

# WEST COAST NUT

JULY 2019 ISSUE

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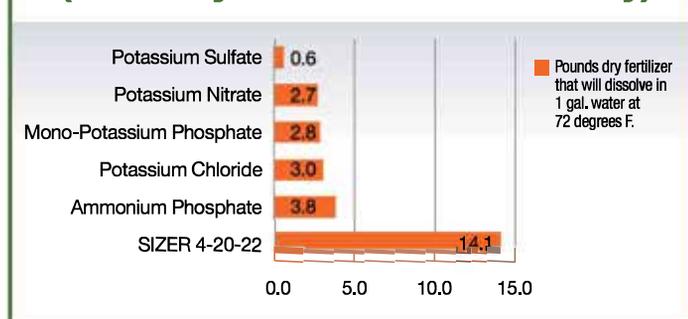
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# WEST COAST NUT

By the Industry, For the Industry

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### *Tips for Almond Harvest*

The number one concern for growers approaching harvest should be controlling navel orangeworm (NOW) in their orchards. Mel Machado, director of grower relations for Blue Diamond Growers said timing of spray applications for this pest is critical to control and minimizing nut damage due to NOW.

See full article on page 4



# TIPS FOR ALMOND HARVEST

Being prepared increases the likelihood of a successful almond harvest.

By CECILIA PARSONS | Associate Editor



Photo courtesy of Kathy Coatney.

**T**HE NUMBER ONE CONCERN FOR GROWERS approaching harvest should be controlling navel orangeworm (NOW) in their orchards. Mel Machado, director of grower relations for Blue Diamond Growers

said timing of spray applications for this pest is critical to control and minimizing nut damage due to NOW.

Timing hull split sprays should be at the top of every grower's harvest preparation checklist, Machado said.

"You don't want to be too late with your hull split sprays, you want to make sure you get good coverage."

Timing and coverage can be challenges for growers. It helps to understand the life cycle of NOW to plan spray applications for when they will be most effective. Hulls split earlier at the tops of the tree canopy than those on the lower third of the canopy. Growers and farm managers are also advised to complete their spray application in less than five days for the best NOW control. Those who do not have the equipment to accomplish this might want to think about aerial applications, Machado said.

Aerial spray applications in almonds can be a controversial subject, Machado said, but it is important that the hull split spray be effective in knocking down NOW numbers in the orchard. Walnut growers with NOW infestations are using aerial sprays to achieve better coverage, Machado pointed out. Those applications may make sense for some almond growers.

Ants are another insect pest that can wreak havoc with nut yield and quality at harvest. Windrowed nuts left on the orchard floor for several days become a feast for ants. High numbers of pavement ants or southern fire ants can build quickly in the weeks leading to harvest. Ants will head into windrowed nuts and can eat/damage a significant amount of kernels in a short time.

Ants are easy to control with baits, Machado said, but growers need to be aware of ant infestations prior to harvest because it takes time for baits to work.



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Almonds being loaded for transport. Photo courtesy of Cecilia Parsons.

### Strategic Deficit Irrigation

This harvest preparation step has to be done right, or there can be a negative impact on crop yield. Spencer Cooper, Senior Manager, Field Outreach and Education for Almond Board of California, said strategic deficit irrigation prior to harvest is a great strategy to reduce incidences of hull rot as well make for a cleaner harvest, but care must be taken to correctly measure tree stress during that time, Cooper said.

Research done by David Doll, former University of California farm advisor in Merced County, showed that some water stress leading up to harvest is acceptable. Water reductions should start in the 10-20 percent range and Cooper advised use of a pressure chamber to monitor tree stress. By inducing a mild stress (-15 bars) at the onset of hull split it has been shown to increase the uniformity of hull split as well potentially reduce the severity of hull rot incidents. The deficit should be maintained for two weeks. Full irrigation must resume to avoid loss of kernel weights.

Cooper stressed that before a grower implements Strategic Deficit Irrigation (SDI) to confirm that their irrigation system has the capability to meet peak evapotranspiration (ET) demand, if the system cannot do this then the grower may already be operating at a deficit for the season so there would be no need to implement a deficit. Maintaining stress too long or starting it too early may have a negative impact on kernel weights. Doll's research showed that understanding the developmental state of the tree in relationship to when it completed kernel fill, timing of blank split and hull split and timing of harvest will determine how much and when deficit irrigation should be done.

