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WALNUT NEWS

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Cooperative Extension Work in Agriculture and Home Economics, U.S. Department of Agriculture, University of California, and County of Tehama, Cooperating.

Full color articles and photos are available on our Website: cetehama@ucanr.edu





Walnut Orchard Management: July & August 2022

Luke Milliron, UCCE Orchard Advisor, Butte, Glenn, and Tehama Counties
Evie Smith, Former UCCE Staff Research Associate, Southern Sacramento Valley
Katherine Jarvis-Shean, UCCE Orchard Advisor, Sacramento, Solano and Yolo Counties
Janine Hasey, UCCE Farm Advisor Emerita, Sutter, Yuba, Colusa Counties

JULY

- ◆ **Drought Management Resources:** Using the pressure chamber and waiting to irrigate until trees are 2 to 3 bars drier than the fully watered baseline remains the gold standard for deciding when to irrigate. How-to information at: sacvalleyorchards.com/manuals/stem-water-potential/pressure-chamber-advanced-interpretation-in-walnut. Additional considerations in the drought article in this newsletter.
- ◆ **Walnut Husk Fly (WHF):** Use yellow sticky traps to monitor weekly for WHF in your orchard. Begin treatment as soon as you detect eggs in trapped females or when the number of WHF in your traps increases significantly. Details at: sacvalleyorchards.com/walnuts/insects-mites-walnuts/walnut-husk-fly-biology-monitoring-and-spray-timing
- ◆ **Spider Mites:** Monitor weekly in July and August for spider mites and their predators. Check 10 leaflets (5 from higher branches), from 10 trees each time you monitor. If more than half of the leaflets with spider mites don't also have predators, consider treatment. Details at: ipm.ucanr.edu/agriculture/walnut/web-spinning-spider-mites
- ◆ **Codling Moth:** The third codling moth biofix occurs in late July or early August (about 1100-1200 degree days after the second). Monitor your traps to decide when to treat. Details at: ipm.ucanr.edu/agriculture/walnut/codling-moth
- ◆ **Botryosphaeria (Bot) or Phomopsis:** Begin pruning dead limbs and removing them from your orchard this month to avoid severe infection. Also consider spraying for Bot in early July if your orchard has a history of Bot infection. Fungicide efficacy on page 72: ipm.ucanr.edu/PDF/PMG/fungicideefficacytiming.pdf
- ◆ **Lean Price Year Considerations:** There are several management options to improve your profit margins:
 - IPM on a Budget: Cost Saving Strategies for Insect & Mite Management: sacvalleyorchards.com/walnuts/cost-and-expense-considerations/cost-saving-strategies-for-insect-mite-management
 - Maximizing walnut quality to improve value in a low-price year: sacvalleyorchards.com/walnuts/cost-and-expense-considerations/maximizing-walnut-quality-to-improve-value-in-a-low-price-year
 - Should You Use Ethephon in a Lean Price Year? sacvalleyorchards.com/walnuts/cost-and-expense-considerations/should-you-use-ethephon-in-a-lean-price-year

AUGUST

- ◆ **Navel Orangeworm:** Begin monitoring for NOW in your orchard. Healthy walnuts are only susceptible to NOW at and after hull split. Consider preharvest intervals and duration of residual activity when considering treatment options. See the above article on IPM on a Budget for NOW control considerations in a lean price year.
- ◆ **Mold:** While the current recommended control timing for mold is hull split, steps can be taken throughout the growing season to reduce mold at harvest. See the article in this newsletter to learn how to control mold in your walnut orchard this season.
- ◆ **Packing Tissue Brown (PTB):** PTB will start developing in mid-August for early season varieties like Serr and Solano. If you're considering using ethephon to remove more nuts at first shake or advance harvest timing, start monitoring for PTB in your orchard about two weeks before expected PTB. Sample once or twice a week by cutting open 100 nuts collected throughout your orchard. Application timing will vary depending on your goal. Apply at 100% PTB to advance harvest, but 5 to 7 days after 100% PTB to synch up maturity to remove more nuts at first shake. See "[Ethephon for Earlier Harvest](#)" for PTB photos and application guidelines.



