Sacramento Valley Walnut News

Issue 45 Fall, 2021

University of California
Agriculture and Natural Resources | Cooperative Extension

In This Issue

Submitted by:

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Emeritus
Sutter, Yuba and Colusa Counties

Take Our Survey on Walnut Freeze Damage

We encourage you to participate in this survey (sacvalleyorchards.com/event/take-our-survey-on-walnut-freeze-damage) provided by University of California Cooperative Extension (UCCE) regarding freeze damage in walnuts. The purpose of this survey is to gain greater understanding of freeze damage in walnuts. For more information on mitigating walnut freeze, see the article in this newsletter.

Sacramento Valley Tree Crop IPM Webinar

November 4 @ 7:30 am - 11:00 am

This is a webinar for anyone directly involved with pest and disease management in orchard production. We will discuss pest and disease issues including NOW management, mites management, wood cankers and other pests.

DPR Credits (Pending)

Event Agenda

7:30-8:30 am	Navel orangeworm and spider mites in almond and walnut, David Haviland, UCCE Kern County
8:30-9:00 am	Ag Commissioner Update, Marcie Skelton, Glenn Co Ag Commissioner
9:10-9:40 am	Quick review of pest management issues ahead of 2022 season Roger Baldwin, UC Davis, Luke Milliron, UCCE, Franz Niederholzer, UCCE
9:40-10:10 am	Differences in managing Bot Canker and Blight of Walnut from Band Canker of Almond, Themis Michailides, UC Davis
10:10-10:40 am	Almond wood canker, Florent Trouillas, UC ANR

Register at: sacvalleyorchards.com/event/sacramento-valley-tree-crop-ipm-webinar/

UCCE Walnut Freeze Webinar

November 4 @ 4:00 pm – 5:30 pm

A panel of UC experts and walnut growers will discuss best practices for freeze mitigation and recovery. Event details and registration will be posted at sacvalleyorchards.com/events. Meeting information will also be emailed out to electronic walnut newsletter recipients and those signed up for updates on Sacramento Valley Orchard Source (sacvalleyorchards.com/subscribe/).

Related to the freeze webinar, please take the time to fill out our survey on walnut freeze damage, which you can find at: sacvalleyorchards.com/event/take-our-survey-on-walnut-freeze-damage

Fall Walnut Orchard Management Considerations

Katherine Jarvis-Shean, UCCE Orchard Advisor, Sacramento, Solano and Yolo Counties

Harvest

Timely harvest is important for nut quality. Delaying harvest can darken pellicles, and encourage mold development and navel orangeworm. Walnut color quality decreases most rapidly in the first nine hours, so try to pick up the same day that nuts are shaken.

Collect a representative **IPM evaluation sample** from across each orchard block at harvest to assess your IPM program. Grade sheets won't always give the detail necessary to decipher the source of damage and what needs to be changed to improve an IPM program. Compare what you see with photos and descriptions in our post on Harvest Damage Evaluation for Walnuts.

Post-harvest

If you are pruning this dormant season, **prune as early in the fall as possible** to avoid *Botryosphaeria* infections. Winter (February) pruning resulted in infection in 78 to 99 percent of cut shoots, compared to 28 to 75 percent in fall (October)-pruned shoots. At minimum, avoid pruning cuts when wet conditions are in the forecast.

If your irrigation water was of lower quality this season, **take soil samples** to assess the build-up of salinity and toxic element(s) such as chloride, boron and sodium. See video series on soil sampling from the UC Davis Fruit and Nut Center. Consult with your CCA regarding fall irrigation practices to help manage rootzone salinity if elevated levels are found.

Apply **potassium sulfate** where leaf sample analysis indicates potassium deficiency. Although **potassium chloride (KCl)** is a cheaper option, use caution when applying in a drought since the chloride (Cl) must leach out of the root zone before spring leaf-out to avoid damage. Also, don't use KCl where there is a perched water table, heavy clay soils, or where summer leaf Cl levels are elevated.

Scout for weeds to evaluate the success of this year's weed management plan and revise your plan for next year. Find weed identification tools and scouting templates in our Post-Harvest Weed Scouting blog post. You **might need to water in your pre-emergent herbicide** if we have another dry fall.