### Nutrient Management

Good yield estimates are essential to a nutrient management strategy in almonds.

Gabriele Ludwig, Director of Sustainability & Environmental Affairs for the Almond Board of California,

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Continued from Page 6

said fertilization rates should be based on realistic, orchard specific yield, and all nitrogen inputs should be accounted for. Adjustments can be made for spring nutrient and yield estimates.

A pre season fertilizer plan should be based on expected yield minus the nitrogen (N) in irrigation water and other inputs. Following full leaf out, conduct a leaf analysis. In May, a review of the leaf analysis results and an updated yield estimate can lead to adjustment of the fertilizer plan. For every 1,000 pounds of kernels harvested, 68 pounds of nitrogen, 8 pounds of phosphorus and 80 pounds of potassium are removed.

Research shows that applications of N to match tree demand in as many split applications as feasible improves efficiency. Recommendations are for 20 percent N in March, 20 percent in April and 30 percent in May. The remaining N should be applied post harvest.

Using the same nutrient management plan every year for every orchard reduces nitrogen use efficiency.

### Orchard Floor Preparation

Clean, smooth orchard floors will go a long way in keeping dust generated by harvest equipment under control and



Photo courtesy of Kathy Coatney.

sending a cleaner product to the huller. Preparing a smooth, level orchard floor will also eliminate low places or holes where nuts can gather and be missed by the sweeper. This also reduces the need for extra passes down the row.

Attention to problem areas on floors should have been done after last year's harvest, Machado said, and it is too late to make major changes prior to this harvest.

Cover crops and/or weeds should be mowed. Rows should be scouted for excess dirt, rocks and trash. Removal will help deliver a cleaner product to the huller. Machado said dirt, rocks and trash picked up in the windrows slows the hulling process, raises costs to the grower and may impact nut quality.

If floors are prepared and sweepers are adjusted properly, there will be less dust generated, Machado said. Keeping dust levels down with some soil types will always be a challenge, but a smooth floor will go a long way in keeping soil out of the windrows.

More challenging soils may require use of dust inhibitors, watering or shells from last year's harvest to reduce dust on roads and yards.

### Harvest Equipment

Think ahead to avoid wrecks, Machado said. Much of the preparation for almond harvest began at the orchard design stage, but if changes have occurred since planting, some planning is in order.

Orchard access and egress need to be evaluated to avoid traffic jams. Routes for sweepers and harvesters should be planned ahead of time to avoid making extra passes.

Machado said that adjusting harvest equipment to match orchard conditions and training operators to reduce speed could help reduce dust.

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# ANOTHER RECORD BREAKING ALMOND CROP PREDICTED FOR 2019

By KATHY COATNEY | Editor

Close up of almonds on the branch. All photos courtesy of Kathy Coatney.

## THE UNITED STATES

Department of Agriculture (USDA)/National Agricultural Statistics Service (NASS) releases two almond reports every year. The first is the subjective report based on opinions from randomly selected California almond growers throughout the state by a phone survey conducted in April and May.

NASS's objective report provides a more precise estimate on yield based on actual almond counts and measurements gathered from over 850 orchards statewide that includes the weight, size and grade of the average almond sample

broken down by growing district and variety.

The 2019 subjective report was released in May, and for the second year in a row it is predicting a record breaking almond crop. According to the NASS, California almond orchards are expected to produce 2.50 billion pounds of nuts this year, an increase of 8.69 percent over the 2018 2.30 billion-pound crop.

NASS's objective report will be released on July 3, 2019.

## 2019 Crop

Richard Waycott, president and CEO of the Almond Board of California

(ABC), said, "We're seeing sort of a mixed report."

"I'd say if you look at the numbers, the northern crop, the northern Sacramento Valley in particular, is certainly lighter than the southern part of the state," Waycott said.

"But the southern part is looking very strong, and that's where the majority of the crop is produced. So in our largest growing area the crop looks to be a very good one for this year," Waycott said.

Considering last year's wet, windy and cold weather, the forecast for a larger crop could be surprising to some in the industry.

"Mother Nature can be tricky," Waycott said. "We have seen this before where we've had a wet winter, and a lot of wind, and cooler temperatures, and yet we can set a really good crop even with those conditions."

