm for a registration form. Mail registration form along with your check to: California Macadamia Society, P. O. Box 1298, Fallbrook, CA 92088.

Questions? (760) 728-8081/Cell 760-580-5516
or RussellFarms@Roadrunner.com

Visit <http://www.macnuts.org/fieldday.htm>

Avocado Production Course for New Growers Course Start Date: October 1, 2019

This 7-week course will be taught by Farm Advisor Sonia Rios and Emeritus Advisor, Gary Bender. Course supplies will be provided (2- production manuals and a copy of the UC Avocado Pest Guidelines). Topics include irrigation fertilizing, pest management, pruning and more!

Course Fee: \$155

Location: San Diego/UCCE Northern County office, 420 S Broadway, Escondido, CA 92025

Space is limited, please register:

<http://ucanr.edu/survey/survey.cfm?surveynumber=28170>

**2019 Pitahaya/Dragon Fruit
Production Tour & Seminar**

**Tour Date: September 25, 2019
7:00 am - 4:00 pm**



Self-Driven Tour in San Diego County -
Itinerary and logistical details will be provided after completing the Online Registration Process!

Pitahaya/Dragon Fruit Production Tour & Seminar Registration: \$ 50.00 if paid Online or postmarked by Friday - September 20th. \$60.00 after this date or at the door if space allows. The registration fee includes continental breakfast, refreshments, lunch, pitahaya or dragon fruit tasting and an information packet.

REGISTER EARLY, this event sells out every year!!

Attendance is limited to 60 participants and this event has sold out in the past. Your early registration also helps plan for meals, refreshments, tasting, and handouts materials. Refunds will NOT be issued, but substitutions are allowed.

Walk-ins accepted if space allows. NO CASH OR CARDS ACCEPTED day of. Checks only. Make payable to "UC Regents".

Register at: <https://ucanr.edu/survey/survey.cfm?surveynumber=28263>

Registration Questions: Front Office, 858-822-7711
Program Information: Ramiro Lobo, 858-243-4608

Date Palm Field Day, November 21, 2019
Field Day will be held at the Coachella Valley
Agricultural Research Station
86501 72nd Ave, Thermal, CA 92274
Time: 8:30 - 2:15 PM
Fee: \$25, lunch included



Agenda

8:00am – Registration for CE units, coffee, pastries
8:30am- Welcome- Sonia Rios, UCCE Riverside
8:45am- Tom Perring, UC Riverside. Current status of Insect and Mite Pests of dates
9:15am- Tom Perring, UC Riverside. Part 1: What we know about puffy skin of medjool dates
9:30am- Robert Krueger, USDA/ARS. Part 2: What we know about puffy skin of medjool dates
9:45- Ali Montazar, UCCE. An update on the on-going date palm. Irrigation management project in California low desert
10:15-Break
10:30- Mark Hoddle, UCR. Updates on the South American Palm Weevil Invasion
11:30- MaryLou Polek, USDA/ARS. State of the Repository: Update on research activities regarding date palms
12:00pm- Lunch- Sponsored by Corteva
Bob Mulherin, Riverside Agriculture Commission. Laws and Regulation Updates

CEU will be provided upon request.

Space is limited, please register at: <https://ucanr.edu/survey/survey.cfm?surveynumber=28232>

*No Cash/Check payment will be excepted on site, day of

Sonia Rios – Subtropical Horticulture, Riverside/San Diego
Phone: (951) 683-8718
Email: srios@ucanr.edu
Website: <http://cesandiego.ucanr.edu>

The University of California, Division of Agriculture and Natural Resources (UC ANR) prohibits discrimination against or harassment of any person in any of its programs or activities on the basis of race, color, national origin, religion, sex, gender, gender expression, gender identity, pregnancy (which includes pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition (cancer-related or genetic characteristics), genetic information (including family medical history), ancestry, marital status, age, sexual orientation, citizenship, status as a protected veteran or service in the uniformed services (as defined by the Uniformed Services Employment and Reemployment Rights Act of 1994 [USERRA]), as well as state military and naval service. UC ANR policy prohibits retaliation against any employee or person in any of its programs or activities for bringing a complaint of discrimination or harassment. UC ANR policy also prohibits retaliation against a person who assists someone with a complaint of discrimination or harassment or participates in any manner in an investigation or resolution of a complaint of discrimination or harassment. Retaliation includes threats, intimidation, reprisals, and/or adverse actions related to any of its programs or activities. UC ANR is an Equal Opportunity/Affirmative Action Employer. All qualified applicants will receive consideration for employment and/or participation in any of its programs or activities without regard to race, color, religion, sex, national origin, disability, age or protected veteran status. University policy is intended to be consistent with the provisions of applicable State and Federal laws. Inquiries regarding the University's equal employment opportunity policies may be directed to: John I. Sims, Affirmative Action Compliance Officer and Title IX Officer, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1397. Email: jsims@ucanr.edu. Website: http://ucanr.edu/sites/anrstaff/Diversity/Affirmative_Action/.

Disclaimer: Discussion of research findings necessitates using trade names. This does not constitute product endorsement, nor does it suggest products not listed would not be suitable for use. Some research results included involve use of chemicals which are currently registered for use or may involve use which would be considered out of label. These results are reported but are not a recommendation from the University of California for use. Consult the label and use it as the basis of all recommendations.