Mid to Late-season Drought Strategies for Walnut Orchards

*Katherine Jarvis-Shean, UCCE Orchard Advisor, Sacramento, Solano, and Yolo Counties
Curt Pierce, UCCE Irrigation & Water Resources Advisor, Glenn, Tehama, Colusa, and Shasta Counties*

With California in an enduring drought and water allocations significantly reduced or reduced to zero in many areas, many growers and managers are stuck with much less water than walnuts use for optimal production. In certain crops (e.g. wine grapes, oil olives, almonds), water stress in certain developmental timeframes (“regulated deficit irrigation” or RDI) is not harmful, or may even be beneficial. Unfortunately, an effective RDI strategy has not yet been identified for walnuts and sustained moderate to high water stress (stem water potential below -8 bars) at any growth stage has been shown to affect walnut crop productivity and quality.

Different factors of walnut productivity are vulnerable to water stress depending on the timing and extent of that stress. Figure 1 shows the generalized water use from walnut as measured by evapotranspiration throughout a growing season and the different stages of nut and shoot growth occurring in the same timeframe. With kernels developing in July, August, and September, water stress during this time can impact kernel size and quality. Perhaps more important, this is also the time that buds are developing, and severe stress in this period will typically reduce bloom counts and yield potential next season.

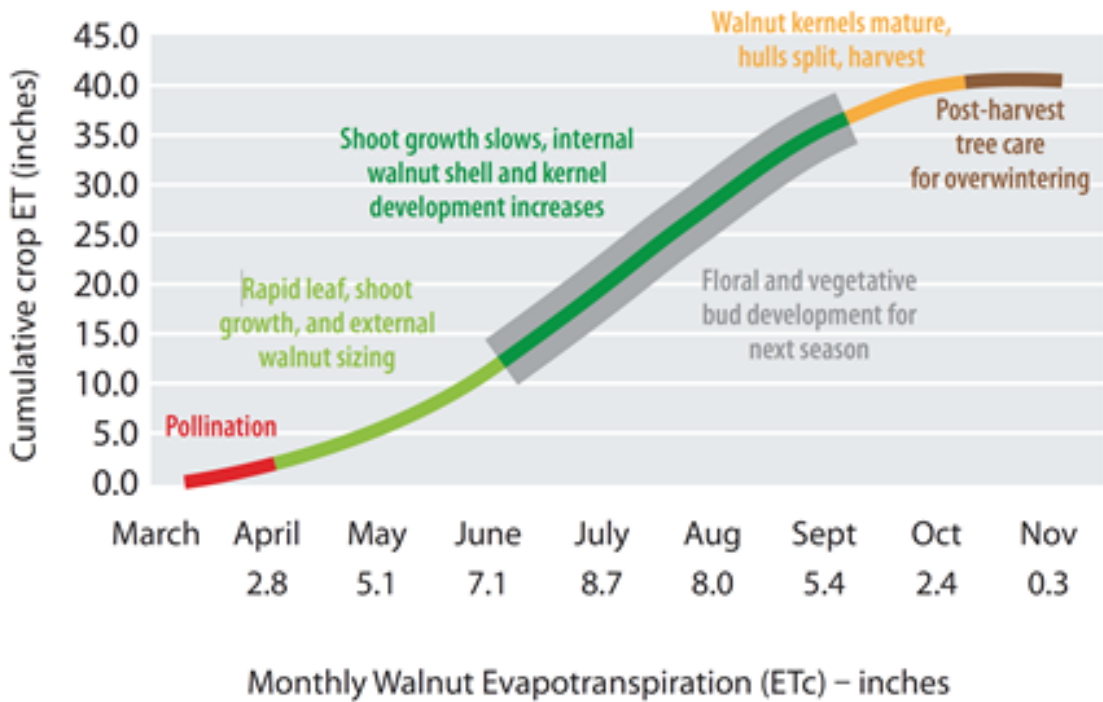


Figure 1. Cumulative and monthly average walnut evapotranspiration, tree growth, and nut development over the growing season. (Fulton & Buchner, 2015)

With less water available, and deficit irrigation infeasible, good system maintenance and precise irrigation application are the best approaches for walnut. For system maintenance tips, check out UC ANR’s [maintenance of micro-irrigation systems](#) site, and [our article on irrigation system maintenance](#) for guidance on how to check system pressure uniformity, flush irrigation lines, and manage emitter clogging. For more precise irrigations, a good place to start is with weekly crop-water loss estimates, or evapotranspiration (ET). We supply weekly ET reports which can be found on the [Sac Valley Orchards ET page](#), and where you can subscribe for weekly emails to be sent directly to your inbox.

