WEST COAST NUT™

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Special Report

2026 State of the Tree Nut Industry

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WEST COAST NUT™

Award-Winning Editorial by the Industry, For the Industry

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Special Report: 2026 State of the Tree Nut Industry

California's almond, pistachio and walnut industries assess market conditions, shifting acreage and the challenges ahead in 2027.

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The People Behind the Harvest



By **JASON SCOTT** | *CEO and Publisher, West Coast Nut*



Harvest is the culmination of months of decisions, investment and work in the orchard. Behind each crop are the growers, employees and families who keep California's nut industry moving (Photo by K. Platts.)

AFTER 15 YEARS OF PUBLISHING, my respect for the people growing our food has only deepened. This industry has become personal to me. When I think about the readers of West Coast Nut, I think about the families and businesses behind the orchards and how much they have invested in getting another crop to harvest.

October brings a lot of that work into focus. You can finally see the results of decisions made months ago. At the same time, you are looking at expenses, watching what the crop will return and thinking about what comes next. Finishing one season and preparing for another tend to happen at the same time.

And anyone who has spent time around growers understands that a good crop does not automatically mean a good year.

You can make sound decisions, put in the work and still face circumstances you cannot control. The market does not price your crop according to how hard you worked. An unexpected expense does not wait for a convenient time. Yet the responsibility for keeping the operation moving still lands on your desk.

I run a business, and I know what it feels like to carry responsibility for employees and family. Farming adds another dimension to that responsibility. You make investments that take years to develop, care for land that may have been in your family for generations and make choices that the next generation may inherit. There is a lot riding on getting it right.

That deserves to be understood whenever we talk about the future of this industry.

It is easy to talk about change in broad terms. On your operation, change has a cost, a timeline and a consequence. A new practice has to fit your orchard. A piece of equipment has to justify the investment. A promising idea has to hold up when you put it to work. Those are the realities that need

“You can make sound decisions, put in the work and still face circumstances you cannot control.”

to guide what we put in these pages.

That is where West Coast Nut has a role to play. Our work is to bring useful research, knowledgeable people and practical experience closer to the decisions you are making. Whether the subject is orchard health, water management, harvest practices or the business of growing nuts, the value comes from helping you see your options more clearly.

Over these 15 years, the relationships have become the most meaningful part of this work. I value the willingness of people in this industry to share what they have learned, ask a difficult question and help a neighbor think through a problem. There is tremendous knowledge in this community. Connecting more growers with that knowledge is work worth doing.

As you assess this season, I hope you also give yourself credit for what it took to get here. The problems still needing attention can consume the whole conversation. There is also the work your crew completed, the problem you caught early and the decisions that kept your operation moving. Those things count.

Thank you for making West Coast Nut part of your business and for the relationships we have built along the way. We care about what happens in your orchards and what it means for the people behind them. As you look toward another season, we will keep putting our relationships and resources to work for you.

Jason Scott

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Planning for El Niño or Not?

Is It Hype or a Hint?

By **CECILIA PARSONS** | *Associate Editor*

WEATHER FORECASTERS HAVE BEEN issuing warnings about the threat of a strong El Niño event since early summer. This weather event is the warm phase of a natural cycle known as El Niño-Southern Oscillation that occurs every two to seven years in the tropical Pacific Ocean. Some preceding El Niño forecasts have rolled in as expected, while others have either been spot on or less than expected.

Daniel Swain with the California Institute for Water Resources writes in an August 2026 newsletter that El Niño events directly affect local climate in the countries closest to the unusually warm ocean waters. Swain stresses that even a strong El Niño forecast does not guarantee specific outcomes in California. This year's strong event, he predicted, will likely result in a strong tilt in the odds toward a wetter than average winter, particularly in the central and southern portions of the state. Peak impacts are expected by November or December and possibly lingering through March.



Wet winters can create challenges for orchard management, but excess surface water may also provide opportunities for groundwater recharge where site conditions are suitable (Photo by C. Parsons.)

"PLAN AHEAD AS ALWAYS, BUT THIS YEAR, ESPECIALLY, INCLUDE A WORST-CASE SCENARIO." — FRANZ NIEDERHOLZER, UCCE FARM ADVISOR

With that information, how should California tree nut growers prepare for this unusually wet possibility? It's not easy to plan for the future when harvest is still underway for many growers, but the extra effort could very well pay off this year.

"Plan ahead as always, but this year, especially, include a worst-case scenario," UCCE farm advisor, Colusa and Sutter/Yuba counties, Franz Niederholzer said. Taking a close look now at site drainage, erosion risk, locations where machinery and equipment can be safely parked, chemical locations and infrastructure safety can make effective action easier when a storm hits, he said. Planning for heavy storms and flooding can help growers prepare for a very wet winter. Reviewing flood insurance coverage is another preparation step to consider.

Prevention and Timing

Plans can include preventing or reducing soil erosion and standing water in orchards. Management practices including orchard sanitation, pruning and weed control can be timed prior to or around rain events. Plans to protect infrastructure including irrigation equipment should also be part of an El Niño preparation plan.

Niederholzer stressed that one of the biggest threats to orchard health is Phytophthora infection, promoted by saturated soils and standing water. These destructive soilborne water mold pathogens cause root and crown rot in almonds, walnuts and pistachios and aerial cankers in almond trees. Infection requires saturated soils from excess rain or irrigation. It can lead to tree decline, branch dieback and sudden collapse as trees begin to leaf out in spring.

"Good drainage is key to orchard health, especially in a wet winter," Niederholzer said.

Walking orchards to map where water goes or where it flows in from helps with drainage strategies. Removing debris, including sediment and excess vegetation, from drainage





Young trees need attention before winter storms: secure stakes and clear weeds, mulch and cover crop growth away from trunks. (Photo by K. Platts)

ditches can help move water out and away from the orchard. If a free-flowing drain out of the low end of the orchard isn't an option, can a sump be made and a high-volume trash pump be ready if needed?

Leaving management practices to the last minute is not advised. Early and prolonged rains can prevent or complicate critical fall and winter fieldwork, including tree planting, orchard sanitation, weed and rodent control and pruning.

Don't sleep on sanitation, even if 2026 was a year with lower worm damage compared to the last several years. Sanitation is best completed after some early rain to wet the mummy nuts but before the ground gets too soft for shakers to work. Moving equipment through orchards with wet ground leaves more ruts with standing water. Getting mummy nuts on the ground early and destroyed by March 1 will cut down on navel orangeworm pressure next year even if it turns out to be a wet winter.

Niederholzer advised getting ahead with pre-emergent herbicide applications, timing them early and applying an irrigation to move herbicides into the soil, but not ahead of a heavy storm which can push the material deeper in the soil and reduce weed control. If rain persists into spring, he said, the early application of herbicide may help growers keep from falling behind with weed control.

If pruning is needed, it should be done during a dry period with no rain in the forecast to allow pruning wounds to heal. If rain is in the forecast and pruning was recently completed, a fungicide application will help reduce fungal infections of the pruning cuts in the event of rain. Check with your PCA regarding materials and rates. Late-fall pruning should be minimal, removing heavy, unbalanced low limbs that could catch the wind and cause the young tree to lean or split under heavy wind loads.

Protect Young Trees

Young trees need extra attention. Their developing root systems lack the structural anchors of mature trees and can easily tilt or blow over in saturated, muddy soil. Stakes should be inspected and replaced if needed. Niederholzer also recommended to clear weeds, mulch and cover crop growth away from the base of the tree trunk as wet vegetation resting on young bark can extend wet bark conditions that invite Phytophthora infection. Weeds can also provide cover for field mice and voles, which can girdle and kill younger trees.

Protecting the Soil

Soil covering ahead of rain should also be considered, Niederholzer said. Cover can be in the form of mulch, including almond shells or a planted cover crop. Maintaining a low, managed cover crop or natural vegetation in the row middles can provide traction

for necessary winter equipment passes and prevent heavy rains from eroding the topsoil around shallow young root zones. Spreading almond shell along the base of berms can reduce erosion and increase infiltration in the herbicide strip. Applying shell also delivers some potassium (about 30 to 40 pounds K_2O per ton of shell) to the orchard, according to Niederholzer. Putting shell down along the tree row prior to applying preemergent herbicide may reduce weed control if the shells aren't moved by a sweeper ahead of the herbicide spray.

Recharge Opportunities

A wetter than normal year can also present an opportunity for tree nut growers to capture excess canal or stream water and flood a prepared orchard site to recharge groundwater aquifers. Depending on location and soil type, growers can work with irrigation districts or apply for rights or permits to spread excess surface water. Managed aquifer recharge is not a solution for all growers. Wendy Rash, project director for Sustainable Conservation's Water for the Future program, said managed recharge is not possible on all sites, but it can be an effective part of a broader groundwater management strategy. Sustainable Conservation has tools and resources to help growers assess whether recharge is suitable for their soils and crops.

The Recharge Readiness webinar series began Sept. 14, and a Recharge Methods manual is also available. Information and additional resources are available at GroundwaterRecharge.org.

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PUBLISHER'S TAKE

The Big Picture: What to Do Next



1 Check drainage before storms arrive
Walk orchards now to identify low spots, drainage problems and areas where water may enter or collect.

2 Get sanitation done while you can
Take advantage of workable ground conditions to get mummy nuts down and destroyed before wet weather limits equipment access.

3 Time fieldwork around rain
Plan pre-emergent herbicide applications and pruning carefully around forecast storms to protect efficacy and reduce disease risk.

4 Protect young trees
Inspect stakes and clear weeds, mulch and cover crop growth away from trunks to reduce problems associated with saturated soils and prolonged wet conditions.

5 Prepare the orchard floor
Use managed vegetation, cover crops or appropriate mulch where suitable to reduce erosion, improve winter access and protect soil during heavy rain.



SMOKE IN THE ORCHARD: The Lingering Effects of California Wildfires

By **KATHY COATNEY** | *Contributing Writer*

Orchard tree crops in California are at risk from long-term smoke exposure from megafires. Jessica Orozco, a postdoctoral fellow at Stanford, and Maciej A. Zwieniecki, a professor in the Department of Plant Sciences at UC Davis, were involved in the study Megafire Smoke Exposure Jeopardizes Tree Carbohydrate Reserves.

The study found that smoke from the 2020 megafires reduced the amount of sunlight available for photosynthesis, contributing to a significant drop in tree carbohydrate reserves.

Collecting and Analyzing Tree Samples

Zwieniecki started collecting monthly samples from various orchards in 2017 and continues to do so.

"These are the non-structural carbohydrates, meaning sugars that are being stored by trees before entering the winter, and are needed to survive the winter," Zwieniecki said.

By collecting and analyzing sugars over time, the researchers identified a seasonal pattern. Prior to dormancy in the fall, nut trees accumulate sugars and starches that provide stored energy through winter and into bloom in the spring.

The study looked at almonds, pistachios and walnuts. Obtaining reliable yield information for all three crops, however, has been challenging.

"The problem was that the quality of information regarding the yield is very low for walnuts and pistachios. Pistachios are dominated by one company that doesn't want to share data, and walnuts are dominated by small growers, and they don't want to share data either," Zwieniecki said.

He added that growers and companies are reluctant to share yield information because they compete with one another and consider the information proprietary.

Extended Smoke

After the 2020 wildfires, Zwieniecki and Orozco wondered whether the effects of smoke could be detected in orchards because the Central Valley had spent extended periods under heavy smoke. With years of data on tree

Wildfire smoke turns the sky orange in Northern California. Researchers found the effects of prolonged smoke exposure can persist after the smoke clears, with impacts potentially carrying into the following growing season (All photos by K. Coatney.)

carbohydrate levels already available, they decided to investigate whether prolonged smoke exposure had affected the orchards they had been sampling.

"It was basically a side project and more to learn how to use remote sensing in research. We weren't necessarily expecting much, but then we saw there was a huge impact on the amount of starches and sugars collected from the trees," Orozco said.

The researchers found a reduction in starches and sugars. The timing of the smoke was particularly important because exposure that coincided with the period when trees were accumulating carbohydrate reserves for dormancy had a greater impact.

"It was probably due to photosynthesis, but which aspect of photosynthesis we weren't able to determine because there were multiple factors. During that period there was a lot of ash, so it could have been the deposition on leaves, but we didn't measure that or look at that. Or it could have been something with the biochemical processes due to the pollution," Orozco said.

Impact on Trees

Smoke can potentially affect trees in several ways, from reducing available sunlight to depositing ash on leaves and interfering with stomatal function.

"There was also increased ozone content in the air at lower elevations near the ground, likely due to the fires, and those levels were unusually high. Ozone gets taken up through the stomata and triggers oxidative stress inside the leaf, which signals the stomata to close prematurely, so the trees can't photosynthesize normally," Zwieniecki said.

The researchers were unable to determine which aspect of smoke exposure was most important in reducing photosynthesis.

Yield Decline

The effects continued long after the smoke cleared. When Zwieniecki and Orozco evaluated yields the following year, they found declines ranging from 20% to 50%, depending on how close the orchards were to the fires.

"We were really surprised," Orozco said. "I mean, it's not something that's generally looked at because when we think of wildfires, usually it's measured in fire damage and acres burned, not the amount of smoke. You never really think about the smoke shadow to areas that are adjacent. And this is particularly important in the Central Valley because it is a valley, and it accumulates and deposits there." ➲



California almond orchards at harvest. Researchers studying almonds and other nut crops found prolonged smoke exposure can affect trees outside the burn area.





Almonds hang on trees as harvest approaches. Research suggests prolonged wildfire smoke can reduce photosynthesis and affect the carbohydrate reserves trees rely on through winter and into spring.

Recovery

The massive fires of 2020 and 2021 raised questions about whether repeated smoke exposure could have a cumulative effect on orchards. Zwieniecki said one of the most intriguing observations, which wasn't included in the published research, was that recovery from those fires appeared to take multiple years.

Timing and Smoke Density Matter

Not all smoke exposure has the same effect. There is evidence suggesting that light smoke can increase photosynthesis, while heavy, dense smoke can have the opposite effect.

"I think there is some point where the benefits drop off, but we don't exactly know where that is, and it's also kind of complicated because it could be the density, but also the makeup of the smoke," Orozco explained.

Light smoke can diffuse sunlight, allowing more of the tree canopy access to light. Dense smoke reduces the amount of available light and also contains more chemicals, and the composition of those chemicals depends on what is burning.

"In Willamette Valley, there is a lot of smoke related to the cyclical grass burning, which is rather short-term exposure we think," Zwieniecki said.

Prolonged fires in the mountains can leave orchards exposed to smoke for 15 to 20 days or longer. Zwieniecki and Orozco found that the timing of that exposure matters.

Smoke in May or June was less critical because new leaves still had time to photosynthesize. Smoke exposure in August and September, a more common time for prolonged wildfire smoke, had a much greater impact because it coincided with the period when trees were preparing for winter.

Grower Participation

Growers play an important role in providing samples for the ongoing research.