If you're **removing an orchard**, **October** is the time to kill roots with Garlon. It is critical to paint stumps with Garlon within five minutes of cutting trunks, and leave stumps for 60 days. See our article on Considerations for Replanting Walnut Orchards for more information.

Sanitize orchards to remove mummy nuts that can harbor overwintering NOW. Shake or pole remaining nuts out of trees, blow nuts into middles and flail mow. Clean out processing facilities that are adjacent to orchards.

If **seeding a cover crop**, try to seed before leaf drop to get the best stand establishment. If drought conditions continue this fall and winter, supplemental irrigation will be needed for germination and/or optimal growth. Make sure you have an available water source during the winter months before seeding this fall. There's more information in our blog post: Time to Think About Cover Crops in Walnuts.

Five Steps to Prepare for the Next Sudden Autumn Freeze

Luke Milliron, UCCE Farm Advisor Butte, Glenn, and Tehama Counties
Janine Hasey, UCCE Farm Advisor Emerita

In the Sacramento Valley, an autumn freeze has damaged walnut orchards every November for the last three years. Although sudden autumn freezes are nothing new for walnut growers, it is potentially unprecedented to have severe autumn freezes three years in a row! Now, preparing for these freeze events needs to be a regular part of every walnut grower's summer and fall orchard operations.

How to reduce future damage.

1. For mature trees, don't apply any additional nitrogen (N) from September onwards to prevent tender new growth that is most vulnerable to freeze damage. For young trees, it's best to cut off N applications by mid-August.
2. For young trees, withhold irrigation starting in early to mid-September, waiting to resume irrigation until a terminal bud (photo 1) is set on the trunk. After the terminal bud has set, irrigation can resume to avoid tree stress and defoliation, without the fear of pushing tender new growth.

   For bearing trees, terminal buds may set as a positive side effect of the water cutoff ahead of harvest done to avoid shaker injury.
3. If there has not been adequate rainfall by the end of October, irrigate both young and mature orchards so the soil is moist going into November. Trees with adequate soil moisture are better able to withstand low temperatures without damage than trees in dry soil because water-filled spaces in the soil conduct and store more heat than empty airspaces. To know if rainfall is meeting this moisture need or if irrigation is called for, compare rainfall totals with ET, and monitor soil moisture levels by hand or with sensors, with a focus on the top foot of soil moisture.
4. Continue to actively monitor soil moisture and freeze predictions in November and December. If a freeze is predicted and the soil is dry, it should be wetted 2 to 3 days prior to a freeze event to fill the air spaces so the soil will store more heat. The top foot of soil is the most important and should be at field capacity (not saturated/ponding). Either a dry surface crust on one extreme or a frozen sheet of ponded water on the other extreme will both hinder the re-radiation of stored daytime heat during the night.
5. If you suspect freeze damage occurred, cut into the branches in the fall or winter and check the tissue for drying or browning (photo 2). Swift action in the week after the freeze event can significantly decrease damage. Sunburn after freeze can further damage tissue on the southwest side of the tree. Paint the southwest side of damaged trees with 50% diluted (1:1 water to paint) white interior latex paint. Painting up to a week after the freeze event can reduce additional damage by half or more.

Grower experiences. The November 2018 freeze caught several walnut growers with large and small acreages in the Sacramento Valley by surprise when severe freeze damage was seen in spring 2019. After these growers adapted their management practices, particularly with postharvest irrigations in early November when there was no rainfall, their trees survived the freeze events in 2019 and 2020 largely unscathed. In 2020-21 because of severe drought conditions, a Butte County walnut grower irrigated regularly throughout fall and winter to maintain constant soil moisture and attributed this practice to his success of avoiding severe freeze damage.

Drought is a clear and direct challenge to preparing for the next sudden autumn freeze. Let's hope for early November rainfall since it is likely that growers with only surface water sources may not be able to irrigate this November.

Survey. We encourage you to participate in this survey provided by University of California Cooperative Extension (UCCE) regarding freeze damage in walnuts. The purpose of this survey is to gain greater understanding of freeze damage in walnuts.