While ET replacement irrigation scheduling is a great start, using a pressure chamber to directly measure tree stress via stem water potential is the most precise way to gauge the stress orchard trees are experiencing. Waiting to irrigate until pressure chamber readings show that trees are 2 to 3 bars drier than the fully watered baseline (e.g. fully watered baseline is -4.5 bars, irrigating when trees near -6.5 to -7.5 bars). Sac Valley Orchards has a series of [how-to guides](#) on measuring and interpreting stem water potential for everyone from beginners to long-time users.

Even with a highly uniform system and precise irrigation accounting for the climate, soil, and tree measurements, reducing applied water to stressful levels may be unavoidable. During the last drought Allan Fulton and Rick Buchner, Farm Advisors Emeriti, created a [drought strategies guidance document](#) to explain different strategies and expected outcomes depending on the level of irrigation reduction. For more detailed information on drought mitigation irrigation strategies for walnut, please refer to that publication. More recently, Ken Shackel, professor of plant sciences at UC Davis, Allan Fulton, and others reported new [start-of-irrigation guidance for walnuts](#) not yet incorporated into the drought strategies document, but which offer additional opportunities for water savings heading into next season.

Welcome...Adela Contreras, with industry support, joins Sacramento Valley UCCE Extension Team



Adela Contreras joined UC ANR in 2022 as a Staff Research Associate and serves the southern Sacramento Valley with Katherine Jarvis-Shean and Franz Niederholzer across six counties. Among other research projects, she works on prune and walnut rootstock experiments and safe and effective spray application strategies. Adela is a first-generation college student from Salinas, CA, graduating with a B.S. in Environmental Science and Management at UC Davis in 2020. She plans to pursue a Ph.D. in Agronomy or Soils and Biogeochemistry and inform future grower decisions. She enjoys kayaking, hiking, visiting family, eating, and adventuring with her dog Oakley.

Managing Mold in Walnut, 2022 Update

Clarissa Reyes, UCCE Orchards Staff Research Associate, Butte, Glenn, & Tehama

Luke Milliron, UCCE Orchards Advisor, Butte, Glenn & Tehama

Dr. Themis Michailides, UC Davis Plant Pathologist at the Kearney Ag Research and Extension Center

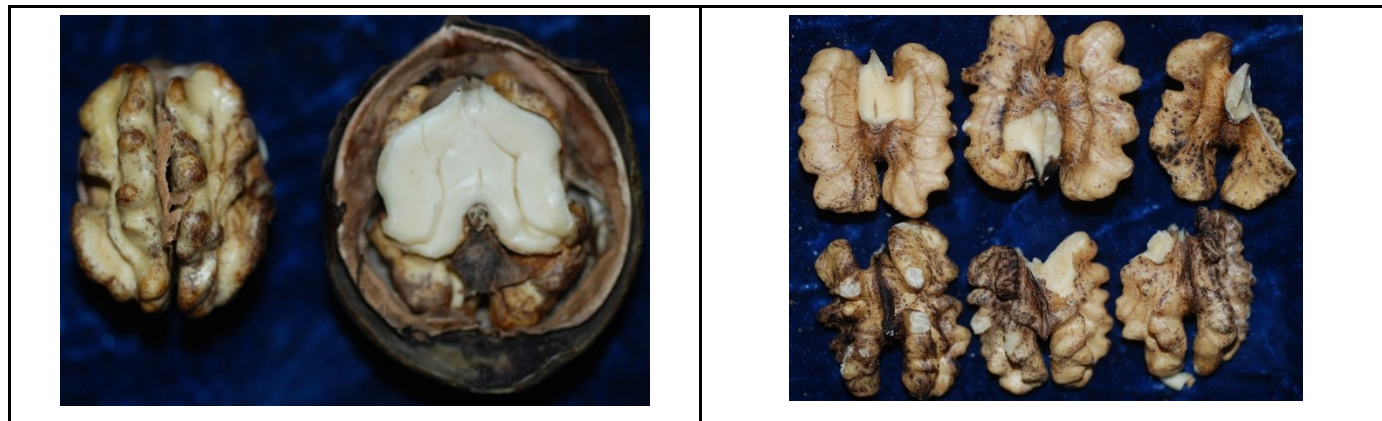


Figure 1. Left photo: incident of walnut mold. Right photo: stained regions on the kernel are covered by loose mold mycelia. Photos courtesy of Dr. Themis Michailides.

