Sacramento Valley Walnut Newsletter
Summer, 2025

UC CE UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources Cooperative Extension

In This Issue

Submitted by:

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Summer Walnut Considerations

Jaime Ott, UCCE Tehama, Shasta, Glenn, and Butte Counties

July

- **Irrigation:** Both too little and too much water can decrease walnut quality and cause tree stress. Especially during hot spells, giving trees the right amount of water minimizes tree stress and darkening nuts. A pressure chamber is your best tool for determining your trees' water needs. Plan to irrigate when trees reach 2-3 bars drier (more negative) than baseline.
- **Continue monitoring for insect and mite pests**
  - **Walnut Husk Fly:** monitor using yellow sticky traps charged with ammonium carbonate. Begin treatment when you detect eggs in trapped females or when you trap counts increase significantly.
  - **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.
  - **Codling moth:** Monitor traps to decide when to treat. The third biofix occurs in late July or early August (about 1100-1200 degree days after the second). Treat if there is evidence of greater than 2% canopy infestation. Remember that nearby mating disruption can affect trap catches.
- **Botryosphaeria (Bot) or Phomopsis**: Prune dead limbs and remove them from your orchard. Consider spraying for Bot in early July if your orchard has a history of Bot infection
- **Consider ordering ethephon:** Depending on the application timing, you can use this tool to either promote a 1-shake harvest or to advance harvest timing. See the article in this issue for more information.

August

- **Begin monitoring for navel orangeworm:** Walnuts are only susceptible to NOW at and after hullsplit. If egg laying is occurring at hullsplit, consider an insecticide treatment and a prompt harvest to avoid damage.
- **Mold**: Practices that help maintain hull integrity are part of the pre-hull split management of kernel mold. Some fungicides may be applied prior to hull split to prevent mold, with ongoing research for optimum timings. Blight, Bot, sunburn and insect damage all predispose walnuts to mold. Bot sprays alone do not protect against *Fusarium* and *Alternaria* species, which also cause walnut mold.
- Monitor for **Packing Tissue Brown** (PTB) about 35 days before the expected harvest date to plan ethephon application, if you choose to apply it. Do not treat until 100% of nuts are at PTB, or you can reduce kernel weight and quality.
- Plan for a timely harvest to ensure walnut quality. The longer nuts are left on the ground, the darker they will be.

Native hedgerows as a weed management tool in orchards

Justin Valliere, Assistant Professor of Cooperative Extension, Invasive Weed & Restoration Ecology, UC Davis
Rachael Long, Emeritus Farm Advisor for Field Crops, Pest Management

Field edges are a common source of weed intrusion into farms, often requiring intensive management. Establishing hedgerows of native California perennial plant species offers a proactive approach for reducing weed invasion while lowering the need for herbicide use and non-chemical control. Our recent research[1] in California found that orchard and crop borders planted with native perennials had significantly fewer weedy plant species, with lower overall cover and diversity of weeds. Although some growers may be concerned that hedgerows could introduce or harbor weeds, our findings demonstrate the opposite effect – native plantings can instead serve as an effective barrier against weed invasion.

We compared weed abundance, cover, and diversity in native hedgerows and conventionally managed field edges across 20 farm sites in California's Central Valley, spanning orchards (walnuts and almonds), row crops, and field crops. Native hedgerows significantly reduced weed abundance and diversity along field borders, and at some sites, these benefits extended into adjacent crops, where we observed lower weed cover and fewer weed species. **These benefits were especially apparent in the orchards included in the study.** Orchard borders with hedgerows had significantly lower weed density, cover (Figure 1), and diversity. These benefits also extended far into orchards, with lower weed abundance observed up to 10 meters into tree rows and avenues.

These reductions in weeds with established native hedgerows also led to lower weed management costs for growers, decreased herbicide use, and reduced investment in control efforts on field borders. This study highlights how planting such native hedgerows can save time, money, and resources invested in weed control.

Multiple benefits of native hedgerows

This study adds to a growing body of evidence demonstrating the benefits of native hedgerows in farming systems, including:

- Enhancing biodiversity
- Expanding wildlife habitat
- Improving erosion control
- Increasing soil carbon sequestration
- Supporting natural enemies for pest control
- Boosting pollinator populations
- Improving weed management and reducing control costs
- Lowering herbicide use

Important considerations

Installing native hedgerows offers significant ecological and economic benefits. However, careful planning is essential:

- Select and establish native plants carefully to ensure successful growth
- Manage weeds diligently during early establishment to support plant survival
- Take advantage of available grants and incentives to offset installation costs
- Consider hedgerow design and placement to maintain equipment access and operational efficiency

You can learn more about designing and installing native hedgerows on farms here.