"We also rely on the participation of growers, so a lot of the samples are actually sent in on a monthly basis by growers. We do some sampling on our own, but it's impossible to do everything ourselves," Orozco said.

Growers send twig samples because carbohydrate levels in leaves are too variable. A leaf collected in the morning can have very different carbohydrate levels from one collected in the evening. Leaves also aren't the primary storage tissue researchers are interested in for winter survival because they are shed during dormancy.

The researchers also tried to collaborate with growers in Oregon's Willamette Valley to study the effects of smoke on hazelnuts but found it difficult to collect enough samples.

What Can Growers Do?

Unfortunately, there isn't a practical way for growers to replace the sunlight trees lose during prolonged periods of heavy smoke, Zwieniecki said.

He continues to collect samples, building the long-term data set that made it possible to identify the effects of the 2020 fires in the first place. When another significant wildfire smoke event occurs, researchers will have additional data available to investigate its impact on orchard trees.

Comments about this article? We want to hear from you. Feel free to email us at article@jcsmarketinginc.com

Heavy smoke from Northern California fires obscures the sun. Dense smoke can reduce the sunlight available for photosynthesis and may affect orchard trees in several other ways.



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Inaugural CCC Awards Recognize Leaders in *California Agriculture*

By **KRISTIN PLATTS** | *Editor*

The Crop Consultant Conference recognized four California agriculture professionals with its inaugural awards during the 2026 conference in Visalia.

Deborah Miller, founder of Deerpoint Group, received the Titan Award; Gary Osteen was named PCA of the Year; Rich Kreps was named CCA of the Year; and Dr. Elizabeth Fichtner was named Researcher of the Year.

The four recipients represent different areas of California agriculture, from crop consulting and plant nutrition to research and agricultural water management. Their work has also touched many of the issues facing California tree nut growers, including pest management, water, nutrition, orchard management and emerging disease threats.



JCS Marketing CEO Jason Scott presents Deborah Miller, founder of Deerpoint Group, with the inaugural Titan Award at the 2026 Crop Consultant Conference in Visalia. (Photo by K. Platts.)



TITAN AWARD

Deborah Miller

Founder, Deerpoint Group



Deborah Miller speaks at the 2026 Crop Consultant Conference in Visalia. (Photo by K. Platts.)

FOR DEBORAH MILLER, some of the biggest challenges facing California agriculture have also represented its greatest opportunities for innovation.

That outlook helped shape more than three decades of leadership at Deerpoint Group, the company Miller founded in 1993 to bring new chemistry, technology and service concepts to agricultural water management.

Miller's career began in science. She earned a bachelor's degree in biology and chemistry from Case Western Reserve University in 1974, graduating with honors, and later pursued graduate business studies at the University of Chicago while working full time.

After early positions in laboratory and research chemistry, Miller spent approximately 17 years with Nalco Chemical Company, advancing through scientific, manufacturing, marketing and executive management roles. Agricultural responsibilities first brought her to California in 1980, beginning what would become a career closely tied to the state's growers.

She eventually left Nalco to establish Deerpoint Group. What began in agricultural water management expanded into irrigation-water treatment, fertigation, plant nutrition, specialized fertilizer chemistry, analytical services and automation.

Asked what she is most proud of from more than three decades building the company, Miller pointed to the innovations Deerpoint brought to agriculture.

"Because it was a paradigm shift for both water treatment and fertigation, and encompassed processes and products," she said.

That innovation was often driven by constraints.

Limited water and poor water quality became opportunities to find new solutions. High fertilizer prices and limited seasonal availability created another reason to innovate. Declining grower profitability required the same response, all to help the grower increase profitability.

"Leadership became the force to always see these challenges as opportunities," Miller said, "find a solution and drive the company's focus to the goal."

Deerpoint ultimately grew to serve agricultural customers throughout California and, at its peak under the leadership of Miller and her husband and business partner, John, employed over 120 people. In 2025, a majority interest in the company was acquired by Edgewater Capital Partners as part of a succession and growth strategy.

Miller also watched the role of women in agriculture evolve throughout her career. She's seen more women move into field positions, she said, although fewer have reached executive levels of authority.

Her own approach, however, was never centered on succeeding specifically as a woman.

"I always strove to be the best at what I did, worked the hardest, and let no adversity stand in my way," Miller said.

Her advice to the next generation follows the same philosophy.

"Ignore the stereotypes society wants to place on you," she said. "Don't expect or want any concessions for your gender or race, just be the best and stay focused on your goals."

As Miller moves into the next chapter of her career, she said she knows Deerpoint will continue growing into a national and global leader in the innovations she and John developed. As for her own legacy, she hopes to be remembered for her dedication to the company and for the honesty and integrity that helped it grow. ➲





PCA OF THE YEAR

Gary Osteen

PCA, San Joaquin Valley



CCA OF THE YEAR

Rich Kreps

President, Ultra Gro

JCS Marketing CEO Jason Scott presents Gary Osteen with the PCA of the Year award at the 2026 Crop Consultant Conference in Visalia. (Photo by K. Platts.)

AFTER MORE THAN 45 YEARS as a PCA, Gary Osteen still considers field scouting one of the most important parts of the job.

"A good PCA first off has to be a good field scout," Osteen said. "And if you don't do that, you're not doing your job right."

Osteen earned his bachelor's degree in plant science agronomy with an emphasis in plant protection from Fresno State before continuing his education in plant protection and pest management at UC Davis. He started his career working in crops including cotton, alfalfa and grains. As cropping patterns in the San Joaquin Valley changed, much of his work shifted into permanent crops, particularly almonds and pistachios.

Today, Osteen works with more than 45 growers across the San Joaquin Valley. Some of those relationships have lasted more than 35 years, including one approaching 40.

"That has been very gratifying," he said.

Osteen has also watched pest pressure change over the course of his career. In almonds, pests such as leaffooted plant bug and green stink bug have become more prominent, while mealybugs have become a greater concern in pistachios and grapes.

Changes in crops, pest complexes and available products mean PCAs have to continue learning, he said. Osteen regularly follows university research and changes in pesticides, resistance, monitoring and pest biology.

For younger PCAs, however, he said the foundation still starts with knowing how to scout a field.

"Number one, you have got to learn how to check a field, determine whether it's got a problem, what that problem is, what the population dynamics are, what's the best products for you to use, and that's constantly changing," he said.

Osteen has also worked extensively in forensic agronomy on cases involving pesticide drift, crop losses and PCA standard of care.

At 70, he has no immediate plans to retire. And while receiving the PCA of the Year award after more than four decades in the industry is gratifying, Osteen said much of his satisfaction still comes from helping growers produce quality crops, maintain yields and control costs.

"I love my job," Osteen said. "That's why I haven't retired."

RICH KREPS took a bit of an unconventional route into plant nutrition.

The Ultra Gro president initially studied pre-med and chemistry at UC Santa Barbara before moving into human nutrition, entrepreneurship and business. His career included restaurant ownership, personal training and sports nutrition counseling before he moved from human nutrition into plant nutrition about 15 years ago. He recently completed his MBA in 2026.

Kreps said one of his proudest accomplishments has been helping build Ultra Gro around healthy soils and regenerative and sustainable farming practices before those terms became as common in agriculture as they are today.

"More effectively combining nutrients with complexors and actively brewed beneficial biology has been a fun journey to stay at the forefront of with Ultra Gro," he said.



JCS Marketing CEO Jason Scott presents Rich Kreps, president of Ultra Gro, with the CCA of the Year award at the 2026 Crop Consultant Conference in Visalia. (Photo by K. Platts.)



RESEARCHER OF THE YEAR

Dr. Elizabeth Fichtner

UCCE Tulare County orchard systems advisor



JCS Marketing CEO Jason Scott presents Dr. Elizabeth Fichtner, UCCE Tulare County orchard systems advisor, with the Researcher of the Year award at the 2026 Crop Consultant Conference in Visalia. (Photo by K. Platts.)

Pistachio nutrition is one of Kreps' current areas of focus. He believes more research is needed on nutrient synchronization, particularly when individual nutrients are needed to match tree demand and physiological patterns. Better monitoring and artificial intelligence could help answer some of those questions, he said.

That work also connects to one of Kreps' longtime influences, retired UCCE farm advisor Bob Beede.

"I told Bob Beede 15 years ago that I would be the pistachio nutrient guy in 10 years for this industry," Kreps said.

Beede joked that he would be retired by then. Kreps pointed out that Beede continues to work with growers and contribute to the industry today, something Kreps hopes to do throughout his own career.

Kreps expects AI, automation, soil health and more efficient irrigation management to play larger roles in agriculture. He also believes the industry has to remain willing to question established practices.

"We have to continually question the efficacy of old practices and embrace new technology," he said.

His advice to the next generation is simple.

"Never stop learning," he said.

DR. ELIZABETH FICHTNER has spent much of her career working on research that benefits California orchards.

Fichtner has served as a UCCE Tulare County orchard systems advisor since 2009. Her research and extension program focuses on the productivity and economic sustainability of nut crops, olives and prunes, with work in plant pathology, orchard management and horticulture.

One of her current research areas is a growing concern for almond growers in the southern San Joaquin Valley: *Ganoderma adspersum*, a fungal pathogen associated with internal wood decay and tree mortality.

Affected trees can appear healthy and continue setting a crop before snapping at the base because of internal decay. There are currently no palliative or curative treatments, and Fichtner said the disease could eventually reduce the economic lifespan of affected orchards as it becomes established in the region.

Fichtner's research has also included work outside of California. During her postdoctoral research in the United Kingdom, she studied forest diseases and found invasive pathogens could survive and reproduce in asymptomatic root infections, identifying a potential pathway for pathogens to move through international nursery plant trade.

In California, she has worked with researchers including professor of Cooperative Extension, Dr. Bruce Lampinen on alternative pruning strategies in walnuts and pistachios aimed at maintaining production while reducing management costs. Her work has also included walnut rootstocks, pistachio and almond disease issues and other questions related to orchard productivity.

Fichtner is also incorporating new technology into her research. Two of her current projects include weather-based risk models for olive fruit fly and an app to evaluate fruit-size distribution in table olive samples.

When asked what she hopes will remain from her career, Fichtner pointed to one of the more traditional parts of extension work.

"My favorite part of my job is the composition of written extension materials," she said.

She hopes those science-based resources will continue to be useful to growers and PCAs long after she retires.

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New Approach to NOW Control Takes a Genetic Route

By **CECILIA PARSONS** | *Associate Editor*



"Because our insects are not subjected to irradiation or associated handling, they retain more of their natural fitness than irradiated insects." *— Neil Morrison, Flyttr*

New biological approaches to navel orangeworm management are being developed for California almond and pistachio orchards, but current best practices remain an important part of NOW management (Photo courtesy of Eryn Wingate.)

NAVEL ORANGEWORM CONTROL IS TAKING A NEW DIRECTION. Biotechnology company Flyttr has announced a multi-year program to develop a genetically sterile male navel orangeworm that could be used to control NOW populations in California tree nut orchards. Unlike the Sterile Insect Technique program currently underway, this UK and Virginia-based company will not use radiation to sterilize the male NOW. The program focuses on developing an implementation-ready "Friendly" navel orangeworm product they say can integrate into and dramatically improve established pest management systems. Flyttr is a global biosecurity and sustainable pest management platform formerly known as Oxitec.

Neil Morrison, chief strategy officer at Flyttr, said the focus is producing a robust, competitive male NOW.

"Because our insects are not subjected to irradiation or associated handling, they retain more of their natural fitness than irradiated insects," Morrison said. Confirming their performance in California orchards in field trials is part of the process.

Believing that the irradiation used in the ongoing Sterile Insect Technique program to sterilize male NOW is affecting the ability of the males to disperse and mate with wild NOW females when released over an orchard site, this effort is focused on a "Friendly" male navel orangeworm biologically engineered to achieve the same end result through a small, precise change in the insect's genetics rather than radiation. Flyttr confirmed the process does not use CRISPR technology.

Release and deployment of the sterile males are part of the program. Morrison said those actions will be designed in close consultation with growers and other industry partners so they fit established pest management systems and operational realities of almond and pistachio orchards. The number of sterilized males needed to overflood wild NOW moths in orchards has not been determined. Morrison said they expect the male-only releases and the higher fitness of those will reduce NOW numbers relative to conventional sterile insect approaches.

No Word on Costs

Morrison said it is still too early to put a figure on grower costs. The aim, he said, is to deliver suppression that conventional tools cannot achieve at farm scale and over large landscapes, cost-effectively and in a form that fits the needs of the industry.

Flyttr reports that its process has two advantages: it enables male-only releases, which are more cost-effective and due to the change in genetics, irradiation and subsequent handling are avoided. The company says its genetically engineered male moths could be more competitive



New approaches to navel orangeworm control are being explored as the industry looks to expand the tools available for managing one of California tree nuts' most costly pests (Photo courtesy of UC IPM.)

and effective after release. Field trials in California almond and pistachio orchards will evaluate their performance. "The male-only releases and the higher fitness of our insects are both designed to reduce the numbers required relative to conventional sterile-insect approaches," Morrison said. "We are in the early stages of a multiyear program. Over its course we will develop and validate the product, the large-scale production systems and the deployment and manufacturing infrastructure needed to bring it to growers," he added.

Both the Almond Board of California and the California Pistachio Research Board have invested in UC efforts to control NOW with the Sterile Insect Technique, rearing and sterilizing male moths and releasing them in orchards to mate with wild moths and control numbers in orchards. The number of moths released to affect NOW populations, marking and monitoring have been parts of the program. UC Extension Specialist Houston Wilson, in a report to CPRB in 2025, said work continues to improve production, handling, transport and release of sterile moths. Alternative strategies for rearing and sterilizing the moths are also being explored to produce a more competitive moth.

Lauren Fann, IPM manager at the Almond Board of California, noted the board has a long history of investing in innovative, science-based alternatives to traditional pest control methods and has invested in sterile insect technology to manage navel orangeworm for several years.

ABC Support

"The board's support of sterile insect technology is part of that ongoing commitment to providing growers with more tools in the toolbox to manage navel orangeworm. By continuing to explore and invest in new approaches, we can help growers build effective, sustainable pest management programs for the future," Fann said.

The Foundation for Food and Agriculture Research, the Almond Board of California and Flyttr partnered on a nearly $5 million grant to advance the development of a biological approach targeting navel orangeworm in almonds and pistachios. ABC is helping fund a portion of the project as part of a broader commitment to support practical, science-based solutions. Funding from FFAR and industry partners will support work needed to move the technology closer to practical use, including large-scale production systems and field studies. FFAR was established in the 2014 Farm Bill. USDA is listed on its website as a major source of funding.

The Almond Board of California notes that the significance of this new technology is not that it replaces today's best practices. Sanitation, monitoring, mating disruption, timely harvest and well-timed treatments remain important parts of navel orangeworm management. Instead, this research is focused on developing a targeted biological tool that could complement existing programs and help reduce reliance on conventional insecticides over time. It represents an important step toward expanding the number of durable tools available to growers managing navel orangeworm pressure.