What is walnut mold?

Growers and processors have reported elevated mold levels in harvested walnuts to farm advisors, which has resulted in pathology sample submissions to Dr. Themis Michailides, UC Davis Plant Pathologist (Photo 1). Although *Botryosphaeria* and *Phomopsis* (BOT) can cause walnut mold, most walnut mold develops from *Fusarium* and *Alternaria* species. Furthermore, walnut mold spray timing is later than BOT prevention spray applications and therefore your fungicide program for BOT will not control mold. Walnut mold does not begin to develop until the hull completes maturity and begins to split, long after most BOT-controlling sprays have been applied. Before these alerts and ensuing research, not much was known about managing mold in walnut.

Because of increased mold reports, the California Walnut Board has funded Dr. Michailides to investigate the management of walnut mold. Although all possible predisposing factors have not yet been investigated, conditions that compromise the integrity of the hull, such as walnut blight, sunburn or insect-damage can serve as an entry point for mold fungi.

Predisposing factors and cultural controls for mold:

Practices that help maintain hull integrity are part of the pre-hull split management of walnut mold. One predisposing factor is sunburn, with mold commonly isolated from the sunburnt side of developing walnuts. Freeze damaged trees with less protective foliage are at high risk of sunburn and subsequent mold infection. Higher incidence of mold has also been found in insect infested nuts. Thus, controlling sunburn and insect damage will also help keep down mold infections. Finally, a critical management practice is timely shake and pick up. Bill Olson (UCCE Butte Advisor Emeritus) previously showed that mold and other quality problems increase the longer walnuts remain both on the tree and especially on the ground. Picking up the same day as shaking is a critical best practice for overall quality and grower returns, particularly for non-Chandler blocks.

Some varieties, such as Ivanhoe and Livermore are more susceptible to mold than others, and therefore more diligent attention to mold management may be required. In earlier research, higher incidence of mold was discovered in walnut varieties with larger openings at the stem end and larger sized nuts.

Fungicide¹ management for mold, 2019-2021:

In a 2019 trial using Chandler located in Butte County, the fungicide Rhyme (flutriafol) was tested because of its short preharvest interval (PHI). A single spray at either 30 or 60% hull split, reduced mold incidence by over 73%. In 2020, in the same orchard, two sprays with Rhyme, one at 3 weeks before hull split and the second at 20-30% hull split, resulted in 7% mold while the untreated control had 13% mold. However, this difference was not statistically significant. In 2021, a spray 2 weeks before hull split (HS), 1 week before HS, a spray at 20-30% HS, and 3 sprays at all 3 dates, significantly reduced mold (by 57-72%) in comparison with the untreated control. There were no differences among the treatments, an indication that one spray should be sufficient in reducing mold significantly.

More efficacy testing of various chemical controls for walnut mold are planned and these results will be reported at: ipm.ucanr.edu/PDF/PMG/fungicideefficacytiming.pdf

¹Mention of pesticides and spray timings do not constitute a pesticide recommendation; it is merely the sharing of research results. Always follow the pesticide label and consult with your PCA.