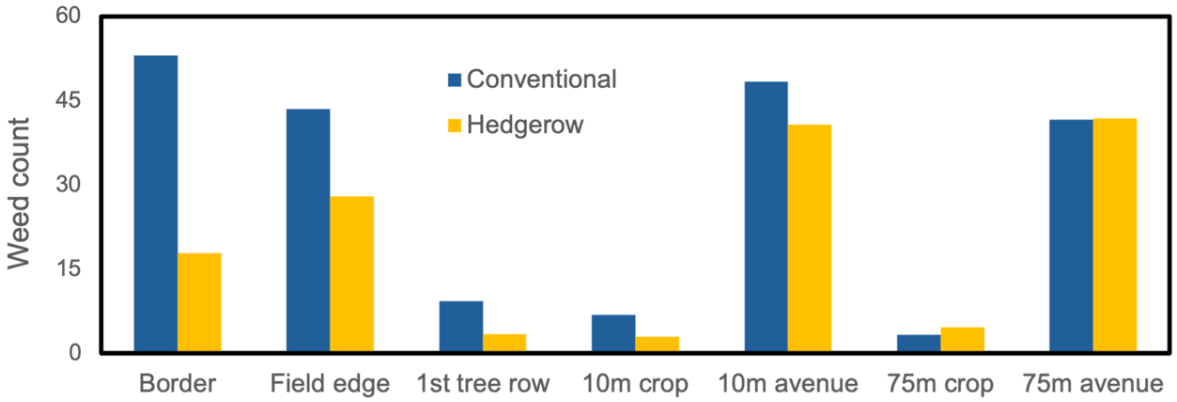

Figure 1. Weed numbers in orchards at field borders, edges, and within crop rows and avenues in those with conventionally managed field borders and those planted with native hedgerows.

Figure 2. Example of an established native hedgerow along a field border (Photo credit: Rachael Long)

[1]Long RF, Valliere JM. Established native hedgerows on field borders suppress weeds on farms. *Weed Science*. Published online 2025:1-20. doi:10.1017/wsc.2025.2

Maximizing Walnut Quality: Summer 2025

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Carlos Crisosto, CE Specialist, Postharvest Physiology
Bruce Lampinen, CE Specialist, Plant Sciences
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An adaptation by Milliron of an article by Fichtner, Crisosto, and Lampinen (2019)

The overall value of a walnut crop is based on yield and nut quality. With yield already set for 2025, your job now is to maximize profitability through nut quality. Nuts with a larger kernel size and lighter color pellicle (outer coating on the kernel) garner the highest prices in the market. As the figure below shows, specific nut quality defects vary over the season. Early July through early August is the kernel filling period, a time when kernels are sensitive to shrivel. From later in the kernel filling period through early hull split (early August through early September), kernels are sensitive to discoloration.

Nut quality problems can be associated with current year conditions or previous year conditions

Current season carbohydrate deprivation resulting from water stress (lack or excess) and/or shading related leaf loss

Symptom	Timing
thin shell	early June
severe shrivel	early July
slight shrivel	early August
yellow pellicle	early August
black pellicle	mid-August
bronze pellicle	late Aug/early Sept

Previous season insufficient carbohydrate storage during bud formation resulting in small leaves and small nuts in current season. Likely associated with buds that developed in shaded positions the previous year.

- Very weak bud = pee wee nut
- Relatively weak bud = brown adhering hull


Yellow


Bronze


Black

Why do these quality problems occur?

Kernel shrivel is most often caused by either shortage or excess of water. Insect damage and sunburn may also cause shrivel.

UC research trials have shown that carbohydrate deprivation can cause darkening of the kernel pellicle. It can result from either excess or lack of water. Historically, dark kernel color has been associated with water-stressed trees resulting from under-irrigation. However, more recent research has shown that it is now most often associated with trees that are wetter than the midday stem water potential fully watered baseline in mid to late summer. Darkening from carbohydrate deprivation can also be caused by shaded conditions in the inner canopy as orchards age. Heavy pruning results in a denser canopy that can exacerbate inner canopy quality problems.

Howard and Tulare are very sensitive to pellicle color problems due to carbohydrate deprivation resulting from either poor irrigation management and/or shading. Chandler is less sensitive to these problems.

