Sacramento Valley Almond News

Fall, 2024

University of California
Agriculture and Natural Resources | Cooperative Extension

In This Issue

Luke Milliron
UCCE Advisor
Butte, Glenn, and Tehama Counties

Late 2024 and Early 2025 Sacramento Valley Orchard Meetings!

Tue Nov 12, 9:00 - Noon	2024 Orchard IPM Post-Mortem, Colusa	Rocco's Banquet Hall (546 Market St in Colusa)
Wed Jan 15, 7 AM - Noon	2025 North Valley Nut Conference, Chico	Silver Dollar Fairgrounds Chico, CA
Wed Feb 5, 8 AM - Noon	Sac-Solano-Yolo Almond Meeting	Woodland
Mon Feb 3, 8AM-Noonish	North Sacramento Valley Prune Day	Red Bluff Elk's Lodge
Tues Feb 25, 8AM-1ish	South Sacramento Valley Prune Day	142 Garden Hwy, Yuba City
Wed Mar 5, time TBD	Sutter/Yuba Walnut Day	Yuba City
Thurs Mar 6, 8AM-1:30PM	North Sacramento Valley Walnut Day	Red Bluff Elk's Lodge
Wed Feb 26, 8 AM - Noon	Sacramento Valley Pistachio Meeting	Woodland
Wed, Mar 12, 8 AM - Noon	Sac-Solano-Yolo Walnut Meeting	Woodland

Details for events will eventually be posted at: sacvalleyorchards.com/events

Almond Management Considerations—Fall 2024

Jaime Ott, UCCE Tehama, Shasta, Glenn, and Butte Counties
Becky Wheeler-Dykes, UCCE Glen, Tehama, and Colusa Counties

Postharvest nutrition Use information from your July leaf samples and harvest hull samples, along with 2024 yield, to plan potential fall Boron, Zinc, and Potassium applications. A fall boron spray can increase yield by hundreds of kernel pounds per acre when hull boron analysis is less than 120ppm. A fall zinc spray is the most effective way to provide this nutrient for good growth next spring. Use a high rate (20+ lbs zinc sulfate per acre) in November, or a lower rate (5 lbs/acre) in October. Potassium (K) can be effectively applied in-season or in the fall: for a fall application, potassium should be banded or concentrated in micro-irrigation zones. These fall applications, boron in particular, can have an outsized impact on the following year's yield. Nitrogen (N) applied in the fall, however, does not benefit yield if an orchard is otherwise healthy and July leaf analysis results are >2.5% N. Read the Postharvest Nutrition Review for details on fall fertilizer applications.

Cover crops Cover crops or resident vegetation have numerous benefits including improving water infiltration and soil water holding capacity, providing additional forage for bees in the spring, and providing easier access to the field when the soil is wet. It's important to monitor soil moisture and irrigate (if using sprinklers) after planting a cover crop if we have a dry fall. This ensures good germination of your cover crop. Check out the UC-Almond Board Cover Crop Best Management Practices Guide for information on timing, cover crop species selection, equipment and more.

Weed survey After the first rain, scout for weeds and develop your weed management strategy for the next year. Correct weed identification is critical for effective management plans, so utilize the Weed Research and Information Center Weed ID Tool if necessary.

Winter sanitation Count the mummies in 20 trees throughout each orchard. If more than 2 mummy nuts are found per tree, sanitize by shaking or poling nuts to the ground by Feb. 1 to reduce navel orangeworm pressure next year. Also note if mummy nuts are caused by hull rot, which may indicate a need to reevaluate your irrigation and nitrogen management practices next season.

Dormant spur sampling Sample dormant spurs for scale and mite eggs and examine green shoots for scab lesions. Use this data to decide whether to apply a dormant spray to manage scale and mites and then watch for scab lesion sporulation in spring.

Honeybee planning Get your order in for 2-3 honeybee hives per acre for the spring pollination season. Self-fertile varieties should have 0.5-1 hive per acre. See our article on Honeybees, Colony Strength, and Beekeeper Challenges for best practices for using honeybees in the orchard.