There's always a little bit of doom and gloom with these kinds of winter's even though the water is desperately needed, Waycott said.

The Sacramento Valley was hit the hardest with the weather.

"They just got so hammered by wind and rain up there so consistently that I think the impact on pollination was evident," Waycott said.

Waycott said, he thinks a lot of it boils down to if there's enough time for the bees to do their work. And the southern part of the state appears to have had enough breaks in the weather for the bees to work, Waycott said.

## Almond Acreage

A contributing factor to the larger 2019 almond crop is the increase in almond acreage. NASS reports that almond acreage in California increased in 2018. Bearing acres were reported at 1.09 million acres, up six percent from 2017. Total almond acres including non-bearing acreage in 2018 is estimated at

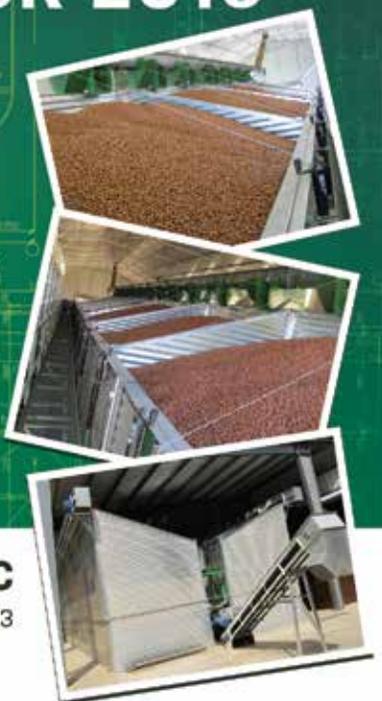
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1.39 million acres, up two percent from the previous year.

Currently, there are approximately 300,000 nonbearing acres of almonds in the ground.

“That number has been pretty consistent over recent years, and as a result of that, we have quite a pipeline of acreage that’s coming online in terms of bearing (acreage). We don’t see any real slowdown at the moment anyway,” Waycott said.

A significant increase in bearing acreage has been seen as well. “We’re forecasting to be up at about 1.17 million acres with the crop that’s coming on right now,” Waycott said.

The increase in acreage has been studied thoroughly, Waycott said, and a lot of the new acreage is going into other cropland that growers have converted from annual to permanent crops.

“We also have the dairy industry that’s been quite a source of new acreage as well,” Waycott said.

Many dairy producers have decided to bring cattle feed in from other states and plant permanent crops like almonds or pistachios instead, Waycott said.

“In theory there’s still acreage that could be converted into almonds or some other permanent crop,” Waycott said.

Acreage is increasing across all almond growing regions, Waycott said.

The more unusual trend has been acreage increases in the Sacramento Valley. Almonds have always been grown there, but lower yields have kept growth at a slower pace than the San Joaquin and Central valleys, Waycott said.

The majority of the growth has taken

place in the southern part of the state because of the higher yields that are produced there.

“It’s just easier to manage the crop because of less wind, and less rain, and all those things,” Waycott said.

“But what has happened to a limited extent is that some growers have either switched to almonds, or new growers have come in and expanded almond acreages in the Sacramento Valley just due to the prospect of having better water availability,” Waycott said.

*Continued on Page 12*

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## Long Term Growth

For long term growth water is crucial to increasing acreage.

“Water is obviously the major bugaboo in all this in terms of really being able to have long term growth in an old fashioned way,” Waycott said, adding SGMA (Sustainable Groundwater Management Act) will also have an impact on water and growth.

SGMA could mean repositioning of cropland, and some growers may have to idle part of their acreage, Waycott said. And other growers are already trying to reposition into areas of the state where they have better access to surface water, he added.

“And so in terms of the long term trend, it’s really a bit up in the air how we’re going to transition into SGMA and what the net effects are going to be,” Waycott said.

ABC continues to be very focused on increasing water use efficiency.

“I’m sure you’ll see increased gains in that area, which will help, but there are

some areas of the state that are going to be hugely effected by the SGMA implementation,” Waycott said.

## Crop Safety

The almond industry has made great strides in food safety, too, by improving many aspects of their food safety in terms of the crop and have a better understanding of what and where the risks are, and how to deal with them, Waycott said.