Irrigation Management is the Key:

Many growers spray with kaolin clay to reduce sunburn and optimize kernel quality. Unfortunately, in five UC studies lead by Bruce Lampinen, no economic benefits were found with these applications. Instead, optimal kernel color is best achieved by maintaining orchards at a midday stem water potential of approximately **2 bars below the baseline** (more dry) during mid- to late summer. Maximize your profits by paying attention to water management all season long. We have resources on adopting the pressure chamber. You can also ask your local farm advisor to come out and take pressure chamber readings for you.

Ethephon use for managing walnut harvest and quality

Clarissa Reyes, Orchards Advisor, Sutter-Yuba, Butte and Placer Counties

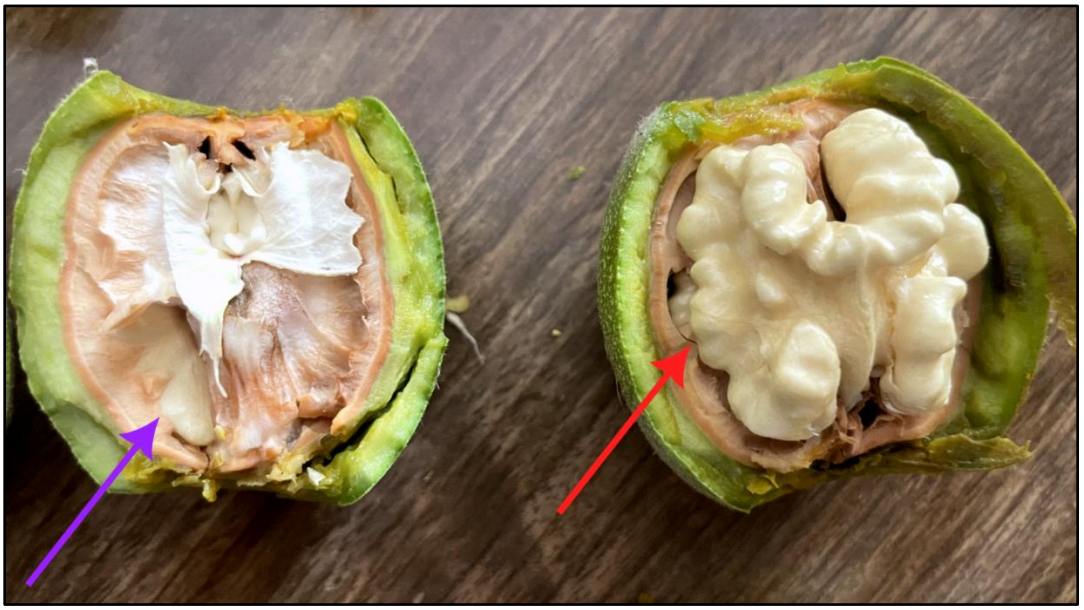
While it's too early to predict how severe weather or pest flights might impact walnut harvest, we do know some basic walnut physiology that can inform our ability to adapt depending on what nature throws our way.

Typically, walnut kernels reach maturity and have the highest market quality 3-4 weeks before they can be harvested, but hulls are not loose enough at that time in the Sacramento Valley. So, while we wait for hulls to loosen from the shell and split, kernel quality may decrease on the tree due to heat, mold, and insect damage.

The point at which walnut kernels are mature, lightest in color, and of highest value is reached when packing tissue between kernel halves has just turned brown, commonly referred to as "packing tissue brown" or PTB. Climate greatly influences this – there is less time between PTB and the time when hulls have separated from the shell in cooler, coastal areas than there is in the hotter and drier valley regions.

Examples of mature nuts at packing tissue brown (PTB), left, and immature nuts, right. Photo: Bob Beede.

Examples of mature nuts at packing tissue brown (PTB), circled, and immature nuts. Photo: Clarissa Reyes.



Purple arrow indicating where kernel still attached to packing tissue on immature nut, left; red arrow indicating the kernel detached from the packing tissue close to maturity, right. Photo: Clarissa Reyes

More examples of packing tissue brown. Photo: Clarissa Reyes

Ethephon is a compound that accelerates separation of the walnut hull from the shell. This enables harvest at an earlier time after PTB, when the kernels are at highest quality.

It can be useful to use ethephon 1. To move harvest closer to PTB to preserve kernel quality, or 2. Facilitate a one-shake harvest, which can help with harvest cost efficiency. Both objectives might be worth considering if you have a lot of acreage that will harvest around the same time, because strategic applications among some select blocks can ensure harvest timing will be staggered and that equipment and dryer space will be available at optimal timing.