Process harvest samples November is a great time to pull those harvest samples out of the freezer and evaluate them to identify specific pest damage. Grade sheets do not distinguish between different types of insect damage, so harvest samples are an important tool to evaluate your pest management program.

Review practices, inputs, and results (grade sheets, tissue samples, etc.) orchard by orchard and variety by variety with management team to plan/budget for the 2025 season.

Say hi to your UC advisor and check out new UC research at the poster session at The Almond Conference.

Playing Potassium Catch-Up?

Kat Jarvis-Shean, Orchard Systems Advisor UCCE Sacramento-Solano-Yolo

I had a number of farm calls this summer for leaf burn in almonds. It was often much worse in Monterey than the other varieties, and in fields with strong disease management programs. The culprit? Low potassium. It's an understandable problem to arise when input prices are high and almond prices are low. Gone are the day of throwing on a little extra just in case. Everyone is trying to find that sweet spot of delivering just enough inputs to maintain healthy trees and a good crop, and it's easy to miss that mark when margins are so thin.

Photo 1. Leaf burn symptoms associated with very low potassium. Potassium leaf concentration in Sonoras was half of the K value in Nonpareil in the same orchard.

Fertilizer management with thin margins is extra tricky with almonds because varieties can yield so differently within a year. Almond potassium demand is largely driven by cropload, which uses 95 lbs K2O per 1000 lbs kernel crop. Ideally,

you'd fertilize differently by variety to meet different crop demands. However, most almond orchard fertigation systems are not plumbed to do this. If potassium is applied to orchards with the average yield in mind, the lower yielding varieties are having their needs met and then some, whereas the higher yielding varieties like Monterey are getting shorted.

Post-harvest can be a great time to start catching up on potassium. One potential solution for this would be supplementing heavier setting varieties with soil-applied potassium. Post-harvest is the ideal time for this application if you're applying potassium chloride and/or if the orchard in question is on drip. Post-harvest is the best time for potassium chloride so that winter rains can leach the chloride out of the root zone. Potassium chloride may not be a good idea for orchards with chloride sensitive rootstocks (Lovell, K86) or a perched water table. Post-harvest is a good time for soil applied with drip systems because the rains can move the potassium into the soil. Post-harvest applied hulls and shells is rarely applied in different weights by cultivar, but can be a lower-cost source of potassium, in general. UC Davis research has found hull or a hull-shell mix contains 57 lb K_2O per ton.

Now is also a good time to make a plan for next season. Differential fertilizing using soil applied K can also work during the growing season with SOP, applied in the wetted zone of microsprinklers or drip emitters, though the wetted zone for drip is admittedly a smaller target to hit. The other options would be turning off all but the heavy set variety lines for a fertigation event, or foliar spraying only the heavy set variety. Given that you can only move 5-10 lb/ac of potassium in through the leaves per foliar spray, this is unlikely to pencil out as a cost-effective K catch-up approach. Depending on your labor availability and costs relative to the cost of your K source, running one or two heavy-set-only fertigation events might pencil out. If you saw a little tip burn or off color by variety this year, consider leaf nutrient sampling by variety next year. Another $60 leaf sample (60 cents/acre for a 100 acre block) could give you a heads up before nutrient deficiencies are easy to diagnose visually, at which point they are already impacting tree health.

Small steps boost net grower returns

Franz Niederholzer, UCCE Farm Advisor, Colusa and Sutter/Yuba Counties
Domena A. Agyeman, UCCE Ag and Natural Resources Economic Advisor; Butte, Glenn, and Tehama Counties

Almond growers are in a long tunnel of low prices and high costs. With volatile nut prices largely out of grower control, cost management and cost-effective yield improvements offer the best hope of maintaining headway and reaching the light. This article focuses on small changes in proven practices with the potential for generating positive returns for growers. The 5% rule, introduced by Danny Klinefelter, is a simple farm improvement framework that focuses on making incremental 5% improvements in cost, yield, and price, ultimately driving larger overall profitability.