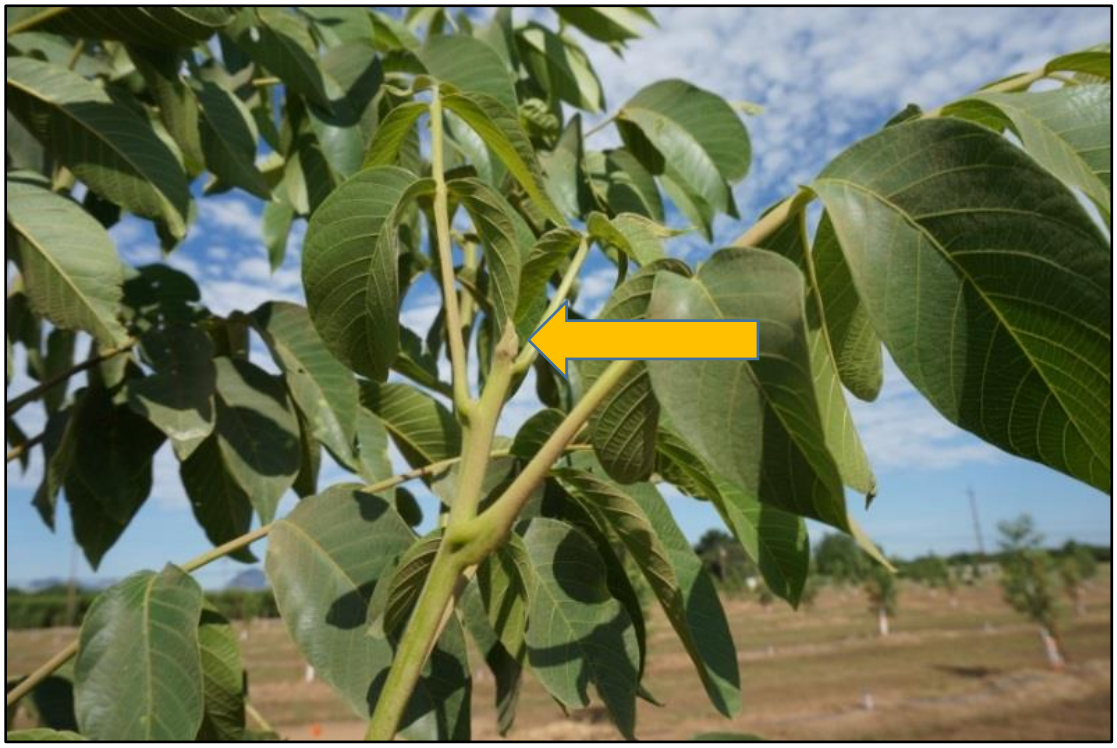


Photo 1. Withhold irrigation until a terminal vegetative bud sets on trunk (photo: Janine Hasey).

Photo 2. After a severe freeze event cut into the southwest facing trunk, looking for dark brown discoloration of the cambium (photo: Janine Hasey).

Fall Walnut IPM – Looking Back and Looking Forward

Jhalendra Rijal, Area IPM Advisor, UCCE Stanislaus & UC Statewide IPM Program
Sudan Gyawaly, Associate Specialist, UCCE Stanislaus

A Look Back at Moth Pressure – 2021

Codling moth.

Codling moth can damage walnuts over multiple generations, from spring to the fall (i.e., 1st to 3rd generations). Codling moth IPM strategy includes 1) implementing mating disruption to minimize the pest pressure and 2) applying insecticides that target the freshly hatched larvae.