Navel orangeworm remains one of the costliest pests facing California tree nuts, with industry losses estimated at more than $800 million each year. Damage can affect yield, quality and food safety, which is why the pest continues to be a priority for research, industry collaboration and new technology development.

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The Consultant's Take: Micronutrient Management Starts in the Root Zone

By **RICH KREPS** | *CCA, SSp*

Boron needs separate management from iron and zinc because the margin between deficiency and excess is narrow. (Photo courtesy of Louise Ferguson.)

WHEN IRON, ZINC OR BORON problems show up in tree crops, it is tempting to start with a simple question: how much nutrient did we apply? In high-pH soils, that is rarely the whole story. A better question is whether the nutrient stayed available long enough for the tree to use it. Many orchard soils contain measurable amounts of micronutrients, yet crop response can still be limited because alkaline conditions change those nutrients into forms roots cannot easily take up. That is especially true for iron and zinc. Boron behaves differently, but it still requires careful management because the safe range between deficiency and excess can be narrow. For growers and advisers, the starting point for better micronutrient efficiency is not just the fertilizer program. It is the chemistry of the root zone.

This discussion moves from root-zone chemistry to three practical micronutrient challenges: iron, zinc and boron. Iron and zinc are emphasized because high pH and bicarbonate can reduce availability; boron is treated separately because its safe range is narrow. It's not a coincidence boron rhymes with moron. We know pistachios are boron pigs, but putting "more on" is not always the answer. Almonds carry boron with a higher sorbitol production. Pistachios and walnuts don't make as much sorbitol and have issues moving it.



"FROM THE TREE'S POINT OF VIEW, THAT NUTRIENT MAY AS WELL BE LOCKED BEHIND A DOOR."

— RICH KREPS, CCA

Start With Root-Zone Chemistry

High-pH soils make micronutrient management tricky because they change the form nutrients take in the soil. Iron and zinc are most useful to the plant when they are dissolved in the soil solution near active roots. As pH rises, those nutrients are less likely to stay dissolved. They can become tied up with carbonates, hydroxides, clay particles or organic matter. From the tree's point of view, that nutrient may as well be locked behind a door. It is present in the block, but not available at the time and place the crop needs it.

Irrigation-water bicarbonate adds another layer to the problem. Bicarbonate contributes alkalinity, which is the water's ability to neutralize acidity and resist pH change. That distinction matters. A water sample can tell you the pH on the day it is tested, but alkalinity helps explain what that water will do repeatedly in the root zone over a season. When bicarbonate-rich water is applied again and again, it can push the wetted soil volume toward more alkaline conditions. In drip- and micro-sprinkler-irrigated orchards, that zone is exactly where fertilizer, salts and feeder roots are concentrated.

That is why "more fertilizer" is not





In high-pH orchards, micronutrient management starts with understanding conditions in the wetted root zone, including pH, bicarbonate and root activity (Photo by C. Parsons.)

always an efficient fix. If the chemistry around the root encourages iron or zinc to precipitate or become fixed, a higher rate may simply create more unavailable nutrient. A better approach starts with a few practical checks: soil pH, irrigation-water bicarbonate and alkalinity, carbonate pressure in the root zone, where active roots are located, and when the tree is actually demanding the nutrient. In high-pH systems, the most useful question is often not "What are we short on?" but "What is keeping this nutrient from getting into the tree?"

Iron: Availability, Not Just Supply

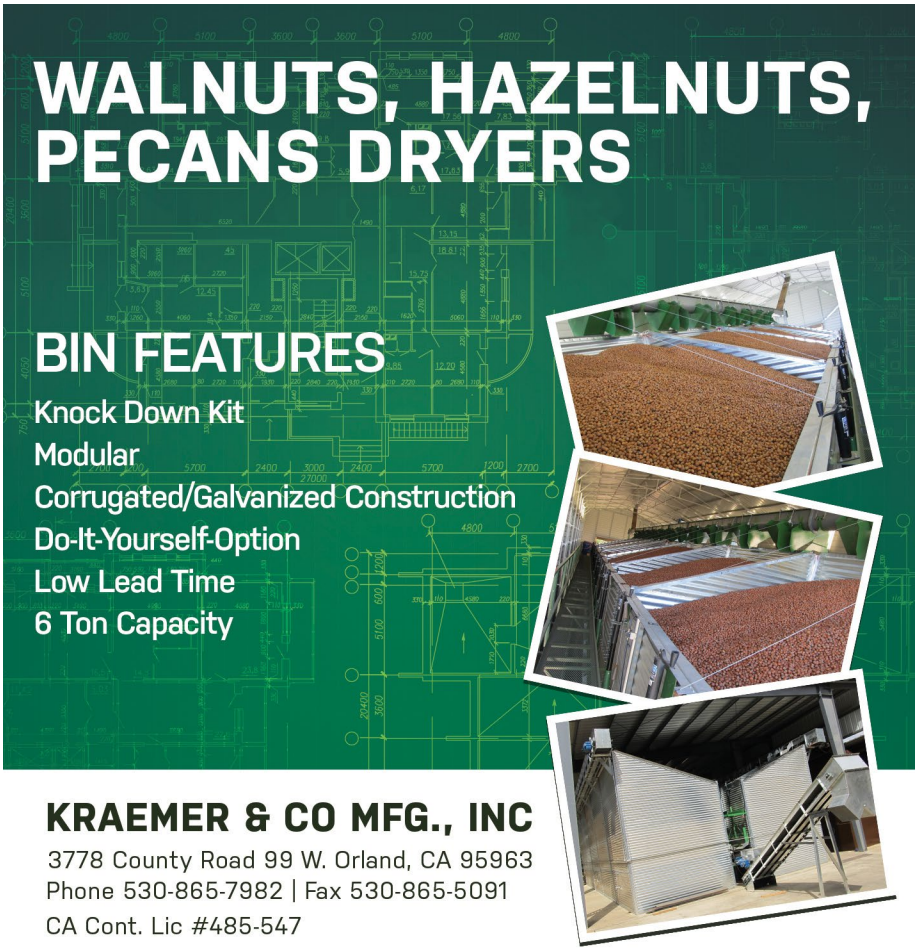
In high-pH orchards, iron deficiency is often a chemistry problem, not a supply problem. Total soil iron may be adequate, but alkaline conditions can shift it into poorly soluble forms. The common result is interveinal chlorosis on young leaves, with yellow tissue between greener veins.

Because iron moves poorly inside the plant, symptoms often appear first in new growth and may not correct quickly. Management should focus on keeping iron soluble near active roots by addressing pH, bicarbonate pressure, drainage, root health and product form. In difficult alkaline soils, stable chelated iron sources may help when placed where roots can use them.

Zinc: Focus on Timing and Placement

Zinc shows this clearly. As soil pH goes up, soluble zinc can drop quickly. In an alkaline orchard soil, zinc may attach to carbonates and soil surfaces or move into forms that roots cannot easily absorb. The result is a frustrating but common situation: a soil report may show zinc is present, while the tree still behaves as if zinc is in short supply. The issue is not always the size of the zinc bank. Often, it is the tree's access to that bank. Tissue tests that aren't rinsed with acid first can show adequate zinc levels that aren't actually being utilized by the plant. Ask for them to be rinsed with acid first to ensure the most accurate numbers.

Spring is when this limitation often becomes most visible. New shoots and expanding leaves have a strong demand for zinc, but root activity may still be



limited by cool soils, wet conditions or restricted root health. Symptoms can include small, narrow leaves, shortened internodes, delayed leaf-out and rosetted shoot tips. By the time those symptoms are easy to see from the orchard floor, however, the crop may already have lost some productive potential. That is why tissue testing, block history and an understanding of pH and bicarbonate conditions are more reliable than waiting for the canopy to tell the whole story.

Efficient zinc programs are built around timing and placement, not just pounds applied. Soil-applied zinc can be useful in some situations, but performance is often limited where high pH and bicarbonate-driven alkalinity tie up the nutrient quickly. Chelated materials may improve availability when conditions justify the cost and when they are placed where active roots can use them. Foliar applications can also help bypass root-zone constraints, especially when timed to active leaf uptake and early-season growth. The goal is simple: get enough zinc into the tissues that are building leaves, buds and crop load. In high-pH orchards, that usually requires managing chemistry first and fertilizer rate second.

Boron: A Narrow Margin

Boron behaves differently from iron and zinc, so it needs separate management. Availability is affected by irrigation, soil texture, organic matter and root activity, but precision is the main issue. Tree crops need boron for reproductive growth, pollen function, fruit set and shoot development, yet the margin between deficiency and excess is narrow.

Testing and timing are therefore critical. Boron decisions should rely on tissue analysis, block history and symptoms, not routine application alone. When boron is needed, rates should be conservative and matched to crop stage, irrigation pattern and soil conditions to correct deficiency without creating toxicity risk.

Management Takeaways:

- Diagnose the root zone before raising rates; pH, bicarbonate, alkalinity and root activity often explain weak response.
- Match the strategy to the nutrient: iron and zinc need availability-focused placement or foliar support, while boron needs careful rate control.
- Use tissue testing, block history and timing to act before symptoms reduce growth, fruit set or yield potential.

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KEENAN FARMS Looks to the Next 50 Years

By **LORI FAIRCHILD** | *Contributing Writer*



Keenan Farms' processing facility sits amid Central Valley agricultural land. Water security is a major focus for the family as it plans for future generations, with marketing manager Elizabeth Keenan Schuh saying the company's goal is to continue farming for at least another 50 years. (All photos courtesy of Keenan Farms.)

Keenan Farms began when Charles Keenan swapped an apartment building for a vineyard and 100 acres of newly planted pistachio trees. Today, the company manages just under 1,000 acres of its own and works with numerous growers to fulfill the needs of its customers.

Despite spending some time in the Bay Area and in Southern California, Elizabeth Keenan Schuh always knew she wanted to come back to the family business where she now serves as marketing manager for the company. Her brother is the vice president, focusing on export sales, overall business strategy and production, while her mom and dad continue in leadership roles in the company, as well.

We asked Schuh to share with us her family's story and her thoughts on the nut industry:

Tell us a little bit about your family history in the nut industry.

My grandpa, Charles Keenan, was in the real estate business in the Bay Area. In the '70s, he found a great opportunity to trade an apartment building for some acreage

in Modesto, which was grapes at the time. Basically, it was a straight swap: a building for a vineyard. There wasn't enough equity in the deal, they needed to sweeten it just a little bit to make it apples to apples, so the sellers threw in 100 acres of newly planted pistachio trees in Kettleman City, California. That's how we acquired the land to grow Keenan Farms.

My grandparents moved from Palo Alto to Kettleman City. They developed the pistachios and grew over time, and as they were approaching 1976, which was our first commercial harvest, they saw a need for a processing facility. They started with a potato peeler and a coffee roaster to get the hull off of the pistachios, and then dry them out and roast them enough so that they're edible.

That's obviously not a super sustainable system because it can handle 500 pounds, which was our first harvest, but it's not going to handle a couple million pounds. So they, in tandem with a couple other processors in the industry, started developing better systems.

Large-scale commercial farming for pistachios didn't really develop until the '70s and '80s. My grandpa was pretty instrumental in pioneering the systems for how we process and how we harvest. Now, we have a massive facility with two separate hulling plants, and we have all kinds of great technology to make sure we're optimizing our farming production.



Elizabeth Keenan Schuh serves as marketing manager for Keenan Farms, the family business her grandfather helped establish in the 1970s. Schuh returned to the pistachio industry after working in marketing and quality assurance.

Elevate Your Pistachios with Keenan Farms

Here are just a few reasons why partnering with Keenan Farms can help maximize your value:

- **Consistently High Returns:** We have proven competitive grower returns year over year.
- **Capacity and Technology:** We have invested in expanding our capacity by over 50% with room for more growth, prioritizing quick turnaround times.
- **Customer Base:** Our quality is the standard-bearer of the entire U.S. pistachio industry. Global buyers prefer pistachios from Keenan Farms.
- **Communication and Transparency:** For 50+ years, we have kept our growers' best interests in mind, demonstrated through quick and honest communication.



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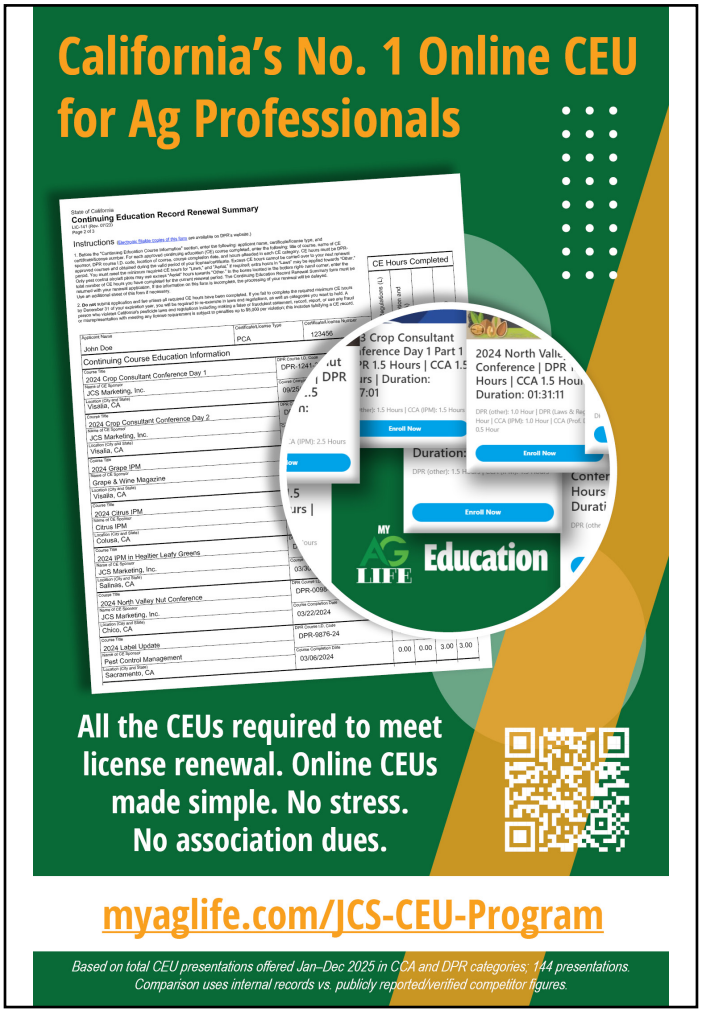
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Zack Raven, Grower Relations Manager





Keenan Farms has grown from processing its first pistachio crop with a potato peeler and coffee roaster to operating a large-scale facility with modern processing technology. The company continues to invest in efficiency and automation as labor and production costs rise.



What is your story in farming?

I grew up in Lemoore, California, on my parents’ property. We had 27 acres of pistachios out in Lemoore. My brother and I grew up there.