“In our orchards, certainly orchard floor sanitation is very important, and that has improved dramatically,” Waycott said.

In the processing plants, not only where cross contamination could take place, but also knowing where salmonella could be present, and how to deal with that, has been important, Waycott said.

Pasteurization has been the best practice the industry developed, especially knowing that certain pathogens are just ubiquitous in nature, Waycott continued.

Through testing and work with the University of California Davis a risk assessment for almonds was created that

shows salmonella risk is very sparse and has very low levels. But when salmonella does exist, pasteurization is the extra step that ensures a food safe product is being shipped, Waycott said.

And also on the processing side, there have been zero outbreaks of foodborne illness attributed to California almonds since the establishment of the pasteurization program a decade ago.

By taking these steps early, it’s made the Food Safety Modernization Act (FSMA) a smoother transition, Waycott said.

“I think by necessity we were sort of out in front of a lot of industries in terms of dealing with this,” Waycott said.

“We definitely did have a leg up in being able to deal with the FDA (Food and Drug Administration) as the food safety modernization act came forward,” Waycott said.

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# Spraying Mature Nut Trees

By FRANZ NIEDERHOLZER | University of California Cooperative Extension (UCCE) Farm Advisor, Colusa and Sutter/Yuba Counties

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**M**ANY HUNDREDS OF DOLLARS PER ACRE can ride on the outcome of summer pesticide sprays on nut crops. While all steps in the process of crop protection, including orchard monitoring, application timing, material selection and careful spraying, are important, none is more important than actual pesticide delivery. For the best possible pest control, the pesticide in the tank has to end up in a uniform deposit throughout each tree canopy (bottom to top) across the orchard. If this doesn't happen, pest control will suffer, along with grower return(s), even if

the pesticide selection and spray timing are on target. Effective pest control in mature nuts is as tough or tougher than it has ever been for most growers and pest control advisors (PCAs) operating today.

## Today's Nut Orchard

Nut orchards, today, are denser (and more productive) than those in previous decades. Developments in planting density, micro-irrigation, fertigation, reduced pruning and/or rootstock selection now commonly produce nut orchard canopies with 70+ percent light interception, six to eight acres of leaf surface area per acre of trees, and higher yields than 20-40 years ago. Delivering uniform spray coverage to the dense orchard canopies of today is more challenging, but potentially returns more dollars/acre to the grower, than in recent memory.

Pest pressure is up. More nut acres from Red Bluff to Bakersfield have increased risk of crop damage from insect pests, particularly navel orangeworm (NOW). That highly mobile pest infests and overwinters in almonds, pistachios and walnuts (among many other crops and non-crops). Increasingly warm summers drive more NOW generations and damage pressure.

Newer insecticides (Intrepid®, Altacor®, etc.) require excellent coverage for effective pest control, while offering longer residual protection and less impact on beneficial insects and mites than older, broad spectrum pesticides (pyrethroids like Asana®, Warrior®, Brigade®, etc.). In addition, resistance to at least two pyrethroids has been reported in some NOW populations from the southern San Joaquin Valley.

Nut quality standards remain high, with good reason. NOW damage reduces grower returns, increases processor costs to remove damaged nuts and increases the risk of Aflatoxin contamination in the final product as shipped to buyers. Keeping NOW damage as low as possible benefits the entire industry—growers, processors and marketers. As nut production increases, maintaining high nut quality (low NOW damage) helps maintain strong sales in a world market and prices to growers.

With these realities in mind, here are some steps to prepare your sprayer(s) to deliver the best pest control possible. Check your current setup before hull split. If you like what you see and have had low reject levels in the past two years, you may not need to change your spraying practices. If you don't like what you