Despite the concern of high codling moth pressure due to the dry winter and warm spring and summer, the overall codling moth populations this year have been relatively quiet throughout the Central Valley. The first flight 2021 biofix dates for most of the Sacramento and North San Joaquin Valley orchards ranged from 5 April to 15 April. In the orchards where we had codling moth traps in the Modesto area, the biofix dates for the first, second, and third flights were 13 April, 14 June, and 30 July, respectively (see Figure 1). The average lengths of the first, second, and third generations were 1021, 1156, and 1280 degree-days, respectively. The peak moth activities of these flights occurred around the 3rd-4th week of April (first flight), 3rd-4th week of June (second flight), and the 1st week of September (third flight). However, overall trap captures during the entire season were relatively low, including the most recent third flight (see Figure 1). Since the pest pressure has remained low so far, the potential risk of damage by codling moth is expected to be minimal. In most years, the third generation's late-stage "mature" larvae drop from the infested fruits to the ground and diapause (winter dormant state) inside thick, silken cocoons under loose bark and soil or debris around the base of the trees. Currently, we believe that codling moth phenology is in that stage. These larvae pupate in the following spring and emerge as adult moths.

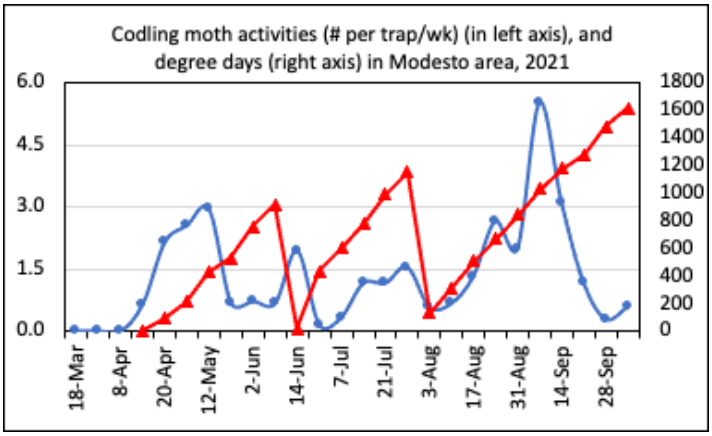


Figure 1. Codling moth activities (# per trap/week, see blue line) in a 1x-phermone trap (in left axis), and degree days (right axis, see red line) in Modesto area, 2021.

Regardless of seasonal trap counts and nut sampling, crop damage can be assessed accurately by harvest sampling. UCIPM Guidelines (link here: http://ipm.ucanr.edu/PMG/C881/m881hppests.html) recommends collecting a minimum of 1,000 sample nuts from individual orchard blocks and performing crack-outs for damage caused by codling moth, navel orangeworm, ants, walnut husk fly, sunburn, etc.

Navel Orangeworm.

Current navel orangeworm IPM practices include 1) conducting winter sanitation to destroy 'mummy/trash nuts' before the spring flight; 2) minimizing other predisposing factors (i.e., blighted, sunburnt, and codling moth infested in-season nuts); 3) performing a synchronized and early harvest; 4) applying insecticides at husk-split if needed; 5) applying mating disruption products. Since navel orangeworm has multiple hosts, primarily almonds and pistachios,

the pest pressure and the risk of nut damage in walnuts have increased with the increase of the host crop acreage in the Central Valley.

This year, with minimal walnut blight issues and low codling moth pressure, two important disposing factors, navel orangeworm damage to in-season nuts before husk-split, is expected to be low. Figure 2 shows the seasonal flights of navel orangeworm in Sacramento (left) and the North San Joaquin Valley (right). As we can see, the third flight moth counts (both male and female) in the traps increased steadily after mid-August. This upward trend is expected due to the increased number of moths in the third flight and the potential influx of moths from nearby orchards of multiple nut crops. The male moth counts in pheromone traps in the Stockton area (Figure 2, right side) have remained high as of mid-September data presented here.