We always had it in the back of our minds that, of course, we’re going to come back to the pistachio farm one day, but I opted to go back to the Bay and spend some time up there, especially for college. I went to Santa Clara University. I got to get the picture of what Bay Area living is like. It’s cool, but I like a little more space. I majored in English. I thought about pursuing the law track, but it just didn’t make sense for my life. I love to travel, I love to be outside, I love agriculture and gardening, so why would I want to be stuck in a law library?

I got further into marketing, which English has actually been incredible for. I moved to Southern California for a few years to just double-check. I knew California was home, but I just wanted to double-check I’m where I’m supposed to be.

I worked in marketing for a quality assurance business, so I got to learn about quality, which I was kind of strategic about, too. Quality has become a hot-button topic for the pistachio industry, especially as regulations kick up globally, but I got to learn about quality processes in quality-critical industries, so aerospace, pharmaceuticals. Everything that’s kind of life or death. Of course, ag, we want to be food-safe, but there’s a little less high-stress pressure in this.

How has growing nuts changed over the years?

It truly started out with a few businesses with up to 100 acres like us, just grassroots figuring out how things work. We’ve evolved a lot from the potato peeler and coffee roaster to massive, multimillion-dollar production facilities with so

many different processes and so much new technology.

That collaboration between engineering and innovation and finding its niche in ag, specifically pistachios, has been so cool. Seeing how we develop different systems used by older products or bigger crops, modifying them to suit the very niche, specific needs that pistachios have.

The micromanagement of our full supply chain is incredible, just the lot tracking and the keeping up with so many different customer needs. Back in the day, it used to be:

"I'd like some in-shell pistachios, can you ship them to Germany."

"Yep, sure can. Let's go."

Now, there's labeling requirements, there's so many different certifications and tests and compliance paperwork that needs to be dealt with and really developing and educating customers on the best way to handle pistachios, the best way to market them, the best way to streamline whatever processes they are thinking about as pistachios enter a new market. It's been really interesting and fun to keep up with.

What would you say are the biggest challenges facing the industry today?

The vast majority of U.S. pistachios are grown in California, and we have the perfect climate for it, which is incredible.

The only real complication with growing here is regulation on farmers, which has been huge in recent years, and California makes it pretty tricky to be a business, especially a small business. There's some regulatory issues that we consistently face, including cost of labor, minimum wages going up.

It's very expensive to hire people and manage people. Water security is huge. We have drought seasons and lower snowpack than we'd like to have in our mountains, but there's also very strict regulation on our water usage. SGMA has been a huge issue.

That makes it pretty complicated for us to supply our plant, let alone our trees, with water. Just to process the pistachios takes water.

The state doesn't make it easy to manage all of that, but, despite that, farmers are pretty resilient. We've been here for almost 55 years, and we have zero plans to move anytime soon. It's such a huge part of California's economy and we love what we do so much that we'll take on any challenge that anybody throws our way, including our state.

Pistachios became really popular and plantings went up quickly. Are you starting to see the effects of all that product coming to the market?

We had fears that there would be more inventory than there is demand. I think between state regulations and between complicated growing regions where people planted and didn't find much success, we've started to regulate ourselves a little bit more.

We're going to see more and more acreage come online, but we're also seeing some acreage be removed or just people are done farming it. Water's expensive, labor's expensive. In some growing regions, there's very alkaline soil, or acidic soil, or just other complications like no water that have taken those acres out of production.

Global demand has matched our inventory pretty well. There's actually maybe a little bit more global demand than we have supply for. That's all comforting.

Talk a little bit about how Keenan Farms manages labor and water.

Labor is tricky. California minimum wage is going up … and it's just been increasing over time.

We have a very efficient plant and very efficient systems, so that helps minimize the amount of labor we need, and as we grow, we haven't needed to increase our workforce too much. Our biggest way to save on labor costs is some automation, but mostly being a good place to work. Reducing employee turnover, finding highly skilled people, trusting them, and building a partnership with them. That's huge. That's the story to our success.

As we grow, our employees are skilled, they can keep up with it, and we have good systems, good technology to make sure our employees are able to be as efficient and have everything that they need to keep it moving.

And then water. We pay close attention to our water district. Westlands is the district we're in. We have good relationships with them. We stay on top of our information.

We've purchased fallow land in the last couple of years. We have bought land that we do not farm just for the water rights. Our plant is secure, our farm is secure. We have the water we need to operate what we operate, but that's not the same case with everyone in our industry.

We're not trying to grow or exceed what we can handle. We grow to match the industry, and we're very long-term minded. Our goal is to farm at least another 50 years. Let's see if we can get a couple hundred out of it, but we want to make it into multiple new generations of Keenan farmers. We want to make sure that future's there for us.

What does the industry need to do to be on the best possible path for the future?

I think growing pistachios that are at the most premium quality we possibly can is our differentiator. Being consistent and having high quality globally is important. We produce a lot of pistachios, but they have to be good quality.

> ***"We've been here for almost 55 years, and we have zero plans to move anytime soon."***
>
> *— Elizabeth Keenan Schuh*



Keenan Farms manages just under 1,000 acres of its own and works with numerous growers to meet customer needs. The family has been growing pistachios since Charles Keenan acquired 100 acres of newly planted trees in the 1970s.

We need to be very mindful of food safety, high-quality farming practices, and very diligent processing. I think that stability and security we can provide ourselves is an industry-wide collaboration.

As new technologies are developed, as new systems for managing your supply chain are developed, we all have to take it upon ourselves to invest in our farms, and invest in our processing, and make sure that quality is our top priority.

How do you reinvest in your community?

Making sure our community is taken care of is a big initiative that I handle. We partner with quite a few different organizations throughout the Central Valley community, including our hospital systems. We make sure that they get donations and we're participating in their activities.

Foster care has become a huge concern of ours. In the Central Valley, we have so many successful businesses and so many successful people, but there's also poverty, and California's expensive. The foster care network has become an incredible resource for our community.

And food security is another huge issue. We grow so much food in California, and California still has food deserts. We make sure our local food banks are supplied, not only with pistachios but with donations, not just during the holidays but throughout the entire year. That's very important for us.

And we all have a soft spot in our hearts for animals. Everyone in my family has rescued a dog off the streets. Just being in a rural town, people drop off their pets, and it's heartbreaking, but we work with a few different dog rescues in the area to make sure even the four-legged animals and members of our community are taken care of.

The community has supported us for over 50 years, and we're just happy to be able to put back whatever we can. Youth sports and youth 4-H projects, those are huge. We just try to spread the love pretty thoroughly. Everybody can always use a case of pistachios for a fundraiser or whatever, and we love to support where we can.

My parents started a scholarship at our local community college, which is incredible, so we're very proud of that.

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2026 STATE OF THE TREE NUT INDUSTRY

PISTACHIOS

Short Crop Comes Ahead of More Production

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ALMONDS

Fewer Acres, Higher Costs and a Push for Demand

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WALNUTS

Smaller Crop Brings Hope for Better Returns

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Three Crops, Three Different Outlooks

California's almond, pistachio and walnut industries assess market conditions, shifting acreage and the challenges ahead in 2027.

By **KRISTIN PLATTS** | *Editor*

ALMONDS, PISTACHIOS AND WALNUTS aren't entering 2027 from the same place.

California's three major tree nut crops have each faced a different set of circumstances over the past several years. Almond and walnut growers have removed acreage following years of difficult returns, while pistachio acreage continues to expand as more young orchards come into production.

Still, growers across all three crops are dealing with many of the same pressures. Rising production costs, water availability and global competition continue to affect profitability, while each industry looks for opportunities to build demand at home and abroad.

For *West Coast Nut's* 2026 State of the Tree Nut Industry, processors and industry leaders across almonds, pistachios and walnuts shared what they're seeing now, where they see opportunities and what growers should be watching as they plan for 2027 and beyond.

2026 OUTLOOK SCORECARD

Where California's three major tree nut crops stand heading into 2027, as reported by the growers, marketers and industry leaders interviewed for this report.

PISTACHIOS

650M lb

Expected 2026 crop, down from a record 1.6 billion lb in 2025

DEMAND

Growing for kernels, in China and Europe, and in new uses like Dubai chocolate

PRESSURES

Water, labor, inflation, input costs and processing capacity

WATCH IN 2027

Your processor's capacity, and the quality of your crop

ALMONDS

2.7B lb

USDA forecast for the 2026 crop, down 1% from 2025

DEMAND

India is the top opportunity; 80%+ of ABC's budget supports global demand

PRESSURES

Fuel and fertilizer costs; neglected and abandoned orchards

WATCH IN 2027

"Know your cost of production" and spend the right dollar

WALNUTS

680,000 t

USDA 2026 estimate, down 16% from 809,000 tons in 2025

DEMAND

The record 2025 crop sold out; exports are about 65% of shipments

PRESSURES

Production costs; competition from China and Chile

WATCH IN 2027

Quality is being rewarded with better pricing

Figures as reported by Wonderful Pistachios, Blue Diamond Growers, the Almond Board of California, the California Walnut Board, USDA and USDA NASS (2026 almond forecast, May 2026). Summaries condense the reporting in this section.



Pistachio growers are coming off a significantly smaller crop in 2026, and Wonderful Pistachios' Andy Anzaldo is estimating production at about 650 million pounds, compared with a record 1.6 billion pounds in 2025.

PISTACHIOS

Short Crop Comes Ahead of More Production

650M lb
Expected 2026 California crop
Source: Andy Anzaldo, Wonderful Pistachios

1.6B lb
Record 2025 crop

520,000
Bearing acres, plus 100,000 not yet bearing

CALIFORNIA PISTACHIO GROWERS ARE coming off an unusually small crop in 2026, but the longer-term outlook is still one of growth.

The industry currently has about 520,000 bearing acres, with another 100,000 acres planted but not yet bearing, according to Andy Anzaldo, senior vice president of grower relations at Wonderful Pistachios. Anzaldo expects the 2026 harvest to total about 650 million pounds, down from a record 1.6-billion-pound crop the previous year.

"Our supply has dropped almost two-thirds in a year," Anzaldo said.

American Pistachio Growers (APG) CEO Mike Forbes also identified managing the smaller crop as the industry's most immediate challenge.

"The biggest challenge is creating a bridge to the 2027 harvest," Forbes said. Current crop data, he noted, has continued to support expectations for a much smaller crop than 2025, making inventory management an important issue in the months ahead.

Anzaldo said an important part of that bridge will be making sure established customers continue to have access to pistachios during the short crop.

"The key for us heading into 2027 is ensuring those key buyers in the markets of China, Europe and domestic all have some supply for this year because we're going to need them going into 2027," he said.

At the same time, more pistachio production is coming. Anzaldo said he expects another 300 million pounds of production by the end of the decade.

Forbes said growing demand will depend in part on continuing to connect pistachios with consumer interest in protein, fiber and simple foods. APG emphasized those attributes in its 2026 marketing and plans to continue doing so.

Forbes also sees an opportunity for growth in kernels as consumers look for more convenient snack options.

"I am excited about the growth of the kernel market," Forbes said. "Consumers around the world are becoming strapped for time and on-the-go snacking is on the rise."

Anzaldo pointed to China and Europe as important international markets for California pistachios. Domestically, he said no-shell products have continued to grow, while new flavors and uses for pistachios as an ingredient are reaching more consum-

ers. Wonderful's No Shells flavors have outpaced category growth threefold since launching in 2019, according to the company.

One recent example is the Dubai chocolate trend. Wonderful entered the confectionery category in 2025 with Chocolate Sea Salt and Chocolate Toffee pistachios and added Dubai chocolate-covered pistachios in 2026. Anzaldo said consumer response has exceeded expectations. American Pistachio Growers also first highlighted the trend at its 2025 annual conference, where attendees sampled the popular Dubai chocolate bar featuring pistachio cream and knafeh, a traditional Middle Eastern shredded phyllo dessert.

Those new uses also make maintaining supply important during a short crop, particularly for companies that have developed products using pistachios as an ingredient.

"When your product's an ingredient and in years like this where we have really a disaster crop, we have to ensure those customers that have invested in pistachios, they get the supply," Anzaldo said.

Capacity and Quality

More production will also require enough processing capacity to handle larger crops.

Anzaldo said the pistachio industry has doubled in size over the past decade, while inflation, interest rates and labor costs have made it more difficult to build additional capacity. For growers, he said choosing a processor capable of handling larger crops will become increasingly important.

Without enough processing capacity, quality can suffer or nuts could be left on trees. Anzaldo said maintaining quality starts in the orchard, with good soil and water and effective pest and disease management. Wonderful works with more than 1,000 grower partners, sharing farming practices to help improve quality.

"Number one, it's always focus on quality, and then focus on a relationship with your processor," Anzaldo said.

Costs and Water Remain Concerns

Pistachios may be expanding, but growers are dealing with a lot of the same challenges facing the rest of California agriculture.

Anzaldo pointed to water availability, labor, inflation and higher input costs among the pressures growers are facing. Weather was also a contributing factor to the difficult 2026 crop, with heat during bloom affecting production.

Forbes also identified water availability and increasing production costs as concerns for growers in the years ahead. While pistachios can have advantages when it comes to water use, he said growers remain sensitive to reduced availability and rising costs. He added that APG plans to become more active in helping its members navigate those challenges.

Those costs also affect California's ability to compete with pistachio-producing countries around the world.



Dubai chocolate featuring pistachio filling was sampled at the 2025 American Pistachio Growers Annual Conference, highlighting growing interest in new uses for pistachios.

"We must be cost competitive to remain relevant on the global stage, or other countries can begin to chip away at our market share," Forbes said.

For now, the industry has to make it through a short crop while keeping the customers it will need when production increases again. Anzaldo expects supply to rebound in 2027 and said another record crop could be ahead.

With thousands of additional acres still coming into production, maintaining demand, quality and enough processing capacity will be important as California's pistachio industry continues to grow.

"Number one, it's always focus on quality, and then focus on a relationship with your processor."

— **ANDY ANZALDO**, Wonderful Pistachios





Almonds lie in a windrow awaiting pickup during harvest. California almond growers continue to face high production costs as the industry adjusts to changing acreage and market conditions.

ALMONDS

Fewer Acres, Higher Costs and a Push for Demand

2.7B lb
USDA forecast for the 2026 crop, down 1%

80%+
Of the Almond Board's budget supports global demand

2014
Year the rapid acreage expansion began

Sources: USDA NASS 2026 forecast (May 2026); Clarice Turner, Almond Board of California; Mel Machado, Blue Diamond Growers

CALIFORNIA'S ALMOND INDUSTRY continues to adjust after several years of difficult grower returns, with acreage declining and production costs remaining high. Although prices have improved, growers are still working to recover from previous losses.

Mel Machado, chief agricultural officer at Blue Diamond Growers, said acreage removals are moving the industry toward a better balance between supply and demand. But he's still troubled about orchards that remain standing despite receiving little or no care.

"My concern is not so much the acreage that's been removed, it's the acreage that's still standing that has been neglected," Machado said.

Some of those orchards have gone unharvested for multiple seasons, making it hard to determine how much of California's reported bearing acreage is actually producing a commercial crop.