Spring Management to Control Mold

Secondary blight predisposes nuts to mold:

Secondary walnut blight (*Xanthomonas arboricola* pv. *juglandis*) infections that do not penetrate to the kernel resulting in nut drop, can create an entry for not only moth pests, but for the mold causing *Fusarium* and *Alternaria* species. These infections are a specific type of walnut mold called brown apical necrosis (BAN), named because the black blighted lesions at the styler end (aka: floral remnant) of the fruit, that turn brown following fungal colonization (Photo 2). As the fungal infection expands under the hull, the hull is decayed and the infection spreads to the kernel, most likely through the apical end. It stands to reason that improved walnut blight management, particularly of secondary infections, will lead to less BAN although this has not yet been studied. More on walnut blight best management practices at: sacvalleyorchards.com/walnuts/diseases/walnut-blight-management/

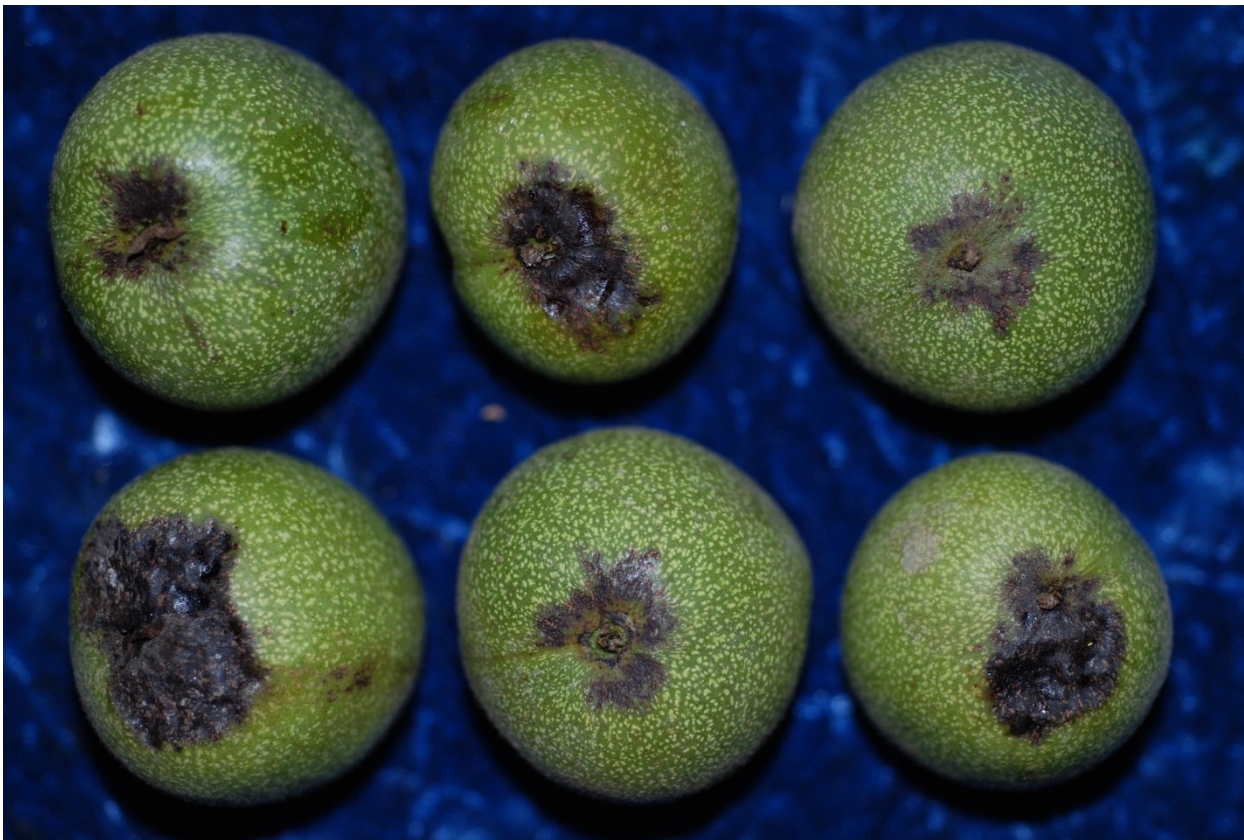


Photo 2. Brown Apical Necrosis (BAN) mold infections in Ivanhoe. Photo courtesy of Dr. Themis Michailides.

New research on infection and control at bloom timing:

A second year of data collection further bolstered the conclusion that most mold infections start at the styler end (aka: floral remnant) of the nut. These findings reinforce the contention that some infections by the mold fungi might start at bloom time. To determine if this could be a cause, bloom spray trials were initiated in 2021 and were repeated in 2022. In a trial using Tulare walnuts in Tulare County, a bloom spray gave similar control of mold as the 3 week and 1 week before hull split sprays and lead to significantly lower mold than the unsprayed control (evaluation by Diamond Foods). The same treatments applied using nearby Chandler showed no significant differences between the various spray timings and the unsprayed control trees. Please stay tuned for further information from the 2022 trial.