If your goal is to advance harvest, either to preserve kernel quality or spread out the harvesting of different blocks of the same variety, apply ethephon when 100% of nuts reach PTB. This will move harvest up by 7-10 days, then a second shake should occur approximately two weeks later.

In this case, PTB is accurately assessed by crossing diagonally across an orchard, and collecting 100 nuts, and splitting them in half. This should begin at least two weeks before PTB is expected. Mature nuts will have oak-colored brown tissue throughout the hull. Treatment should not occur until 100% of collected nuts are at PTB.

If your goal is to remove the most nuts in a single shake to save the cost of sending the harvest crew through the block a second time, apply ethephon about 10 days before normal harvest. Even applying ethephon as early as five to seven days after PTB will improve percent nut removal and the chances of having to only harvest once, avoiding an uneconomical second shake. Although a complete harvest (meaning 100 percent in one shake) may not be feasible, a far greater first harvest, and in some cases a near complete harvest, is possible earlier than normal with the use of ethephon.

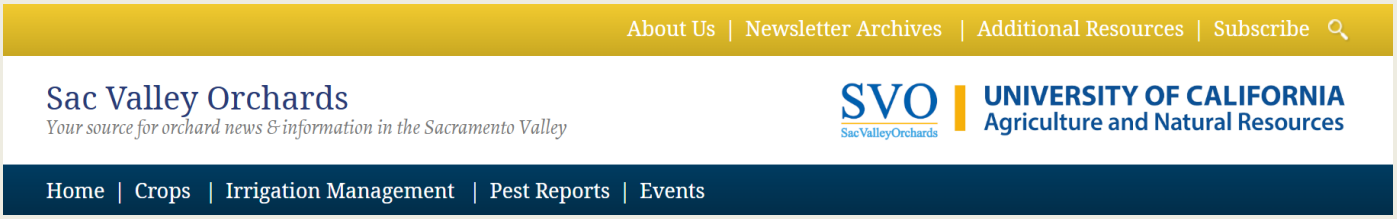
Ethephon can be a helpful tool to manage harvest timing, but its use comes with some caveats.

- Research on ethephon application was conducted in the 1970s on Ashley, Chico, Franquette, Hartley, Manchetti, and Payne and in the 1990s on Serr. We do not have replicated research on Chandler or Howard, or newer varieties such as Solano, Durham, or Wolfskill.* Anecdotally, growers report that Tulare produces the most ethylene and nuts fall off the tree shortly after treatment. Howard is responsive to ethephon in Northern California, resulting in increased quality and value. Several growers report success using ethephon on some of their Chandler blocks to stagger harvest.
- Ethephon is labeled for use between 300-900 ppm (3-5 pints/acre). Care must be taken with concentration because some varieties are more susceptible to leaf drop than others, which will affect photosynthetic recovery after harvest, and potentially affect subsequent tree growth and nut production the following year.
- Ethephon is most effective when applied between 60-90°F and with higher humidity conditions. If the weather is predicted to be rainy, hot, or windy, ethephon efficacy is decreased.
- Ethephon is slow to translocate so complete nut coverage is necessary to achieve the full effect of the application.
- Growers who do not have their own harvest equipment or who, for some other reason, cannot harvest the crop promptly should not use this material. Once ethephon is applied, harvest must start as soon as feasible to avoid loss in kernel quality. Ethephon should not be used in stressed orchards because this may lead to defoliation. This can complicate harvest due to excessive leaf debris, and again, potentially impact trees the following year.

Some other notes on quality:
Regardless of ethephon use, nut quality is greatly impacted by temperature. Once the connection between nut and tree is broken and the transpiration stream ceases, the temperature of sun exposed walnut kernels increases rapidly, while sun-exposed nuts on the tree remain cooler. Nuts on the ground exposed to sun will lose quality and value when air temperatures reach approximately 90°F. Placing nuts in the shade minimizes color change. If air temperatures exceed 100°F, even nuts in shade will experience excessive heat that can result in rapid darkening of kernel color. Nuts that are harvested with hulls will reach excessive temperatures faster than those without hulls.

** What ethephon rates do you use on which walnut varieties to manage your harvests? I appreciate your response to this anonymous survey (click link or scan QR) to inform design of a future ethephon experiment this fall in Howard and Chandler and newer varieties such as Solano and Wolfskill. –Clarissa*

These newsletter articles, and the latest orchard announcements, events, and resources are available at our website



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