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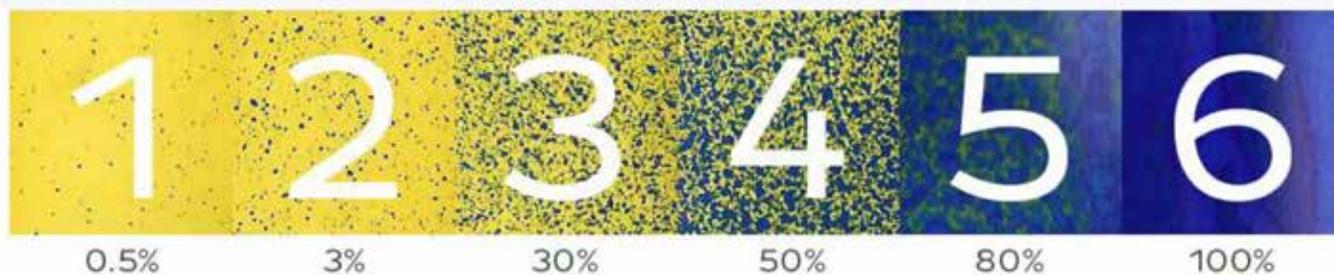
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## COVERAGE



Water sensitive paper percent coverage on a scale of 1-6. Optimum coverage is 50 percent (4 on the scale of 1-6). Slide and data courtesy of Matt Strmiska, private spray consultant.

see, go back and adjust your sprayer(s) to improve coverage in each orchard you farm.

### Getting the Best Coverage

To check your current set up, look at the actual coverage in different parts of a couple of representative trees, especially in the upper middle of the canopy—the toughest spot to reach with a ground sprayer. To do this, put up water sensitive paper (WSP, available from local ag supply stores or on internet) in the

canopy and spray with clean water at regular operating pressures and ground speed. The WSP will turn blue where droplets land. The WSP doesn't perfectly mimic a leaf or nut, but shows where spray reaches and in what relative amounts. NOW control research indicates that roughly 50 percent coverage is the target coverage (see images from Matt Strmiska in this article and/or use SnapCard App to check coverage). Another option to check coverage is to spray clean water or water+Surround™

(white clay sunblock product) and look directly at the spray coverage on the leaves or nuts from a ladder or pruning tower. Using WSP, which can be saved for your records and compared to manufacturer or research results, is less subjective than spraying water or water+Surround™, but both approaches should help improve control.

Check spray coverage (and make spray applications) when temperatures are below 80° F and relative humidity is above 40 percent. Spray evaporation loss is lowest under those conditions.

There are several ways to use WSP. The key is to place the paper at different spots inside the canopy so spray coverage throughout the tree can clearly be checked. Pieces of WSP can be taped to a long length of PVC pipe at regular intervals and run up through the canopy interior. Other options for WSP placement include wrapping it around almonds in the canopy and securing it with a rubber band (idea from Brad

*Continued on Page 16*



Water sensitive paper, stapled back to back and secured to shoot with paper clamp. Photo courtesy of Franz Niederholzer.

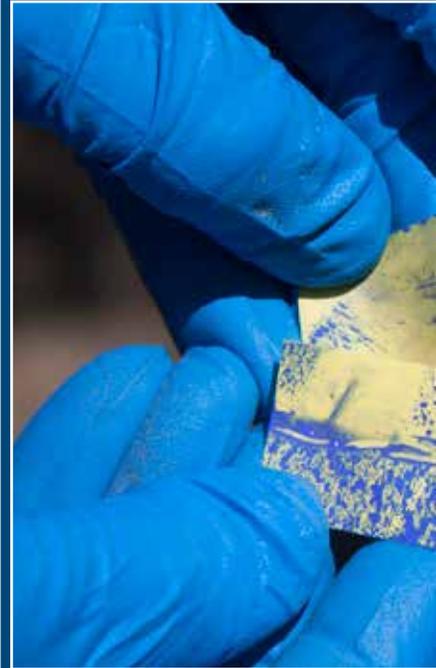
### SnapCard Spray App

Local interest: Christian Nansen, a professor in the Entomology Department at UC Davis, was one of the developers of SnapCard when he worked at the University of Western Australia.

More info: <https://www.agric.wa.gov.au/grains/snapcard-spray-app>.



Water sensitive paper, wrapped around an almond branch and secured with a rubber band. Use gloves to handle WSP to avoid marking the paper with fingerprints. Photo by Cheryl Reynolds, courtesy of UC Statewide IPM Program.



*Continued from Page 15*

Higbee, Trécé, Inc.) or held on a shoot using large paper clamps (see photos). Use a pruning tower to get high in the canopy when attaching WSP directly to shoots and/or nuts. Once the water has dried in the canopy, retrieve the WSP. If the coverage is less than 50 percent throughout the canopy, or light in the tops and heavy low in the canopy, there are several steps to improving coverage. Here are some suggestions, based on different results with WSP.