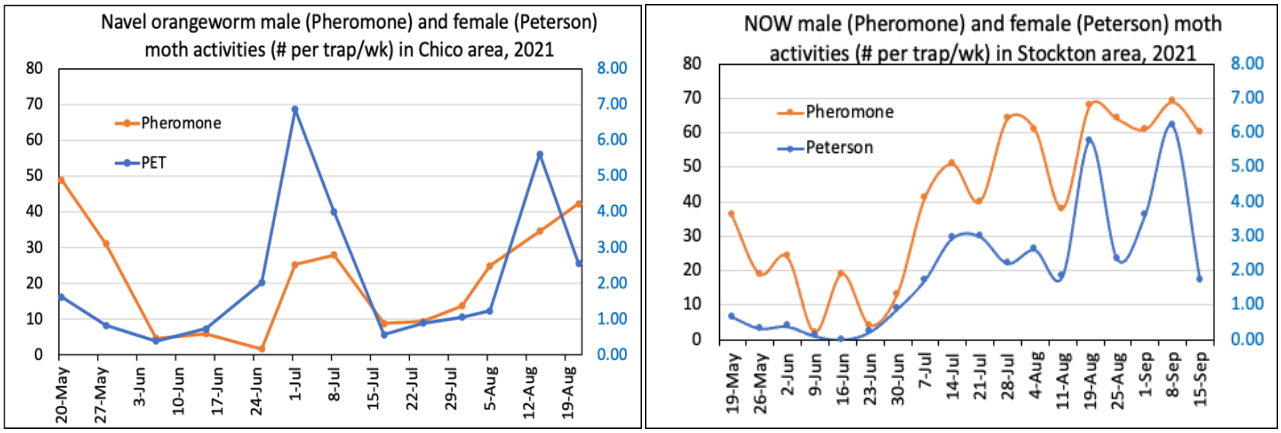


Figure 2. Seasonal flights of navel orangeworm in Sacramento (left) and the North San Joaquin Valley (right). Navel orangeworm male (phermone, see orange line) and female (Peterson, see blue line) moth activities in number per trap per week are displayed.

In terms of in-orchard damage risks, all walnut varieties after husk-split are susceptible to navel orangeworm, and close assessment of both nut maturity (i.e., husk-split) and moth flights (3rd - 4th) is crucial to make informed pest management decisions. For example, some early varieties like Serr or Vina may have husk-split nuts susceptible to the navel orangeworm third flight that began in mid-August. Similarly, the third navel orangeworm flight (started in mid-August and continued through mid-September) can be critical in infesting Howard and some early-split Tulare varieties. While the third flight won't damage the most common walnut variety, Chandler, which doesn't split until the third week of September or later, the fourth flight, which usually occurs between the last week of September and the first week of October, has a greater potential to cause damage to Chandler. Timely applications of ethephon can facilitate a synchronized or early harvest to avoid additional navel orangeworm pressure to the crop.

An Emerging Pest to Look for This Fall - Flatheaded Borer.

Background.

In recent years, walnut growers have reported higher infestations of the Pacific flatheaded borer (Photo 1). This pest is not new to the Central Valley but is becoming a reemerging problem, with drought likely a contributing factor. Flatheaded borers are known to cause damage to stressed, wounded, and sunburnt trees. However, there is a concerning trend of flatheaded borers attacking healthy trees as well. The borers damage wood from small pencil-sized twigs to 2–4-inch diameter branches, limbs, and tree trunks.

Research by the University of California is working to understand more about the lifecycle of this pest and cultural and chemical control options. Currently, there are no traps available for growers to assess populations and chemical control options. At this time, we recommend walnut growers and PCAs be aware of the lifecycle and damage the flatheaded borer can cause and be on the lookout for emerging damage in their orchards.

Flatheaded borer adult beetles deposit eggs singly in weak wood portions (i.e., sunburnt, freshly pruned, etc.), bark crevices, or depressions. Newly hatched larva bore into the bark, initially feeding on the cambium layer, but can eventually reach the heartwood by the fall. The borers remain there throughout the winter before pupating and emerging as adults the next summer. Our recent research funded by the California Walnut Board and the USDA's National Institute of Food and Agriculture (NIFA), has found that most adult beetles emerge over three months, May through July (peak flight: mid-June), varying based on the cultivar, temperature, locations, and drought conditions.

Symptoms of flatheaded borer infestation.

Fall through winter is the best time to survey for the borer infestation as it is easier to detect in trees without leaves. The following are ways to confirm flatheaded borer infestation in walnut orchards.