Follow us on Twitter

For timely almond, pistachio, prune, & walnut orchard management reminders,
pest and disease information, events, blog posts and more!
To find us - Use your phone to scan our QR code by opening your
phone's
camera app and hovering over the QR image below:



Or search for us at twitter.com/SacOrchards.

Listen to the Growing the Valley Podcast for the Latest on UC Orchard Research

Weekly episodes from Growing the Valley podcast keep you up to date with the latest UC best practices in walnut, almond, prune, and pistachio production. Listen at: growingthevalley-podcast.com or wherever you listen to podcasts.



SAVE the DATE



Biologically Integrated Orchards Systems (BIOS)

Predatory Mite Release,
Predator Attractants, and
Cover Crops in Walnuts

FREE, ON-FARM DEMO

JUNE 16, 2022

9AM - 12PM

DODGE RD & CA-45
PRINCETON, CA 95932

TOPICS:

Predatory mite release demonstration using a custom backpack sprayer

Application of natural enemy insect attractants

Maximizing the potential of your cover crops as predatory insect habitat

Demonstration of an Unruh roller crimper for cover crop management

2 DPR CEUs applied for

Coffee and donuts will be provided

FOR MORE INFORMATION CONTACT
ECOLOGICALFARMING@CAFF.ORG



CAFF
COMMUNITY ALLIANCE
with FAMILY FARMERS



University
of California
Cooperative
Extension



Speakers:

Daniel Unruh
Princeton Ranch

Amber Vinchesi-Vahl
UCCE Colusa County

**REGISTER
HERE**



Almond Variety Trial & Irrigation Management Demonstration

June 23, 2022, Thursday
8:30 – 10:30 AM

*Location: Almond Regional Variety Site at CSU Chico University Farm
Nicholas C Shouten Ln - continue SE past Organic Vegetable Project (map on back)*



Butte County Regional Variety Trial Tour

Pressure Chamber Demonstration

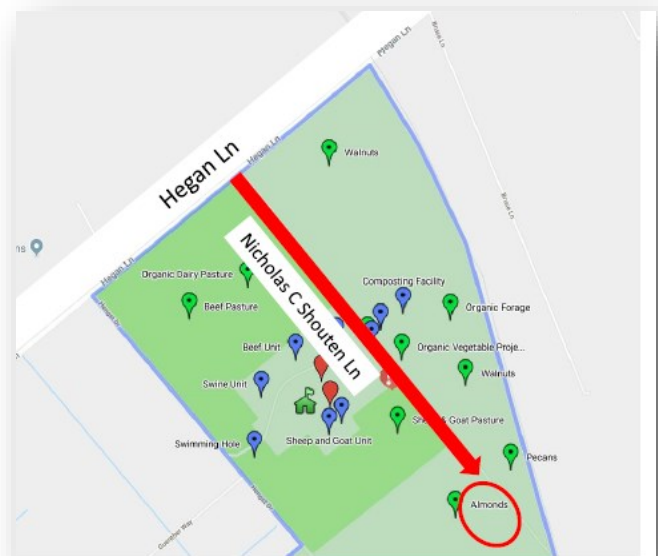


New Irrigation Management Technology

Direction to precise location on the farm:

Enter the farm on **Nicholas C Shouten Ln** and stay straight on that road (DO NOT TURN RIGHT towards the farm office/pavilion/dairy unit). Continue straight past the greenhouses and continue straight towards the back of the farm (past a farm gate) and to the location circled near "Pecans" on the map.

Regional Almond Variety Trial is the almond orchard across from the pecans.



2022 LAKE COUNTY SUMMER WALNUT FIELD MEETING

Growth and Yield Performance of Clonal 'Paradox' Walnut Rootstocks
plus
Walnut Husk Fly Monitoring and Control Summer Walnut Tree Care

Thursday, June 16, 2022

10380 Elk Mountain Road, Upper Lake CA 95485 (*Directions on back; signs will be posted*)

Speakers

*Rachel Elkins, UCCE Farm Advisor Emeritus/Recall Non-Faculty Academic Appointee,
Lake and Mendocino Counties*
Janine Hasey, UCCE Farm Advisor Emeritus, Sutter/Yuba/Colusa Counties
Cindy Kron, North Coast Area IPM Advisor, Sonoma-Lake-Mendocino-Napa Cos.