### Little to no Drops on the Card

Air, generated and delivered by the sprayer fan(s), carries spray throughout the tree canopy. If little to no air from the sprayer reaches the location of the WSP, neither will spray droplets. Slow the sprayer to get more sprayer air and droplets to the WSP. Two miles per hour (mph) is a good target speed that can be adjusted up or down based on WSP coverage. Driving too fast can mean leaving portions of the upper canopy, where many nuts are commonly found, virtually unprotected.

### Some Cards Show Some Blue, but not Enough

If you see good distribution of spray droplets but less than 50 percent coverage try increasing the spray volume (swap out old nozzles and replace with bigger one or add more nozzles) delivered towards the part of the canopy where those cards were placed to improve percent coverage on the WSP. Several years of research on NOW control in almonds by University of California (UC) and United States Department of Agriculture (USDA) researchers showed increased NOW control with 150-200 gallons per acre (gpa) compared to 100 gpa.



Water sensitive paper coverage results. Photo by Petr Kosina, courtesy of UC Statewide IPM Program.



Early morning hull split spraying in almonds. Photo courtesy of Franz Niederholzer.

## Some Cards are all Blue or Mostly Blue

If any of the cards are completely blue or close to it, this indicates excessive coverage in that portion(s) of the canopy and a good chance of wasteful runoff of pesticide from the tree. Reduce spray flow targeting the region(s) of the canopy where those cards were placed. Do this by selecting a smaller nozzle or cutting off one of the nozzles targeting that portion of the canopy. Always double check to make sure the problem is corrected.

As increased acreage and summer heat push up NOW pressure (along with other pest populations), grower investment in the best spray coverage is critical to a successful harvest.

Where needed, these investments pay off in a cleaner grade sheet and reduced processing costs.

"The most expensive spray job is the one that doesn't work."\*

\*quote from Bill Olson, UCCE Farm Advisor, Butte Co, retired.

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All photos courtesy of Danita Cahill.

# OREGON WALNUT PRODUCTION



By DANITA CAHILL | Contributing Writer

**ENGLISH WALNUTS:** *Juglans regia*, also called Persian walnuts, originally came from the Middle East. In the early 1900s, there were many acres of producing walnut trees in western Oregon and Washington.

Several factors rained on the Oregon walnut-growers' parade. Severe windstorms, such as the Columbus Day Storm in 1962, knocked over trees. Severe freezes in the 1950s, the early

1970s and again in the 1980s, killed or damaged many mature walnut trees.

Although the heyday of Oregon walnut growers may have passed, there are still growers scattered throughout western Oregon. Many landowners have one or more English walnut trees. Homeowners continue to plant young trees.

### Interested in Planting Walnuts?

Walnut trees grow best in deep,

well-drained soil. Plant them on hillsides or flat ground. Trees planted at lower elevations tend to produce heavier than those planted on hillsides. Walnut trees do best in temperatures above zero-degrees Fahrenheit. Observe your property and note any frost pockets. Don't plant walnuts there.

Apply lime before planting. A lime application lasts five to seven years. Plant trees in early winter, as soon as possible after purchasing. Do not put

Franquette tree with developing walnuts.



tall, eventually maxing out at around 100 feet.

Walnuts are especially susceptible to spring freezes, so late-leaving, late-flowering varieties do best in Oregon. Here are varieties to consider:

**Carpathian** survives in colder winter climates better than other varieties. If you want to try growing walnuts east of the Cascade Mountain Range, this is a good one to choose.

**Franquette** is a French cultivar. An old variety, its tight shell seal and light-colored kernel makes it a favorite with commercial growers. Drawbacks to Franquette are its susceptibility to walnut blight, small nuts in heavy cropping years and sometimes shriveled kernels.

**Howard** is cold-hardy, late-leaving and California bred. It has medium to large

nuts and produces good-quality kernels.

**Chandler** is another cold-hardy variety. It leafs out at the same time as Franquette and Howard. Franquette is a good pollinator for Chandler.

Buy young trees from a reputable nursery in your area. Avoid trees grown on black walnut, or black walnut-hybrid rootstock. They are susceptible to black-line girdling at the graft and will not perform well in the Pacific Northwest. Instead, aim for trees grafted onto seedling-grown Carpathian, or Manregion, rootstock. Commercial growers may need to order larger quantities from California, or have them custom grown closer to home.