Cost savings…

- Gear up, throttle down spraying. Increasing PTO sprayer speed while reducing power (higher tractor gear + lower RPMs) saves time and diesel without impacting pest management in the winter and spring. For example, if a sprayer delivers good summer pest control at 2 MPH, it should do a good job at 3 MPH (in that same orchard) from dormant through petal fall timing.
- Evaluate potassium (K) fertility programs. Is the entire K budget applied in the fall, before the crop is set? The nuts are the largest user of K in an almond tree (95 lbs K2O/1000 lbs of kernel crop. Variable bloom weather means orchard K needs may vary from year to year. Consider switching from all dormant K application to all in-season or 50% dormant and 50% in-season. In my experience, dry field-grade K fertilizer banded in the orchard in early spring where irrigation water reaches the fertilizer is an effective K source for that crop. Why bet the pot before the cards are dealt?
- Improve nitrogen (N) fertilizer efficiency. Spoon-feed N fertilizer = better results per lb N fertilizer. More and more I'm hearing of growers applying some N every week or every other week from March through May. Check leaf N levels in May and/or June to ensure enough N is getting into the trees.
- Cover crops help increase rainwater infiltration and so improve salt leaching compared to bare ground. In addition, flowers from certain cover crop species are pollen sources (food) for bees and may help lower beekeepers' costs and perhaps a grower's bee bill.

- Mulching with compost or other organic matter (almond shells, etc.) can improve rainwater infiltration and provide nutrients to the soil (especially K). Potassium added to the soil increases with original K concentration of the mulch material and rate of water passing through the mulch (rainwater and/or irrigation).
- Eliminate fertilizer inputs (other than N, K, B, and Zn) not improving yield.

Yield improvements…

- Check orchard boron, add when needed. If orchard B levels are low to adequate (<120 ppm B in harvest hull samples), just 0.4 lbs B/acre in a fall spray can increase yield significantly (100-200+ kernel lbs/acre in UC trials). Talk with your CCA about a boron plan. Fall and pink bud timings are key to improving yield with boron foliar fertilization if hull analysis shows a need.
- Rent bees for self-fertile varieties. In a recent study in California, the number of bee visits to flowers in a solid Independence variety orchard with no rented bees was half the number of bee visits when one hive/acre was stocked IN the orchard. This was not an isolated location but surrounded by almond orchards and rented bee hives. This difference in bee visits/flower resulted in a 45% reduction in yield where no hives were stocked in the study orchard. Using more than one hive per acre did not improve yield. The study authors recommend 0.5 - 1 hive/acre stocking rate in Independence blocks.
- Irrigation: Match water use to orchard need as measured by soil moisture or plant water status (pressure chamber, FloraPulse, etc.). Extended water stress, especially between 90% hull split and harvest, can reduce yield 5-10% by reducing kernel size.
- Evaluate orchard sanitation (mummy removal/destruction) and spraying practices to ensure the best possible navel orangeworm (NOW) and *Carpophilus truncatus* (CT) beetle management and maximize nut quality and yield.

These are a few ideas for research-based cost trimming or yield improvement. Growers and advisors (CCA, PCAs, processor representatives, etc.) will have additional ideas. Even a small amount of saving or income increase can make a big difference compared to not making those steps.

Adopting these proven cost saving and yield improvement practices for small changes can lead to significant gains. The 5% rule is a simple concept where growers should aspire to increase yield and price received by 5% and decrease cost by 5%. Figure 1 shows how 5% improvements in cost, yield, price, and their combinations affect profits. The example is based on an initial profit of $420/acre, which is determined by subtracting the base cost of $3,100/acre from the revenue, which is the product of the base yield (2,200 lb/acre) and price ($1.6/lb). A 5% decrease in cost results in a 37% profit increase, while a 5% improvement in yield or price leads to a 42% profit increase. If the price remains unchanged, but costs are reduced by 5% and yield increases by 5%, profit grows from $420/acre to $751/acre, representing a 79% increase. A combined 5% improvement in cost, yield, and price results in a 123% increase in profit.