Machado said neglected and abandoned orchards also create problems for neighboring growers, particularly when it comes to navel orangeworm and disease pressure.

The industry has seen younger orchards removed as well, he said, including some planted during the rapid expansion of almond acreage that began around 2014. In some cases, growers who have been unable to afford the costs of maintaining an orchard can't afford to remove them either.

"If you can't afford to farm it, you can't afford to make it go away," Machado said.

Machado said the geography of almond production is already changing, particularly along the west side of the San Joaquin Valley, where acreage has declined. Meanwhile, new plantings continue in northern growing areas with more reliable water supplies.

Smaller Crop, Higher Costs

As expected, the 2026 almond crop is coming in below 2025 production, according to Machado. Rain during peak bloom restricted bee activity, while March temperatures contributed to smaller kernel sizes.

He noted that navel orangeworm damage has been among the lowest in several years, although plant bug damage continues to be a concern, particularly in orchards planted with the Independence variety.

During a Sept. 28 interview, Machado said almond prices were being dis-

cussed around $3 per pound, although he cautioned that higher prices don't necessarily mean higher profits.

"When your yield is lower and your costs are up, the prices better be up," Machado said. "And will they offset the cost? Will you get enough net revenue per acre to make it worth it?"

Fuel and fertilizer costs are a big concern, particularly for growers still trying to recover from several years of losses. He described the mood among Blue Diamond members as one of cautious optimism, particularly as growers watch how higher prices translate into actual returns.

Clarice Turner, president and CEO of the Almond Board of California (ABC), said grower profitability has to remain central to the industry's long-term outlook.

"A healthy almond industry is one where growers are profitable, demand is growing and every part of the crop is maximized," Turner said. "Sustainability starts with grower viability; if growers cannot remain economically viable, nothing else matters."

Growing Demand at Home and Abroad

Turner said supply and demand are becoming more balanced, but continued demand growth will be necessary to support California almond growers.

ABC is working to increase almond consumption in the U.S. while continuing to build demand overseas. Domestically, that includes consumer marketing, ingredient innovation, bakery partnerships and culinary research aimed at creating more opportunities for people to eat almonds.

India is still a major opportunity for California almonds. Although it's already the industry's largest international market, Turner said ABC sees room for further growth through marketing and nutrition research, including studies on metabolic health and brain function.

More than 80% of ABC's budget supports global demand programs, according to Turner.

"Demand growth cannot be taken for granted," Turner said. "Consumer preferences are changing, trade remains uncertain and competition is intense."

Turner said expanding into new markets and reducing trade barriers remain priorities. ABC is also looking for ways to increase the value of the entire crop, including finding new uses for almond hulls and other co-products.

Looking Toward 2027

As growers plan for 2027, Machado encourages them to understand their production costs and make careful decisions about where to spend money.

"Know your costs. Know your cost of production," he said. "Don't be afraid to spend the right dollar."

That doesn't mean cutting corners on practices that protect orchard productivity, particularly pest management and sanitation, Machado cautioned.

"You do not cut your costs to reach profitability," Machado said.

Turner also identified efficiency and better decision-making tools as priorities for growers in the coming season. She pointed to AI-enabled yield prediction, nutrient budgeting calculators and precision agriculture as technologies that can help improve productivity and optimize inputs.

But she said growing demand will be just as important as improving efficiency.

"The challenge is ensuring global demand expands fast enough to create value for growers," Turner said.



Almond processing facilities handle California's crop as the industry works to strengthen demand and improve grower returns following several challenging years.

"If you can't afford to farm it, you can't afford to make it go away."

— **MEL MACHADO**, Blue Diamond Growers

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WALNUTS

Freshly harvested California walnuts move through harvest equipment. A smaller 2026 crop, combined with strong global demand, is helping improve prices and offering hope for better grower returns.

Smaller Crop Brings Hope for Better Returns

680,000 t
USDA 2026 estimate, down 16%

~65%
Of shipments go to export markets

+27%
Kernel shipments to Europe, 2025-26

Sources: USDA; California Walnut Board

AFTER SEVERAL DIFFICULT YEARS, California walnut growers are seeing some encouraging signs heading into 2027. A smaller crop, improving prices and strong demand are helping bring supply and demand into better balance. But high production costs and global competition remain challenges.

The USDA's crop estimate put California walnut production at 680,000 tons in 2026, down 16% from 809,000 tons last year.

Robert Verloop, Executive Director and CEO of the California Walnut Board and Commission, said existing inventory is largely presold, allowing newly harvested walnuts to begin moving into domestic and international markets.

Brock Middleton of Alpine Pacific Nut Co. said the crop received so far looks good, although production is trending about 20% below last year.

"The nut size is smaller this year, the color looks great, and we haven't had any rain impacts, so customers can

look forward to top California quality," Middleton said.

The smaller crop could also help California processors focus on their established markets rather than competing as heavily with lower-priced walnuts from China.

Strong Demand, Better Prices

Middleton said global walnut demand has remained strong despite record production last year.

"We had the largest global walnut supply in history last year, and California was able to sell the entire crop," he said.

With less production expected this year, Middleton is optimistic about grower returns.

"With the smaller 2026 crop and continuing strong global demand, we have seen pricing move up to start the season and expect higher prices to growers this year," he said.

Verloop also sees positive signs in the domestic market. According to retail data provided by the California Walnut Board, U.S. walnut dollar sales increased 7.7% between 2022 and 2025. In the 52 weeks ending July 12, 2026, consumers purchased more than 60 million pounds of walnuts, with sales volume up 2.9% from the previous year.

Still, higher prices don't necessarily mean growers are profitable. Verloop said rising diesel and fertilizer costs, regulations and competition from other walnut-producing countries continue to put pressure on California operations.

Building Demand at Home and Abroad

Exports account for about 65% of California walnut shipments, according to Verloop, making international demand critical to the industry's outlook.

Europe remains an important market for California walnuts. Middleton said European buyers recognize California's quality, food safety standards and sustainability practices, although price remains a factor.

California walnut kernel shipments to Europe increased nearly 27% during the 2025-26 marketing year compared with the previous year, according to California Walnut Board data. Middleton also pointed to a new European Union tariff quota that took effect July 1, 2026, allowing up to 500,000 metric tons of U.S. tree nuts to enter the EU duty-free. While the change provided limited benefit to the 2025 walnut crop, it could help make California walnuts more competitive in Europe going forward.

China and Chile remain major competitors in international markets. Verloop said the California Walnut Board and Commission have expanded their marketing efforts from nine core international markets to about 20, with support from federal export promotion programs.

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At home, the California Walnut Board is working to increase consumption through retail, foodservice and food manufacturing. The organization is also promoting walnuts as a nutritious everyday food rather than primarily a baking ingredient.

Verloop said the industry's quality and nutritional benefits remain important selling points as consumer preferences change.

Looking Toward 2027

For growers, keeping production costs under control remains a major concern.

"Production costs are devastating to our growers right now from energy to inputs to labor, and we have to get these costs under control to have any chance to compete globally," Middleton said.

Organic walnuts are another opportunity. Alpine Pacific reports continued strong demand and a price premium for growers in the organic market.

Verloop said maintaining California's reputation for quality while expanding markets will be important as the industry looks ahead. He also pointed to trade barriers, particularly in India, as an issue the industry hopes to resolve.

But Alpine Pacific sees opportunities ahead for growers who have managed to hang on through the difficult years.

"On the flip side, growers that are able to produce high quality in these difficult conditions will continue to be rewarded with significantly better pricing," Middleton said.

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Harvest equipment moves through a California walnut orchard. Despite improving walnut prices, growers continue to face pressure from rising energy, labor and input costs.

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USDA estimates California's 2026 walnut crop at 680,000 tons, down 16% from last year, helping bring supply and demand into better balance.

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Tackling Rancidity Is Key to Building Sustained Demand

By **ROBERT VERLOOP** | *Executive Director and CEO, California Walnut Board and Commission*



Freshly harvested walnuts are loaded into a truck for transport from the orchard. Proper handling after harvest is essential to preserving quality and minimizing rancidity (Photo by K. Platts.)

CALIFORNIA WALNUTS HAVE EARNED a global reputation for quality. Yet as the California walnut industry faces increasing competition and evolving customer and consumer expectations, success depends more than ever on delivering a positive eating experience every time someone opens a package of California walnuts. That reality has sharpened the industry's focus on quality and condition, particularly rancidity.

Rancidity occurs when the fats naturally present in walnuts oxidize over time. Because walnuts contain healthy unsaturated fats (a 1-ounce serving provides 18 grams of total fat, including 2.5 grams of monounsaturated fat, 13 grams of polyunsaturated fat, including 2.5 grams of plant-based omega-3 ALA, and 1.5 grams of saturated fat), they are particularly susceptible to oxidation if proper handling procedures and storage temperatures are not maintained at every stage of the supply chain.

The challenge itself is not new; rancidity has been discussed within the walnut industry for more than two decades. However, clearly defined product solutions that support consistent quality from harvest through consumption are inconsistent. Historically, nearly every walnut produced found a home, time in market was shorter, long-term storage was not needed, global supply and demand were in balance and much of the crop was sold inshell. Today, the pathway to the consumer has gotten longer, storage times have grown longer, and consumption patterns have shifted from inshell to more convenient kernels in raw formats, value-added products and baked goods. While demand has expanded, the lack of a consistent eating experience may have been overlooked as growers and handlers focused on satisfying trade demands without acknowledging the increased consumer demand for premium standards.

Consumers may not know the science behind oxidation and chemical indicators of rancidity, but they know when walnuts don't taste fresh. If their experience is disappointing, they are less likely to purchase walnuts again. In today's marketplace, where consumers have numerous snack and food options, the California walnut industry cannot afford that outcome.

Instead, the industry must continue to work to ensure consumers have a consistently positive eating experience with California walnuts. If consumers enjoy the taste and freshness of walnuts, they are more likely to purchase them again. Those repeat purchases can lead to greater category growth, expanded product offerings and stronger demand, ultimately driving grower prosperity.

Rancidity Task Force Established to Advance Solutions

Recognizing the importance of minimizing rancidity, the industry established a Rancidity Task Force (RTF) through the California Walnut Board (CWB). The RTF comprises 15 industry representatives, including handlers and growers, from multiple walnut-growing counties. Members of the RTF collaborate with researchers, retailers and supply chain experts to address key industry challenges related to rancidity, with the goal of maximizing shelf life and improving consumer perceptions of walnuts.

To achieve this goal, the RTF has established several priorities, the first being developing rancidity standards for the California walnut industry. To do this, the RTF is focused on evaluating current knowledge, identifying data gaps and driving science-backed innovation to develop practical standards that support consistent product quality throughout the supply chain. The group is also investigating new methods for

rapid rancidity assessments that provide more direct indications of rancidity when compared to current methods.

Additional priorities are focused on improved education and implementation of industry and trade best practices to minimize rancidity and raising consumer awareness about storing walnuts in the refrigerator or freezer. Pre- and postharvest practices will be analyzed in depth, along with efforts that can be taken by the consumer. The CWB's Quality Improvement Program (QIP) will monitor the quality of walnuts at retail supermarkets across the United States to capture and quantify what consumers are experiencing at the point of purchase to identify opportunities for improvement across the supply chain.

Another priority is informing an industry-wide strategy to implement "Best If Used By" labeling and shelf-life guidelines. The QIP has highlighted opportunities to evaluate packaging innovations and strategies that may further preserve freshness. More convenient package formats, resealable bags and appropriately sized package options can all contribute to a positive eating experience and support improved sales velocity. The faster the package moves through the supply chain, and the sooner walnuts are consumed, the fewer opportunities there are for walnuts to oxidize.

"Consumers may not know the science behind oxidation and chemical indicators of rancidity, but they know when walnuts don't taste fresh."

Importantly, the RTF's focus extends beyond understanding the science of rancidity. Instead, the RTF is helping shift the conversation toward solution-based and outcome-oriented approaches that provide value not only to consumers, but also to growers and handlers.

Addressing Quality and Rancidity Now

While the RTF works to establish industry best practices for minimizing rancidity, there are general management practices the industry can continue to follow to improve overall walnut quality and condition.

Quality begins in the orchard, where University of California Cooperative Extension research has shown that irrigation management, orchard management practices and canopy vigor and overall tree health can all influence kernel fill, shrivel and pellicle color during critical periods of kernel development. Both under- and overirrigation can negatively affect these attributes, reinforcing the importance of season-long management. While we know maintaining high production standards can be increasingly challenging and costly, consistent attention to orchard management remains critical to producing the premium-quality walnuts that help California compete in the global marketplace.

Timely harvest and hulling also help preserve kernel appearance and condition, while proper drying and temperature management are essential for maintaining freshness and flavor. Throughout processing, sorting and quality-control procedures help remove off-quality product and promote consistency across shipments. Cold storage and refrigerated transportation are equally important, helping protect kernel color, freshness and flavor throughout distribution. Together, these practices support the qualities consumers and buyers expect from California walnuts while protecting a long "taste-life" — a concept that moves beyond the need to maintain shelf life and places additional focus on maintaining flavor and a positive eating experience.