Practice patience. Expect a small crop of nuts by the fifth or sixth year, although trees aren't considered mature until they're 10 years old. A single tree will commonly yield 50-100 pounds of nuts per year. For commercial growers, a good yield is two-thirds of a ton per acre. That's for a mature Pacific Northwest orchard in good health.

chemical fertilizer or animal manure in planting hole. Stake new trees. Paint lower trunks with white, water-thinned latex paint to protect from sun scald.

Cut tops back by half and use the modified central leader training system. A bud will form at the cut. Train that as the new leader, or main scaffold branch. Over the next three years, prune to train three to five branches at strong angles off the scaffold. Leave at least a foot of vertical space between these branches to form a strong tree structure that will hold up to ice and heavy crop loads. After five years, or so, cut out the scaffold branch. Begin pruning then with a multiple-leader system.

Avoid applying nitrogen for the first year. If needed later, apply nitrogen in early spring. Test soil for other fertilizer needs.

If nature has good timing, trees will self-pollinate from male catkins to female flowers. Two or more trees ensure greater nut production. Plant walnut trees 30-feet apart. Expect 18-30 inches of annual growth on healthy trees. Walnut trees mature at 50-60 feet

*Continued on Page 20*



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### Growing Issues

Different regions of Oregon create different challenges for walnut growers. The coastal region is wet and cool, which encourages blight development, shell perforation and kernel shrinkage. The region east of the Cascades, with harsher winters, is a challenging area to grow walnuts. Oregon Walnut production is best east of the coastal mountain range in the Willamette Valley.

Temperatures over 100-degrees Fahrenheit may cause hull sunburn, which could result in dark kernels, or dark-speckled kernels, or even complete failure of kernels to develop. Spring frosts can damage the walnut crops. For this reason, early-leaving varieties should be avoided.

Walnut blight is a bacteria spread by water—rain, fog, mist. To control blight, spray with copper three times during

Franquette tree with developing walnuts.



bloom period, or after rain.

Husk flies overwinter as larvae in the soil. To avoid their maggots, control spray in mid to late July and again three weeks later.

Walnut aphids are pale yellow. The piercing and sucking insect lives on the underside of leaves. Control large populations, which can affect nut crops.

### Harvesting and Drying

Expect walnuts to fall in October. To avoid mold and discoloration, pick up nuts as soon as husks are loose. Wear gloves to prevent stained hands or irritated skin. Dry nuts within 24 hours of gathering.

There are still commercial nut dryers in Oregon, including at least one in the Hillsboro area of the Northern Willamette Valley and one at the south end of the banana belt in the Eugene area.

### A Look at How Two Different Families Market Walnuts

Walnuts are something of a niche market, often run as small, family operations. Charlie Chegwyn and his sister, Agnes Chegwyn of McMinnville, ran

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such a walnut operation for years. They have walnut trees planted around their house and outbuildings, near the road, and in a 14-acre orchard.

"It's quite a process," Agnes said, "and you hope the weather works out and all that."

Walnut growing runs in the Chegwyn's blood. Charles and Agnes' parents ran a small walnut operation during WWII. In the 1940s, the Chegwyns gathered up the nuts and hauled them to a dryer. "We'd take them down to a Dundee processor," Agnes said. The nuts were sold through a co-op. "They were very particular about the color of them, oh my. The blight stuff—that was part of your grading out and sampling. If they find much of that, you'd be docked."

A big freeze in 1955 damaged that year's walnut crop. "What fields we had then survived," Agnes said, adding that