1. Scout the orchard to detect dead and flagged branches infested by the flatheaded borer and look for external infestation signs (i.e., larval feeding wound, fresh or old insect frass, Photo 2).
2. Look for brown-color sap that has oozed out and spread on the bark surface of the infested part of the tree. (Photo 3).
3. Look for any visible wounds on the tree branches and limbs that are prone to sunburn, or have pruning wounds, or any other kinds of cracks and injuries (Photo 4).
4. For young trees, check for damage on the trunk, especially on the south or west side of the tree. These sides are preferred for egg-laying by females due to higher sunlight exposure and heat. Check the graft union and pruning wounds closely.
5. Use a knife to peel the bark in a suspected branch and look for feeding channels packed with frass (sawdust-like insect waste) and cream-colored larva underneath (Photo 5). Keep in mind that larvae tend to move into the heartwood in late fall for overwintering and are harder to find. Larval finds may be easier during June through August when larval feeding occurs just beneath the bark in the cambium layer.
6. Look for D-shaped exit holes of the beetle on infested walnut limbs (Photo 6).

Managing flatheaded borer infestation.

Pacific flatheaded borer infestation may be reduced by adopting cultural practices that encourage vigorous, healthy plants. However, as previously mentioned, the borer has the ability to attack healthy trees as well.

1. Young trees should be protected from sunburn by applying white latex paint (1:1 paint and water ratio) or using mechanical covers over the trunk (e.g., trunk guard) as sunburnt tissue is more susceptible to borer attack.
2. Orchard sanitation comprising of removing weakened, injured, dead, and flagged branches, is highly recommended during the summer and fall since the mature larvae overwinter in the infested wood and pruning wounds are less likely to be infected by Botryosphaeria. Chipping the infested branches kills those larvae.
3. Maintain tree health and vigor to minimize sun-exposed branches, disease, and other issues such as freeze damage.

Note: We are looking for walnut orchards with flatheaded borer infestations to conduct experiments, especially in the Sacramento Valley. Please contact Jhalendra Rijal, jrijal@ucanr.edu if you are interested in becoming a cooperator on this effort.

Photo 1: Flatheaded borer - larvae (left), and an adult (right)