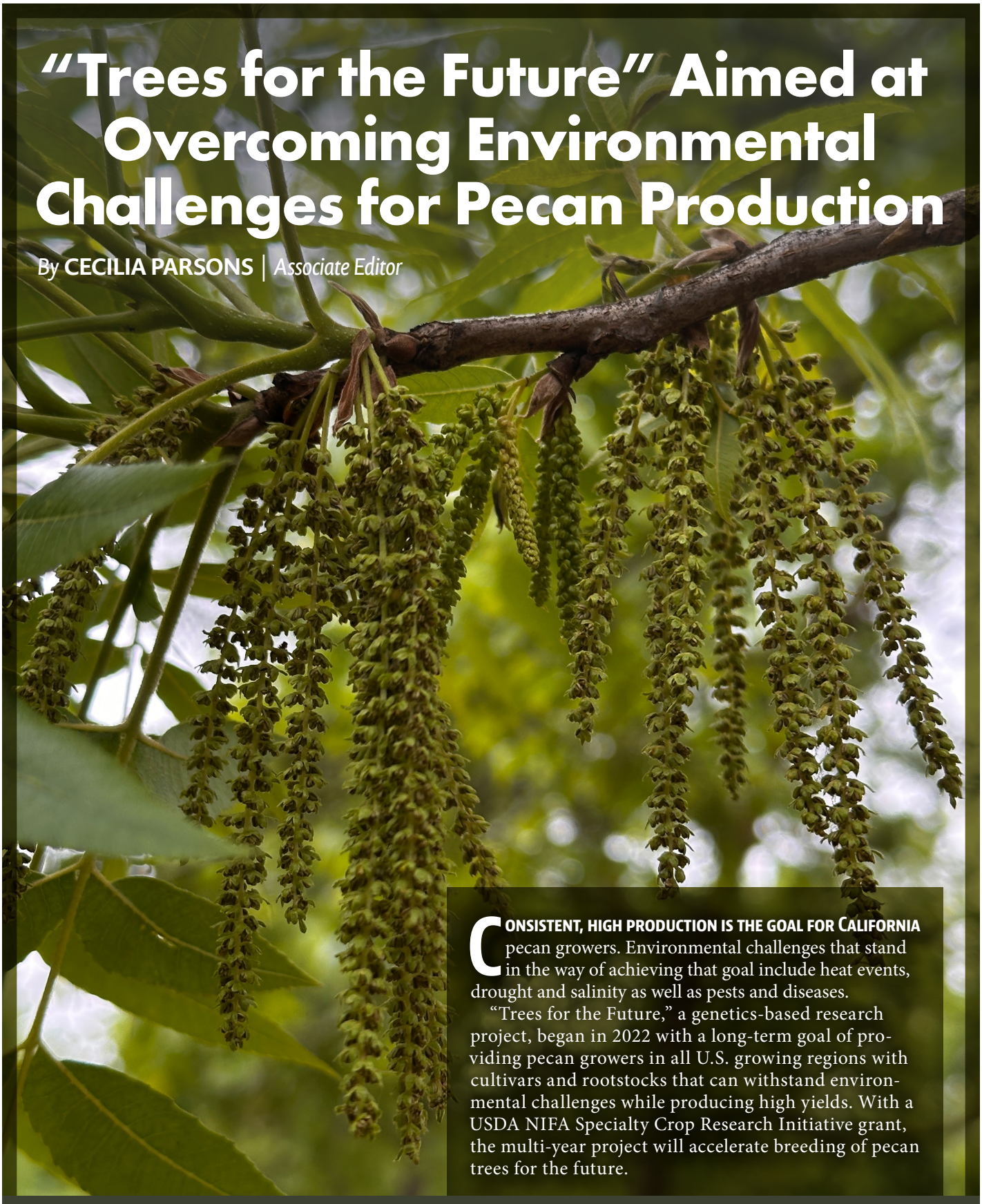
Reducing rancidity is not simply about preventing a defect; it is about removing one of the most significant barriers to increased walnut consumption. When consumers consistently enjoy the taste, texture, freshness and quality of California walnuts, they elevate their perception and real value of walnuts and are more likely to purchase walnuts again, increasing demand and creating greater value for growers, handlers and the supply chain. By continuing to invest in quality improvement and minimizing rancidity, the California walnut industry can improve consumption and consumer satisfaction to drive long-term sales growth and strengthen profitability.

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"Trees for the Future" Aimed at Overcoming Environmental Challenges for Pecan Production

By **CECILIA PARSONS** | *Associate Editor*



CONSISTENT, HIGH PRODUCTION IS THE GOAL FOR CALIFORNIA pecan growers. Environmental challenges that stand in the way of achieving that goal include heat events, drought and salinity as well as pests and diseases.

"Trees for the Future," a genetics-based research project, began in 2022 with a long-term goal of providing pecan growers in all U.S. growing regions with cultivars and rootstocks that can withstand environmental challenges while producing high yields. With a USDA NIFA Specialty Crop Research Initiative grant, the multi-year project will accelerate breeding of pecan trees for the future.

Pecan catkins in a Tulare County orchard. "Trees for the Future," a genetics-based research project that began in 2022, aims to provide pecan growers across U.S. growing regions with cultivars and rootstocks that can withstand environmental challenges while producing high yields.

The research team of 26 scientists comes from several institutions, including New Mexico State University, University of Arizona, University of California (UCANR), Texas A&M, University of Oklahoma, University of Georgia, three USDA research sites, HudsonAlpha Institute of Biotechnology and the University of Tokyo. Leading the research effort is Jennifer Randall from New Mexico State University. Karlene Hanf from Mid Valley Pecan in Denair sits on the advisory board. UCCE farm advisor Elizabeth Fichtner in Tulare County serves as a principal investigator.

Pecan trees are known for their production longevity as well as an extended period from planting to full production. Lack of winter chill, saline conditions and disease pressure are environmental stressors that affect production especially in the West and Southwest.

When the grant was announced, Fichtner wrote that climate conditions in California, including low winter chill, may affect overlap of female and male bloom and affect crop productivity. Current strategies to overcome this include using multiple pollenizer varieties in orchards. In Tulare County, which has more than 1,000 acres of pecan trees, growers have relied on 'Western' and 'Wichita' varieties to ensure pollination.

Assess Timing

One of the goals of this project is to assess the timing and overlap of the male and female bloom of coplanted varieties over years with different climate conditions. Bud break, shoot development and bloom of many cultivars have been assessed to provide the phenotypic data that is being used by geneticists in the development of pecan varieties for the future. Aphid damage, leaf scorch and vivipary evaluation are also part of the project.

Hanf said that in California, drought conditions and salinity are the main challenges in pecan production. Her list of needs for "Trees for the Future" includes lower water use, salt tolerance and consistent production of 4,000 pounds per acre. Aphid resistance and elimination of alternate bearing are also needed.

The first objective of the project was to generate a more complete database of pecan genomic variation. This part is nearly complete. This resource for the pecan research community will permit detailed analysis of the function of presence/absence variants. This includes updating existing genomes and generating new pecan genome information.

Randall, in an update on the project's progress, said that phenotypic data including bud break timing, pistillate flower development, staminate flower development and receptivity was collected for 'Wichita', 'Western', 'Lakota' and 'Kanza' across growing regions from 2023 to 2026. This data will continue to be collected and analyzed. Randall said they are finalizing a manuscript using images from the phenotypic data collected on bud break throughout the U.S. and have made an AI pipeline to analyze the images and determine timing.

Finally, she wrote, the team will define polymorphisms that can be used for marker-assisted selection.

Water Use Research

Researchers also conducted work to describe the physiological differences in water relations among pecan genotypes. Interaction of pecan rootstock genotypes with scions and the interaction of hickory rootstocks with pecan scions are being analyzed and will be published.

The Randall lab has developed a technique for micropropagation, acclimation and growing of clonal pecan rootstocks, which allows for replication in a genetic system. In the update, Randall said existing and newly generated scion/rootstock combinations were challenged with drought in field conditions using an existing microsprinkler system. These trees were used to measure gas exchange, photosynthesis and stomatal conductance. In addition, gene expression studies were conducted to show how each rootstock/scion responds to drought. Analyses of these studies are being finalized and will soon be published.

With information from an earlier study, Randall said they found seed- ➲



lings with maternal "Elliott" parentage exhibited greater tolerance for alkaline and saline sodic conditions. In this study, Elliott trees from the salinity study in Arizona and open pollinated seedlings were successfully introduced into tissue culture and propagated. Salinity assays were conducted under tissue culture conditions. Genetic analysis was used to compare salt stressed plants and control plants. Randall said findings for salinity tolerance in specific pecan genotypes will be shared with the pecan industry. Propagated trees will be used in greenhouse salinity studies followed by a field salinity study.

Pest and Disease Resistance

Another objective in this study is characterizing interactions of pecan trees with beneficial and harmful organisms for improved tree health, reduced pesticide applications and increased production. In the Southeast, the single most important biological constraint to pecan production is scab. Growers often apply up to 20 fungicide treatments to protect susceptible cultivars. This study explored the interactions between the host and pathogens on a molecular scale. While scab is not an issue in California pecan production, aphids are. Researchers are studying the role of pecan allergen proteins in plant defense. Trees are being screened for resistance to aphids or specific aphid populations. The trees that are identified will be used to determine the genetic markers associated with pecan tree resistance. The findings will be made available to the pecan industry and used for future plant breeding.

Breeding for Nut and Tree Traits

Pecan kernel and nut shape variations are also part of the study. Randall writes that pecan nut shape is highly heritable, which will enable improvement through breeding. She notes that nut traits cannot be phenotyped during the immature period in pecan trees, making it imperative to use genetic markers to predict nut quality. Size control in pecan is a desirable trait, Randall notes, and understanding the genetics is imperative to control tree size.



Cameras were mounted in pecan trees to record the timing and overlap of male and female bloom of coplanted varieties under different climate conditions (All photos courtesy of Santosh Bhandari.)

Grower Outreach

This research project includes outreach to pecan grower-association conferences and workshops. Video talks explaining peer-reviewed journal articles to growers and others in the pecan industry are being produced and are located at pecantoolbox.nmsu.edu.

The pecan toolbox was updated over the past year with information for growers. In addition, social media accounts were made for "Trees for the Future." Posts have included photos, text and video of the research and historical notes on pecan research and production and researcher profiles.

Two animations, "Pecan Life Cycle" and "Pecan Breeding and Genetic Analysis," have been completed. Randall said outreach efforts will continue through traditional grower conferences.



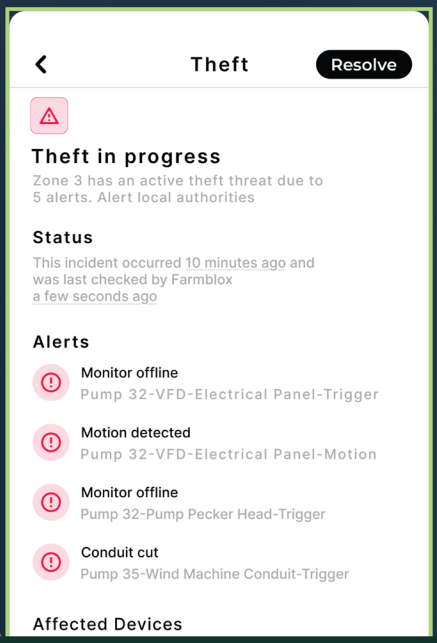
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Farmblox

Drones Offer Flexibility but Come With Rules and Regulations in Agriculture

By **CECILIA PARSONS** | *Associate Editor*

INCREASED USE OF UNMANNED AIRCRAFT systems, commonly called drones, in agriculture comes with rules and regulations for operators.

New and improved versions of these aircraft offer rapid, flexible monitoring of large areas. They can collect data and create high-resolution imagery to assist in management decisions. Drones can also deliver targeted spray applications and release beneficial insects.

"They're fast and they're flexible and can scan 2,000 acres in one day," said Anderson Safre, a University of California Cooperative Extension specialist at the Kearney Agricultural Research and Extension Center.

That doesn't mean these aircraft are invincible. At a recent drone workshop at the Kearney center, participants shared several accounts of crashes and losses of these expensive pieces of technology.

Drones can have an impressive list of features, including a GPS antenna that provides precise location data, telemetry to send and receive data between the drone and controller, and cameras and sensors for RGB, multispectral, thermal and other sensing. Batteries supply power for flights lasting 15 to 40 minutes. Large drones can carry a tank, pump and nozzles to deliver fertilizers, pesticides and other crop inputs.

Safre reported at the workshop that recent restrictions on drones include a Federal Communications Commission proposal to stop the importation and marketing of certain previously authorized foreign unmanned aircraft systems. Import tariffs also took effect on specified imported drones and components. Since December 2025, new equipment covered by the foreign drone restrictions generally cannot receive FCC equipment authorization unless exempted.

These restrictions affect some popular models and their components, Safre said.

"This is not simply a ban on flying foreign drones," Safre said. The major changes involve federal use and funding, FCC authorization of new equipment and future market access. The FCC restrictions do not, by themselves, prohibit continued use of previously purchased drones. However, future hardware and software upgrades, replacements and repairs may face tighter supply chains and higher costs. He advised taking inventory of current equipment and stocking up on essential parts. When purchasing a new drone, he said, ask explicitly whether the exact model is currently approved or falls under any of the 2026 exemptions.

Legal Use

Sean Hogan, academic coordinator of UC Agriculture and Natural Resources' Informatics and Geographic Information System program, explained what is needed to legally use a drone in U.S. airspace.

Recreational flyers must complete The Recreational UAS Safety Test, known as TRUST, and carry proof of completion while flying, regardless of the drone's weight. Flying without the required proof can result in FAA enforcement action.





Nate Nouwels, chief pilot for Ag-Bee, makes an application at 20 gallons per acre to peach trees at the UC Kearney Agricultural Research and Extension Center. (Photo by Cecilia Parsons.)

Hogan noted that the TRUST course is free and usually takes about 20 to 30 minutes to complete.

For small drones operated under Part 107, a remote pilot certificate is required for business or work-related flights in U.S. airspace, even if the operator is unpaid. The FAA says unsafe or unauthorized drone operations can result in fines of up to $75,000 per violation.

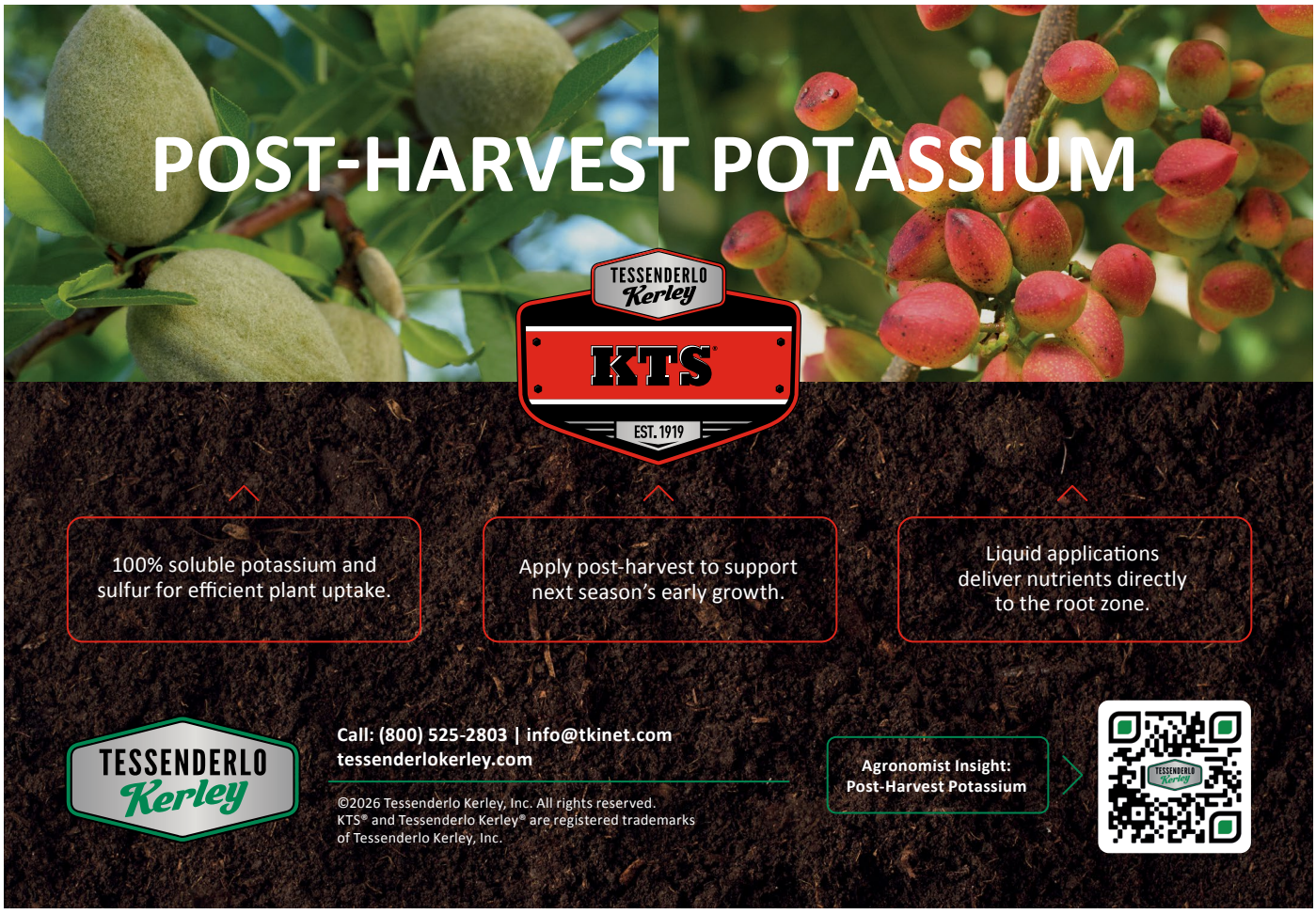
Earning a remote pilot certificate requires more study to pass the knowledge test. The passing score is 70%. Before registering for the test, applicants must create a profile in the FAA's Integrated Airman Certification and Rating Application system. More information is available at iacra.faa.gov.