Agenda

8:30 - 9:00 Sign-in and refreshments

9:00 -10:00 2016 Clonal 'Paradox' walnut rootstock plot tour (Janine Hasey and Rachel Elkins)

Discuss growth characteristics and yield performance of commercially available clonal 'Paradox' rootstocks and new clonal 'Paradox' genotypes developed by the University of California, USDA-ARS, and UCCE. Walk through replicated research plot consisting of 'Chandler' on nine rootstocks.

10:00 - 11:30 Walnut husk fly monitoring and control (Cindy Kron and Rachel Elkins)

11:30 - Noon Summer walnut tree care (All participants)

Contact UCCE Lake County Office at (707) 263-6838, email celake@ucanr.edu,
<http://celake.ucanr.edu> with questions or for further information

DIRECTIONS:

From 29 E Hwy 20, Upper Lake, CA 95485 to 10380 Elk Mountain Rd, Upper Lake, CA 95485
3 min (1.7 miles) via Mendenhall Ave and Elk Mountain Rd

Fastest route now due to traffic conditions

29 E Hwy 20

Upper Lake, CA 95485

Head southeast on State Hwy 20 E toward Mendenhall Ave

0.1 mi

Turn left onto Mendenhall Ave

(signs for Upper Lake/Business Dist/
Ranger Stations/Lake Pillsberry)

0.6 mi

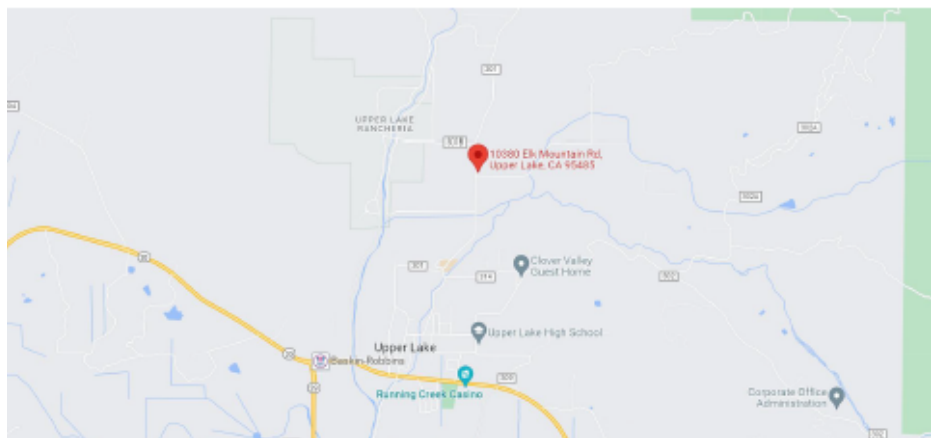
Slight right onto Elk Mountain Rd

Destination will be on the right

0.9 mi

10380 Elk Mountain Rd

Upper Lake, CA 95485





Guidelines and Enrollment

Seeds for Bees encourages the use of cover crops to increase the density, diversity, and duration of bee forage in California orchards, farms, and vineyards, while improving soil health. The seed mixes available through Seeds for Bees are designed to bloom at critical times of the year when natural forage is scarce but managed and native bees are active. Seeds for Bees serves the needs of bees, beekeepers, and growers, increasing sustainability of pollination and agriculture.

Guidelines

- Enrollment is open from June 1st through August 31st, 2022. Seed availability is limited and growers are encouraged to apply early.
- 1st year Seeds for Bees enrollees are eligible for a \$2,500 discount off their total seed purchase.
- 2nd year enrollees are eligible for a \$1,500 discount off their total seed purchase.
- Shipping is free for all orders throughout the enrollee's participation in Seeds for Bees. Growers located within 50 miles of seed distributor are requested to pick up their seed if possible, so more donations can go directly to growers for free seed.
- A limited number of new enrollees will be accepted each year based on available funding.
- Required reading: [Almond Board of California's Cover Crop BMPs](#), [Almond Board of California's Honey Bee BMPs for California Almonds](#), and [Seeds for Bees planting guidelines](#).
- Project Apis m. has sole discretion for final enrollment decisions.
- Project Apis m. has the right to refuse any applicant at any time.