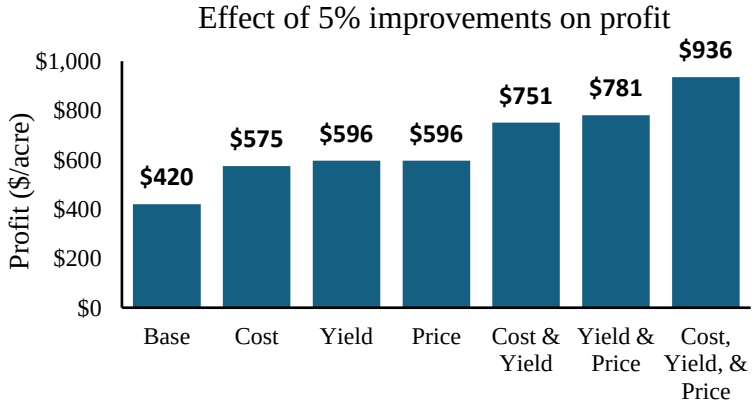

Fig 1. Effect of 5% improvements in cost, yield, price, and their combinations on profits.

The combined effect of these 5% improvements is greater than a simple sum of 5% + 5% + 5% (for a 15% increase) because the relationship between production, marketing, and cost is multiplicative. As a result, multiple consecutive years of 5% improvements will also produce more than a 15% increase in profit, compounding over time to generate significantly larger gains. The big picture of this concept is to target small improvements in multiple areas of your

operation. Adoption of this rule is characteristic of the top 20% farm businesses and a key factor in the success of great farm businesses. For example, the top 20% of corn growers in 2021 had higher yields, received higher prices, and had lower costs.

The concept is straightforward, but achieving 5% changes is not necessarily easy. However, it offers strong motivation for continuous improvement without requiring major management changes that could risk affecting yield or quality, while still boosting grower income.

New Threat to California Almonds: Red Leaf Blotch

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Background

Red leaf blotch (RLB), caused by the fungal pathogen *Polystigma amygdalinum*, is one of the most important leaf diseases currently affecting almond trees in the Mediterranean basin, particularly in Spain, and regions of the Middle East. In late May 2024, unusual symptoms on leaves, including yellow spots and orange to dark red-brown blotches, were detected in an almond orchard (Nonpareil, Monterey and Fritz) on the border of Merced and Madera counties. The disease has since been observed in Fresno, Madera, Merced, San Joaquin, and Stanislaus Counties, indicating the disease is somewhat widespread in the Northern San Joaquin Valley. Following field sampling as well as morphological and DNA/PCR analyses, our laboratory confirmed the detection of *P. amygdalinum* from symptomatic leaves. This is the first detection of *P. amygdalinum* from California almond, and the pest has formally been confirmed as being present in the state by both CDFA and the USDA. Growers and PCAs should be on the lookout for RLB as it is new to California and a serious disease of almond.

Disease symptoms and biology

Symptoms of RLB initiate as small, pale, yellowish spots or blotches that affect both sides of the leaves (Fig. 1). As the disease progresses, the blotches grow larger (1 to 2 cm) and turn yellow-orange with a reddish-brown center (Fig. 2). At advanced stages of disease development, leaves become necrotic, curl, and drop prematurely. Mainly the leaves are affected, and premature defoliation of trees can occur, thus decreasing the photosynthetic capacity of the tree during the current and following growing season, leading to a general decrease in yield.

The disease is monocyclic, with only one primary infection cycle. The primary inoculum are ascospores that form in perithecia (sexual fruiting bodies) on fallen infected leaves from the previous growing season. Infection occurs after petal fall when young leaves emerge and spring rains occur. Rain is essential for the release and dispersal of ascospores from perithecia. The disease may not be noticed before late April to mid-May as infection remains latent for approximately 35 to 40 days. Infected leaves develop small yellow blotches that expand and become orangish to reddish-brown, with variable shapes and sizes, as the fungus colonizes more leaf tissue. During spring/summer leaves contain the pycnidia (asexual fruiting bodies) of the fungus, which produce filiform conidia. These asexual spores do not cause new infection on leaves. Infection of leaves decrease drastically after June and with high summer temperatures. Rain combined with mild temperatures in spring and early summer generally lead to higher disease incidence.