Agricultural dispensing operations also require FAA authorization under Part 137, along with any applicable exemptions. Requirements vary with the aircraft and operation.

Six Key FAA Rules to Keep in Mind:

1. Register drones flown under Part 107, regardless of weight. Recreational drones weighing less than 0.55 pounds are generally exempt from registration.
2. Recreational flyers must complete TRUST. Pilots in command of flights under Part 107 must hold a remote pilot certificate.
3. Obtain FAA authorization before flying in controlled airspace where authorization is required.
4. Keep the drone within visual line of sight unless the FAA has authorized otherwise.
5. Generally, fly no higher than 400 feet above ground level. Part 107 allows a limited exception near structures; other exceptions require FAA authorization.
6. Fly over people only when the operation meets applicable FAA requirements or has the necessary waiver.

Hogan directed participants to the FAA's official drone registration site, faadronezone.faa.gov. Operators should use the official site rather than third-party registration services. FAA registration under Part 107 costs $5 per drone and is valid for three years;



recreational registration costs $5 and covers the flyer's recreational drones for three years.

Hogan said new drone pesticide applicators in California generally start with an apprentice unmanned pest control aircraft pilot certificate from the California Department of Pesticide Regulation. Pilots who already hold a DPR manned pest control aircraft pilot certificate do not need a separate unmanned certificate. In addition to passing the required exams, pilots must register with the agricultural commissioner's office in each county where they plan to apply pesticides. To qualify for an unmanned journeyman certificate, an apprentice must be certified for at least one year and document at least 50 hours applying pesticides with a drone under a certified journeyman pilot's supervision. The passing score on the journeyman exam is 70%.



Drone Applications

The workshop also included information on hayfield mapping and weed detection with drones. Ahmed Kayad, a UCCE agricultural engineering adviser, said nearly 90% of weeds can be detected using spatiotemporal analysis. The approach can be used in other transplanted crops to reliably predict weed populations. This information can also help organize labor across fields and within individual fields. Studies have also used drone remote sensing technologies to monitor and quantify spider mite damage in almonds.

Research by UCCE adviser Raymond Mireles showed how drones could be used to haze pest birds from vulnerable crops. Researchers noted the timing of hazing, bird species and their reactions, or lack of reaction, to the drone.

Kyle Knipper, a remote sensing specialist with the U.S. Department of Agriculture's Agricultural Research Service, explained how plant water consumption can be monitored.

By combining thermal and multispectral data captured by a drone, software calculates crop water use from trees separately from row middles.

Briana Layfield, with the commercial drone service company Ag-Bee, outlined differences between drone and ground applications. Weather, terrain, crop type, products and adjuvants are among the variables associated with drone applications. With so many variables, more research is needed, she said.

"Every drone has unique characteristics that must be tested," she said.

Drone application performance depends on both the technology and how the application is tuned. Canopy deposition and coverage, comparisons among systems and crop-specific efficacy trials are important considerations. Layfield said operators must follow applicable pesticide label directions for aerial applications when using drones.

Compared with airblast sprayers and fixed-wing aircraft, drones offer flexibility along with strong deposition performance in almond orchards, Layfield said.

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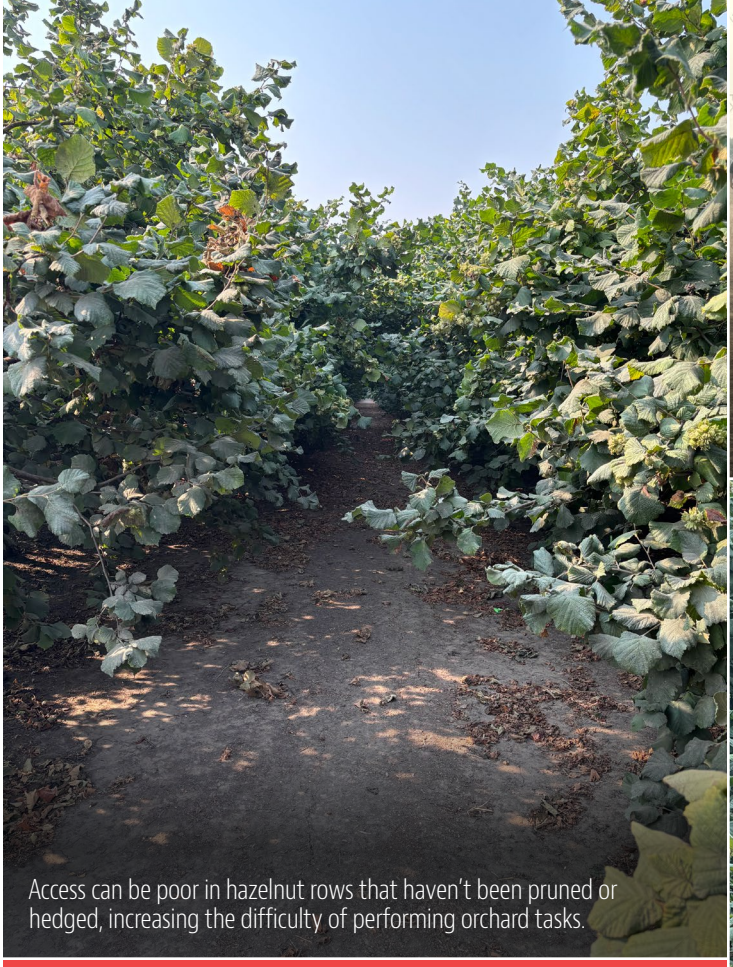
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Access can be poor in hazelnut rows that haven't been pruned or hedged, increasing the difficulty of performing orchard tasks.



Oregon State University Extension Orchard Crops Specialist Nik Wiman talks about the many benefits of heavy pruning and hedging in hazelnuts at the Nut Growers Society Summer Tour in Albany.



A participant in the Nut Growers Society Summer Tour surveys a heavily hedged hazelnut row during a presentation on the benefits of heavy pruning and hedging. (All photos by M. Lies.)

Multiple Benefits to Heavy Pruning in Hazelnuts

By **MITCH LIES** | *Contributing Writer*

UNLIKE SOME OTHER TREE NUTS, HAZELNUT TREES REQUIRE aggressive pruning to reach their full potential, according to a presentation at the Nut Growers Society Summer Tour, Aug. 5 in Albany, Oregon.

"I know probably a lot of you have seen the articles in magazines about long-term pruning studies in California nut crops where they find not doing anything is just as productive as heavily pruning," said Oregon State University Extension Orchard Crops Specialist Nik Wiman. "But I think we have a different situation in hazelnuts where we really need to be pruning and renewing wood."

Trees that are well pruned are more resistant to bud rot, a fungal disease that attacks buds, catkins, leaves and husks, Wiman said, and have more vigorous growth. "I can't tell you how many orchards I have encountered where production has stalled out or the trees just don't look good and some heavy pruning can really help rejuvenate that canopy," he said.

Twenty Percent

In general, growers should prune or hedge bearing wood on 20 percent of an orchard per year, according to OSU guidelines. Wiman noted that the two main types of pruning promote different results: thinning cuts, where a grower is removing whole branches down to the collar, can open up a canopy; heading cuts, where a grower is removing part of the branch up to a bud, promote branching.

Pruning at different times also promotes different results: winter pruning can trigger vigorous growth, he said, while summer pruning can be used to help control vigor. "So, in situations where we are trying to keep trees smaller, we're pruning with the leaves on … so suppressing the growth of the buds," he said.

When hedging, spring timing is ideal, Wiman said. Although hedging can lead to the loss of nut clusters that fall to the orchard floor, it can help improve nut fill in that year's crop and improve the following year's crop.

"I understand it hurts," Wiman said, "especially with good

nut prices right now. But you're doing the same thing in the winter. It's just not as apparent. You're removing fruiting wood when you're pruning in the winter. It's just the nut clusters aren't as developed. So, for some reason, it's more emotional when you actually see those clusters on the ground."

Wiman said concerns about diseases moving into trees through hedging cuts, which are less precise than thinning cuts, have not manifested. "We really haven't seen that," he said. "It often doesn't look amazing, because you might see some shatter on the tip of a branch, but so far, I haven't seen any issues from that."

Rotational Hedging

Rotational hedging, where a grower hedges the west side one year, the east side one year, the north side one year and then the south side, can be an effective means of pruning 20% of your orchard's bearing wood per year, Wiman said. He added that growers might consider using different hedging angles, noting that certain cuts may help improve sunlight interception. In a trial now in its third year, Wiman is comparing standard vertical hedging cuts to those made at a 30-degree angle, similar to a Christmas tree shape, to see if that might improve sunlight interception in a tree.

"So far, we haven't seen much of a difference between the treatments," he said. "For the angle cuts we had a little bit less production the first year we measured it. I think that's because we took off more wood. But now in the second year, the angle cuts were much closer numerically to the pure vertical hedge and I do think that this year, they might eclipse the other treatments."

Enhanced light penetration, an important factor in nut production, and improved orchard accessibility are two benefits that heavy pruning or hedging can bring to an orchard, Wiman said.

Heavy pruning or hedging also can strengthen tree structure, helping avoid limb breakage in ice storms, such as the ones that hit the Willamette Valley in 2021 and 2025. "So, we need to be promoting strong trees, strong growth," Wiman said.

Heavy pruning or hedging can also help slow the penetration of Eastern Filbert Blight (EFB) in orchards. "A lot of growers have implemented successful Eastern Filbert Blight management programs through hedging out diseased wood and letting it renew," Wiman said.

Wiman acknowledged that it can be unsettling to prune out infected material on some of the smaller trees in production today, such as Yamhill, but it is often necessary for tree health.

"We had a lot of big trees back when Eastern Filbert Blight first came into the area, and there is room to cut on those," Wiman said. "When we're seeing these infections on the newer orchards, it is devastating, because there's not much tree left when you get to cutting the cankers out of the tree."

In general, research is showing that trees that are aggressively pruned or hedged are performing as well or better than those not hedged.

"So, what this tells me is that you can hedge (aggressively) without hurting yields at all," Wiman said. "And I think probably for Yamhill, particularly, it is such a big crop that at times, the tree has a hard time finishing off all of those nuts."

PUBLISHER'S TAKE

The Big Picture: What to Do Next



1. **Renew bearing wood**
   Prune or hedge bearing wood on about 20% of the orchard each year.
2. **Match timing to the goal**
   Winter pruning can trigger vigorous growth; summer pruning can help control vigor.
3. **Consider spring hedging**
   Spring hedging can cost some nut clusters but can improve nut fill.
4. **Rotate hedge sides**
   Hedge a different side each year (west, east, north, then south) to spread pruning over time.
5. **Remove diseased wood**
   Use pruning or hedging as part of Eastern Filbert Blight management where infected wood needs to be removed.

"And of course it looks a lot better in the hedgerows and the orchard is very accessible, so I really think that we can get a lot more aggressive and take out more of the tree," he said.

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Ditch cleaning near a young orchard in Sutter County. Keeping downstream ditches open and free flowing can help move runoff away from orchards during heavy rain. (Photo courtesy of Franz Niederholzer.)

A Northern Perspective for Almonds: October

By **FRANZ NIEDERHOLZER** | *UCCE Farm Advisor, Colusa and Sutter/Yuba Counties*

WITH ALMOND AND PISTACHIO harvests winding down and walnut harvest well underway, post-harvest tasks and 2027 planning become a bigger part of day-to-day operations.

Get ready for a very good chance for a wet winter. I'm not suggesting anyone "buy a boat" right now, but lining up a good deal on one that meets your needs plus bookmarking weather sites might pay off. Current long-term National Weather Service forecasts for north of Sacramento (weather.gov/sto) are for chances of warmer temperatures and normal rainfall into December with increasing chances of wetter-than-normal rainfall into spring. That forecast will continue to be updated and may change, but so far the numbers keep pointing to a winter rivaling 1982-83 or 1997-98. It might be worth making several sets of plans this fall, including one for a really wet winter.

Water: Current NOAA Climate Prediction Center forecasts for a warmish fall with average rainfall (equal chances) mean continued fall irrigation despite all the talk of a wet winter. Lots of rain later this winter won't make up for stress on developing buds this fall from insufficient irrigation.

With leaves still on the trees, adequate irrigation is needed to support photosynthesis (water + carbon dioxide + sunlight = sugar + oxygen) to power current plant activities and provide feedstock for winter storage. (Many orchards with widespread leaf drop at harvest put out new leaves in September.) Daily orchard water use will drop through October as days get shorter and cooler, but that water is key to good orchard health. Mild water stress (-10 to -14 bars using the pressure chamber) is OK after harvest according to UC researchers. These targets should be -4 to -6 bars below baseline given expected seasonal high temperatures in the 70s to 80s. See UC ANR publication 8503 on using the pressure chamber in almonds, walnuts, and prunes. Maintaining adequate fall irrigation is key to preparing the orchard for next year.

Should defoliated almonds be irrigated after harvest? It's a little late for this question, this year. Most growers faced that question in August or September. Still, I think a review of expert opinions is worth the ink. The short answer is yes. Why? Maintaining adequate water availability means good leaf function, which feeds healthy bud development through the fall.

> "Getting water out of the orchard and keeping it out will reduce the risk of tree loss."

Late-summer releafing will cost trees carbohydrates and nitrogen, but the leaves will be active through the fall providing net carbon benefit by the time of natural leaf drop months later. Won't there be a chance of fall flowering in blocks that defoliated and were then irrigated? Dr. David Goldhamer, retired UC Irrigation Specialist, reported that late fall flowering will reduce yield potential for the following year when cool weather in October is followed by a warm November. If October is warm, as forecast, it's possible that the risk of fall flowering will be limited while adequate irrigation will help support healthy flower buds for next February.