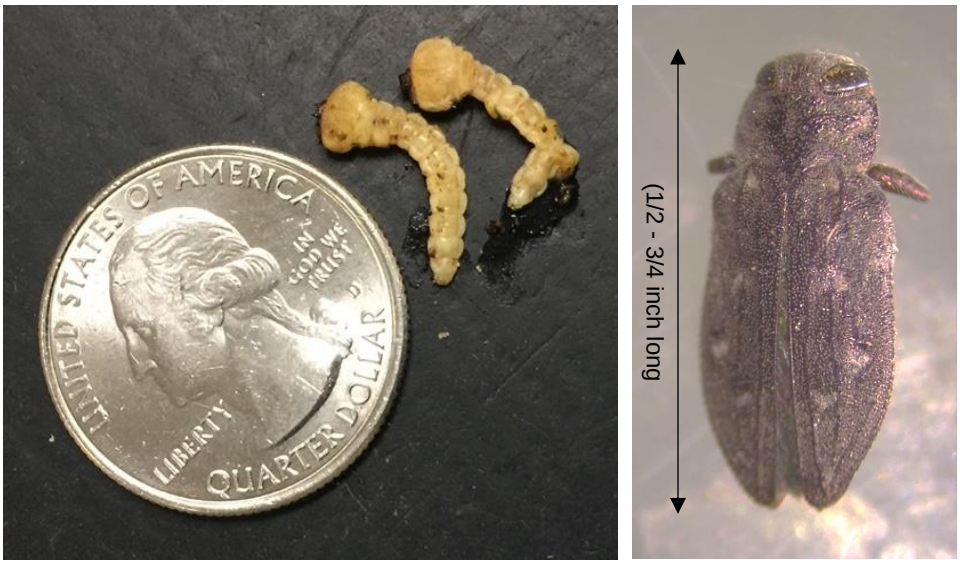


Photo 2: Flagged walnut branch due to the flatheaded borer attack

Photo 3. Brownish sap as one of the indicators of flatheaded borer infestation

Photo 4. Sunburnt and flatheaded borer infested branch

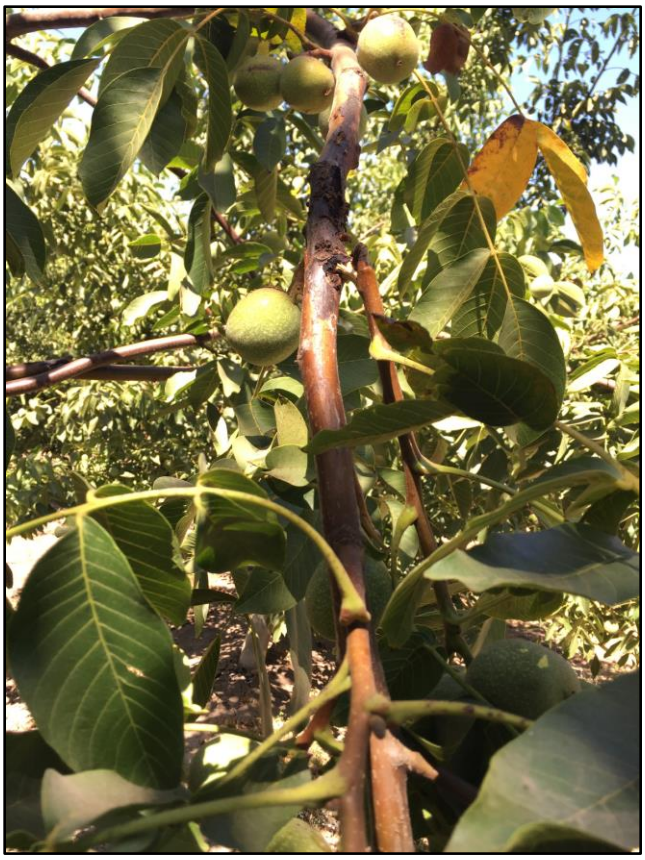
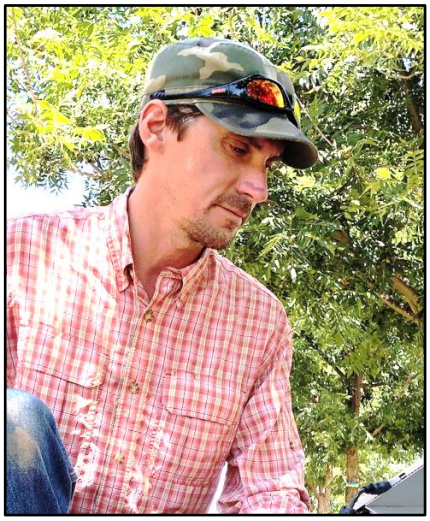


Photo 5: Infested walnut branch showing flatheaded borer larvae and feeding damage

Photo 6: D-shaped beetle exit holes

New Advisor Introduction

Curt Pierce, UCCE Area Irrigation and Water Resources Advisor for Glenn, Tehama, Colusa, and Shasta Counties



On October 15th, 2021, I will be joining the UC Cooperative Extension team as the Area Irrigation and Water Resources Advisor for Glenn, Tehama, Colusa, and Shasta Counties, based in Orland. I am looking forward to getting boots on the ground and working together with all of you.

I have a bachelor's degree in Agriculture and since 2016, I have been working as a Graduate Research Assistant with Richard Heerema, Pecan Specialist in the Extension Plant Sciences Department at New Mexico State University. While there, I spent two years in the Water Science and Management Master's program before moving into the Ph.D. program in Plant and Environmental Sciences with a focus on the stress physiology of woody plants.

My main areas of interest are plant water relations under water deficit, and irrigation system optimization. The research I conducted at NMSU studied methods of targeting limited water to when and where they would maximize benefit, and I look forward to continuing that work in ways that help producers and other stakeholders in the northern Sacramento valley.

In my free time I enjoy hiking with my family and dogs, trips on my motorcycle, and exploring everything I can. I'm excited to be a part of the community and look forward to meeting everyone.

I can be reached at the Glenn County office starting October 15th (530) 865-1107.

Announcing the UCCE Central Valley Pistachio News!

Want to receive this new regular collaborative effort from UC's Central Valley Pistachio Advisors.
Visit https://bit.ly/3adtvZL to sign up!

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