Enrollment

To enroll in the SFB program enrollees must:

- Be a farmer or grower of crops in California.
- Complete an [application online](#) or contact Rory Crowley to apply.
- Grow honey bee pollinated crops (including seed production), nuts, or fruits.
 - Growers of wind pollinated crops may be considered for enrollment based on additional information provided in grower's application.
- Plant a minimum of 2 acres of cover crops.
- Agree to submit 2 photos per year and complete a short annual survey.
- A short phone consultation with the Seeds for Bees program manager is required as the last step to finalize a participant's enrollment if accepted.

2022-2023
ENROLLMENT
OPENS
JUNE 1ST, 2022



Contact Us

Learn more about how planting cover crops can improve soil and honey bee health.

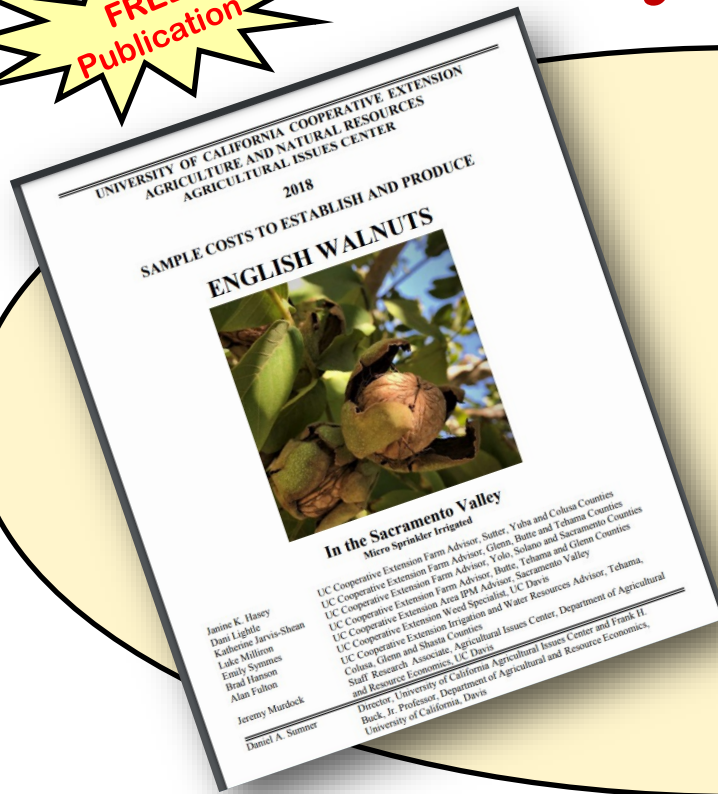
Rory Crowley
Director of Habitat Programs
Rory@ProjectApisism.org
916-287-3035, Ext. 1



ProjectApisism.org/seeds-for-bees



Cost Study Guide –Walnuts



INTRODUCTION Sample costs to establish a walnut orchard and produce walnuts under micro-sprinkler irrigation in the Sacramento Valley are presented in this study. The study is intended as a guide only. It can be used to guide production decisions, estimate potential returns, prepare budgets and evaluate production loans. Sample costs given for labor, materials, equipment and contract services are based on January 2018 figures. Practices described are based on production practices considered typical for the crop and area, but will not apply to every situation. A blank column titled “Your Costs” is provided in Tables 1 and 2 to enter your estimated costs. For an explanation of calculations used in the study refer to the section titled Assumptions. For more information contact Jeremy Murdock; University of California Agriculture and Natural Resources, Agricultural Issues Center, Department of Agricultural and Resource Economics, at 530-752-4651 or jmmurdock@ucdavis.edu. You can contact the local UCCE Advisor through the county offices: http://ucanr.edu/County_Offices/ [Sample Cost of Production studies for many commodities are available and can be down-loaded from the website, http://coststudies.ucdavis.edu](http://coststudies.ucdavis.edu). Archived studies are also available on the website.

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 “52”