Pest/Orchard Review

With wet winter/spring weather in the forecast, the risk to orchard health from saturated soils should be on the radar for all growers and PCAs. Extended periods of saturated soils can kill nut trees either by lack of oxygen (anoxia) or promoting Phytophthora crown and root rot infection. Not all orchards are at the same level of risk based on location, rootstock selection and planting strategy.

Effective water management is the key practice in controlling both Phytophthora crown/root rot and anoxia. Planting trees significantly above the orchard floor (8 to 10 inches) on a berm, island, or mound helps keep the crown out of saturated soils, but that is a one-time practice, and the focus, here, is water management in established orchards. Adding a berm to an established orchard originally planted flat does not raise the crown and can expose the vulnerable scion to disease infection.

Almond, walnut, and pistachio rootstocks differ in Phytophthora vulnerability. Since commercial walnut and pistachio rootstock options are limited, the relative ranking of Phytophthora tolerance is simple. For pistachio, Platinum is the most Phytophthora-tolerant rootstock compared with PG1 and clonal UCB-1. For walnut, RX1 shows moderate to high resistance to two damaging Phytophthora species. For almond, where more than a dozen rootstocks are commercially available, check out the Almond Rootstock Comparison Chart developed by UC researchers with Almond Board of California support. It can be downloaded as a free PDF (fruitsandnuts.ucdavis.edu/almond-rootstock-comparison-chart) or check with your local UCCE office to see if they have a hard copy. We have plenty in the UCCE Colusa office.

Getting water out of the orchard and keeping it out will reduce the risk of tree loss. Keeping downstream ditches open and free-flowing keeps runoff from backing up into the orchard. Conversations now between neighbors on managing ditch flow can help keep runoff water moving



Aerial Phytophthora on a pruning wound in a Colusa County almond orchard. The disease can cause branch dieback and gumming at pruning wounds and the base of small shoots. (Photo courtesy of Franz Niederholzer.)

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Tracked shakers in a Colusa County almond orchard. Wet winter weather can limit orchard access, making it important to plan mummy shaking before conditions prevent equipment from getting into the orchard. (Photo courtesy of Franz Niederholzer.)

to the benefit of all. I've already seen track hoes clearing sediment out of roadside ditches to maintain water movement away from orchards if heavy rain occurs. If an orchard doesn't have a natural drain to outside ditches, consider options to remove excess water before heavy rains hit.

What can be done to protect trees from Phytophthora and anoxia? Unfortunately, there is no treatment for anoxia once the orchard is in the ground. Avoiding saturated soils is the only effective strategy. There are, however, effective treatments for Phytophthora root/crown rot management. A strategy of two applications, a fall (early October) and spring (late February/early March) treatment is recommended by Dr. Jim Adaskaveg, plant pathology professor at UC Riverside. Rotating between effective chemistries helps keep them working (helping manage pest resistance to the fungicide). Consult with your PCA regarding the need for treatment of individual orchards based on location, rootstock, and bearing status.

Aerial Phytophthora (also known as Phytophthora pruning wound canker caused by Phytophthora syringae) is also a threat to almonds in wet winters. Although generally not a risk to entire trees, this disease can cause branch dieback, producing large, red gumballs at pruning wounds and/or at the base of small shoots. The pathogen dies out with warm spring weather. Applications of systemic materials such as phosphite (foliar or soil-applied) or mefenoxam (Ridomil Gold®) can deliver effective control. Recommended timing is early in the growing season (mid-March) as the almond canopy usually fills out by that time allowing both good surface area for foliar products (phosphites) and translocation of soil-applied materials (phosphites and mefenoxam).

Wet weather can limit orchard access for equipment needed for mummy shaking and herbicide spraying. Earlier mummy shaking may be needed to get the job done and help control navel orangeworm (NOW) and Carpophilus beetle plus bacterial spot. Don't count on the winter weather to do the job for you. Weed control in a wet winter means dealing with "good" weed growing conditions for months. Consult with your PCA about preemergent materials and application timing to stay on top of weeds this winter and into the spring. Spraying preemergent herbicides provides longer-lasting control than with postemergent (burndown) materials. Nobody should be trying to control growing weeds with postemergent herbicides next spring while catching up on a backlog of orchard tasks coming out of a wet winter. That's a tall order: expensive, difficult, and often ultimately ineffective. Staying ahead of weeds is particularly important in young orchards as voles and gophers thrive when hidden from predators. Even if weeds are eventually killed, the dead vegetation still hides rodents until a hand crew removes it.

Rust was a problem this year in

some Sacramento Valley orchards. Rust inoculum overwinters on lingering leaves, so a side benefit of a high rate of zinc sulfate foliar fertilization (20 pounds of material per acre after the first rain, when orchard humidity increases) is defoliation, which reduces disease inoculum going into next spring.

How clean was the harvest? Scout the orchard for shaker damage and trunk disease.

Nutrition

Where harvest hull boron levels are below 125 ppm B, a fall spray (equivalent to 2 pounds Solubor®/acre) is recommended. If hull B levels are below 80 ppm, adding in-season (spring and summer) B fertilization to the fall spray should be considered. Zinc sulfate can be tank mixed with boron, but when using polyborate (Solubor®, Borisol®, etc.) reduce the tank water pH to 5 with an organic (acetic, citric, etc.) acid to keep all the boron and zinc in solution. Adding some urea (5 to 10 pounds/acre) to the boron/zinc tank can help with boron uptake and provide a little extra N heading into the winter.

A fall potassium (K) application of dry, coarse fertilizer on the soil surface is an established practice in many tree crops. Winter rains dissolve the material (SOP, MOP) and move it into the soil, getting K in the ground ahead of next year, helping spread costs and saving time next year. However, on light-textured soils (for example, CEC<10 meq/100 gm soil), some K can be leached down and perhaps out of the root zone. The more rainfall, the greater the risk of K leaching on such light soils. In-season alternatives to fall K fertilizer are spring K banding/directed broadcasting or soluble K fertilizer injection (ultra-fine SOP, KTS, pot carb, etc.). Both in-season methods effectively get K into the root zone and help maintain leaf K through the season. When banding fertilizer K in drip-irrigated orchards, place the K as close to the drip hose as possible to allow roots to access the K next season.

Soil Cover

Cover crops or mulch help slow rainwater runoff, reduce erosion, and improve water infiltration. Cover crops should be planted by the end of October for best results. Almond shell or shell/hull mixes applied as a mulch provide potassium to the soil if water (rain or irrigation) wets the material and improves water infiltration. Higher rates of compost can help with infiltration. Shells and compost can interfere with good soil contact for preemergent herbicide, so put down the herbicide before the organic matter (OM) goes into the spray strip or keep the OM out of the tree row and in the tractor aisle as much as possible. Shells spread in the tree row provide "free" K and improve water efficiency but can stay relatively intact and may end up in the windrows the next harvest.

Best wishes to all for a less busy fall and continued solid nut markets.

General Nut Orchard Resources

Loads of great articles and info (weekly ET, nutrition, meetings, pictures, etc.). This is a site developed and maintained by UCCE Orchard Advisors in the Sacramento Valley: **sacvalleyorchards.com**

Trunk & Soil Diseases in Almond: **sacvalleyorchards.com/almonds/trunk-soil-diseases/**

Click on the crop of interest. The pistachio Phytophthora page has recently been updated: **ipm.ucanr.edu/agriculture**

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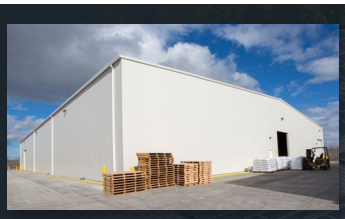
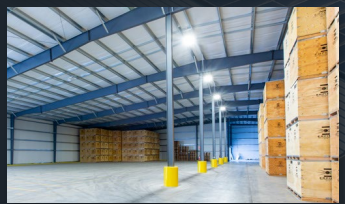
PUBLISHER'S TAKE



The Big Picture: What to Do Next

1. **Keep irrigating this fall**
Maintain adequate postharvest irrigation while leaves remain active, adjusting for declining orchard water use as temperatures cool and days shorten.
2. **Prepare for excess water**
Clear drainage routes and consider how water can be moved out of orchards before heavy winter rains create saturated soil conditions.
3. **Stay ahead of sanitation**
Plan mummy shaking early enough to avoid losing orchard access during prolonged wet weather.
4. **Plan winter weed control**
Work with your PCA on preemergent materials and timing so weed pressure does not add to the spring workload after a wet winter.
5. **Protect the orchard floor**
Establish cover crops by the end of October or use suitable mulch to slow runoff, reduce erosion and improve infiltration.

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What I Want to Know After Harvest

The answers are in your damage samples, tissue results and orchard history. Put them to work before winter.



By **GARY OSTEEN** | *PCA, CCA, Certified Professional Agronomist*



Examining almond samples helps growers and PCAs identify damage and evaluate pest management results before planning the next season (Photo by K. Platts.)



Pistachio mummy nuts remain on a tree. Reviewing harvest damage and sanitation results can help growers and PCAs plan fall and winter orchard work (WCN file photo.)

When I look back at a season, I want to know what happened in each orchard and why. Yield matters. Reject levels matter. But those numbers are only the beginning of the conversation. If we had damage, lost leaves or struggled to get work done on time, we need to understand the cause before we plan another season.

That is where I would start this fall. Look at the results, get out in the orchard and talk through what you saw with your PCA. If something worked well, understand what made it work. If a problem showed up, decide what you need to learn or change.

Review the Timing

One thing that surprised me this season was navel orangeworm damage in some orchards belonging to very good growers. These are growers who normally have good control. It did not happen everywhere, but in the orchards where it did, I kept coming back to timing.

Some larger operations had more acres than they could cover within the intended window. Ideally, we would like to see that work done in four or five

days. In some cases, it stretched into three or four weeks. That extra time in the orchard gave navel orangeworm more opportunity to cause damage.

We saw that even where mummy removal had been good. Application schedules also deserve a look, because sprays may have been delayed or spread over too many days. You have to consider the whole sequence of work.

Before next season, compare the timing you intended with what actually happened. Which blocks were finished first, and which were last? Did you have enough equipment to cover the acreage? Those are practical questions, and they can help explain why a program gave you different results across the operation.

Evaluate Your Crop Samples

We collect almond samples behind the shaker, crack them by hand and grade them. I want to know what caused the damage. A total reject number tells me there is something to investigate, but I still need to see what happened to those nuts.

We also look at nut weights. Before harvest, I kept hearing concerns about small nut size. When we got into our samples, the weights looked pretty standard compared with the last few years. I did not see that problem in the areas where I work. I cannot tell you what happened everywhere else in the state.

That is why I put so much value on sampling your own orchard. Something you hear from another area may be worth checking, but your samples tell you whether it applies to your crop. Keep that information by block so you can use it when you sit down to plan.

Start With the Water History

When someone asks how much water an orchard needs after harvest, my first question is what happened during harvest. Some growers can shake, sweep nuts into the middles and keep irrigating with drip systems or, in some situations, fan jets. Others have a longer interruption.

Those differences affect what the orchards need afterward. The trees need adequate irrigation because bud development is still underway. How urgently you need to do that depends on where the orchard stands when harvest ends. Look at its condition and irrigation history together.

I also want to know whether we kept a reasonable canopy through harvest. Did mites cause leaf loss? Was Alternaria leaf spot a problem? Did the trees become water-stressed? It may have been more than one thing. Water stress and mites can occur together, and you need to sort that out.

Knowing why the leaves came off helps you decide what needs attention next season.

Let the Samples Guide Nutrition

For almond nutrition, I want to see the July tissue samples. Those results should help you decide whether a fall application is needed. Look at the nutrients that are deficient and discuss what can appropriately be supplied now. For boron, look at the hull samples.

We have reduced nitrogen in some of the orchards I work with over successive years because the tissue levels were higher than we wanted. That is why the sample results matter. An orchard's history and current results should guide the decision to apply more.

Potassium and other nutrients need that same attention. If your budget is limited, start by finding the documented deficiencies. You can then have a specific conversation about what the orchard needs, what can be addressed in fall and where that application fits in the overall program.

Consider the Crop and Orchard Age

In pistachios, I pay particular attention to young orchards going into fall. I do not want to keep them excessively wet and pushing vigorous growth late into the season, when an early freeze could become a concern. The idea is to moderate irrigation without stressing the trees.

Mature orchards also need appropriate water management as the weather cools. We have seen Phytophthora issues in pistachios, so irrigation deserves a careful look. Review the August nutrient samples at the same time and see what they tell you about the orchard's needs.

For walnuts, I review codling moth

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control and any new pest observations. We found walnut husk fly at one site during harvest where we had never found it before. That observation gives us something specific to watch for next season. Carry those changes forward in your records.

Plan Sanitation and Weed Management

Sanitation planning should reflect the damage you found. If your results were good, look at the practices that helped you get there and repeat them. If navel orangeworm or other damage remained a problem, review what needs to change, including opportunities for earlier sanitation in fall or winter.

The weeds left at harvest can also tell you a great deal. Identify what is out there. Junglerice, goosegrass and flax-leaf fleabane are among the weeds that deserve attention when you review your program. Match residual herbicides to the species and conditions in that field with your PCA.

Fields may have different weed complexes. You may need different approaches across the operation. Planning that work in fall gives you a chance to get the timing right and build a program around the weeds you actually have.

We also take fall spur samples for scale in almonds. Knowing the population helps us decide whether a dormant spray is warranted. Those samples help us make that decision.

Something you hear from another area may be worth checking, but your samples tell you whether it applies to your crop.

Set Fall Priorities

If I had to protect three priorities between harvest and winter, I would start with documented nutrient deficiencies, appropriate irrigation and timely residual weed management. Those are the areas I would look at first.

I would also make sure the people carrying out the work understand the priority in each block. An orchard needing attention now may be different from the one next to it. Putting those differences into the fall plan helps you connect your field observations with the schedule you follow.

Gather the samples and records, walk the orchard and work through the questions with your adviser. A useful fall review leaves you knowing what your orchard needs and how you plan to address it.

Comments about this article? We want to hear from you. Feel free to email us at article@jcsmarketinginc.com



PUBLISHER'S TAKE



The Big Picture: What to Do Next

❶ Review Timing by Block
Compare planned harvest and spray schedules with actual completion dates to identify delays that may have contributed to damage.

❷ Let Samples Guide Decisions
Use damage samples, nut weights and tissue results from your own orchards to plan pest management and nutrition.

❸ Assess Postharvest Water Needs
Review irrigation interruptions and canopy condition to determine what each orchard needs as bud development continues.

❹ Plan Sanitation and Weed Control
Use harvest damage results and weed identification to prioritize sanitation and select appropriate residual herbicides with your PCA.

❺ Set Clear Fall Priorities
Focus on documented nutrient deficiencies, appropriate irrigation and timely weed management. Make sure crews understand which blocks need attention first.

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