Disease Management

Research and experience in Spain where RLB is more common have shown that one preventive fungicide application at petal fall and two additional applications at two and five weeks after petal fall if rains persist are effective at controlling the disease (this exact timing is not critical but depends on the occurrence of rainfall). This means that fungicide applications and timing to control other common diseases of almond in California such as shot hole or anthracnose will likely also control this pathogen. Researchers in Spain also have shown that FRAC groups 7, 11, M3, M4 and some FRAC3 chemistries are most effective. Cultural practices, focused on eliminating the primary inoculum of infected fallen

leaves, also can help mitigate the disease. These consist of removing leaf litter or applying urea to accelerate its decomposition. However, such strategies are only effective when applied over a wide area. Fungicides applied during bloom and after symptoms are visible are not effective.

If you suspect that you have this new disease in your almond orchard, please contact your local UC Cooperative Extension farm advisor

Figure 1. Early symptoms of red leaf blotch include small, pale yellowish spots or blotches that affect both sides of the leaves. (Picture credits: Alejandro Hernandez and Florent Trouillas).

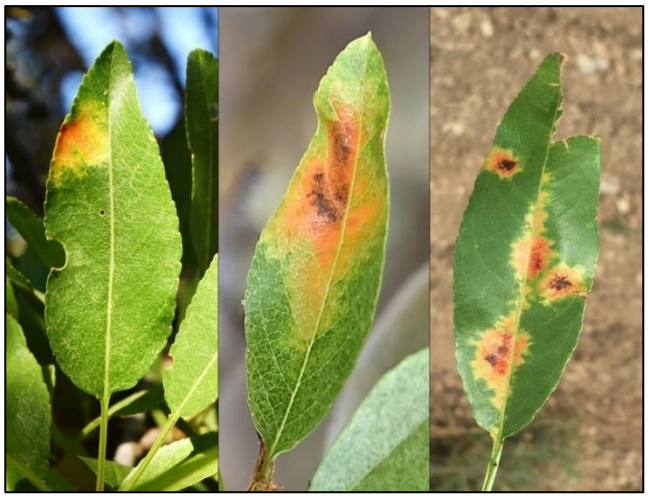

Figure 2. Advanced symptoms of red leaf blotch include larger, yellow-orange blotches (1 to 2 cm)

Know your business

See what you think of these four questions. If you'd like to answer them, click on the link below to see the questions online. You can leave your name or remain anonymous.

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Q. Which rootstock should deliver the lowest summer Nonpareil leaf chloride (Cl^-) level when only irrigated with ground water containing moderate chloride (3 meq/l) concentration?

Q. What timing is the most critical for optimum boron tissue levels in almond production?

Q. In crop year 2022-23, five almond varieties produced 85% of the total crop volume* in California. In order of % of total production, largest to lowest, list those top five varieties. Hint, one of the five is reported as a mix of two varieties.

Q. An airblast sprayer operator is moving the sprayer from one orchard spacing (Block 1; 16' x 22') to another (Block 2; 15' x 21') to continue spraying a hull split spray at 150 gallons per acre. Without changing nozzles, system pressure, or tank mixture; what does the operator need to do to maintain the same rate of pesticide delivery (gallons per acre of spray applied) in Block 2 as Block 1?

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https://surveys.ucanr.edu/survey.cfm?surveynumber=43739

Anyone answering all the questions correctly (and willing to leave their name) will be listed in the next Sac Valley almond newsletter along with what we see as the correct answers. Please challenge the quiz questions with emails to fjniederholzer@ucanr.edu or texts to (530) 218-2359.