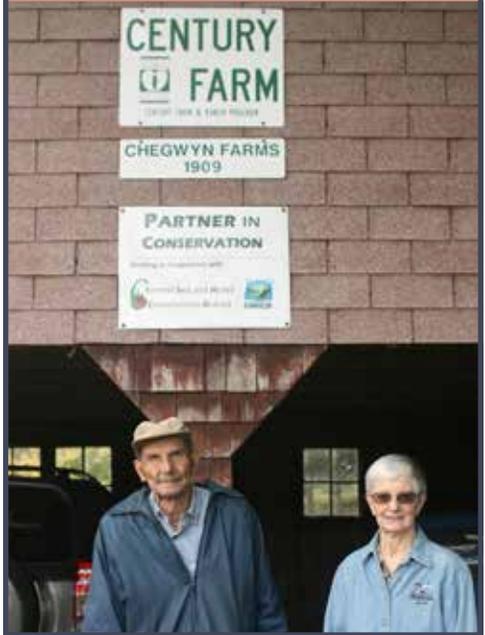
it did a lot of freeze damage to other growers' trees that were up in the hills at higher elevations. "As far as Columbus Day storm and walnuts, it did away with that crop." That 1962 storm not only ruined the Chegwyn's walnut crop that year, Agnes recalls, it blew over some of their trees, too.

"People planted some more walnuts and started planting filberts then," Agnes said.

Charlie and Agnes got out of the walnut business in 2009. "You let somebody else worry about those things and make those decisions," Agnes said.

The siblings, now in their golden years, wanted to make sure the family land forever remained farmland. The brother and sister did a land swap, trading land near a new housing development for a city park and a school,

Siblings Charlie and Agnes Chegwyn of McMinnville, Oregon, pause under their family's Century Farm sign. The Chegwyns grew walnuts, among other crops.



*Continued on Page 22*



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Continued from Page 21

in exchange for more farmland further out. They deeded over their farm, including the 14-acre walnut orchard, to the Yamhill Soil and Water District. The district, in turn, leases the Chegwyn walnut orchard out to Schmidt Farm.

There is still one member of the Chegwyn family who has kept a hand in walnuts. Charlie and Agnes' sister, Kathleen, and her husband, Harlan Mastenbrook, of Lebanon, send a crew up to McMinnville to collect walnuts each fall from the family farm. The crew hauls two to four tons of nuts to a dryer in Hillsboro. After the nuts are dried, they are delivered to Lebanon, where Harlan and Kathleen spend three months shelling them.

"We crack them as fast as we can. We don't keep them in the shell," Harlan said, adding if the nuts stay in the shell in an unheated space, they will draw moisture and have to be dried again.

"We sell them to different people and at bazaars around town," said Harlan, who will turn 89 in a few months.

"It's very small," Kathleen said. "Just a family thing."

"We used to send 20 pounds to a lady in Colorado. Box them up and ship them," Harlan said. He and Kathleen had someone in Australia interested in purchasing nuts, but the agricultural import/export laws proved too steep a hurdle for the couple to want to jump.

Schmidt Farm, in McMinnville, produces walnuts on a

larger scale. All total, they grow around 40 acres of walnuts. They grow additional acreage of hazelnuts, and have a partnership in a chestnut orchard. As a little boy, T.J. Schmidt followed his grandpa around the nut orchards. Now it's T.J. who cares for the trees, helps with harvest and keeps his and other farmers' equipment running.

After the Schmidt's walnuts are machine picked, they run the nuts through a wash line and dryer. "They go through several sanitation processes," T.J. said. The nuts are then sized and sorted for market.

T.J.'s wife, Rachel does fresh market sales from a roadside business at their farm. She also sells at Portland farmers markets. Right before Christmas, she sells at local fairs and bazaars, offering 5, 10 and 50 pound bags of walnuts in the shell. The Schmidt's have a friend who helps with sales, too. Some of Schmidt Farm's walnuts are sold to a broker, who ships the nuts—in shell and out—to China.

*Comments about this article? We want to hear from you. Feel free to email us at [article@jcsmarketinginc.com](mailto:article@jcsmarketinginc.com)*

T.J. Schmidt stands under a Franquette walnut tree on Manregion rootstock at his family's Schmidt Farm orchard.



An old walnut orchard in McMinnville was knocked over because it had fallen into neglect.



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# Pistachio Bloom Affected by Dust

By **CECILIA PARSONS** | Associate Editor

**P**ISTACHIO TREES, WITH their male and female flowers borne on separate trees rely on wind to deliver the male pollen to the female flowers. Both the male staminate and female pistillate flowers, are panicles composed of hundreds of individual small flowers. The florets of male and female flowers are without petals with fully exposed anthers and stigmas, respectively, are vulnerable to wind, high or low temperatures and rain. University of California scientists Louise Ferguson and Lu Zhang began examining the effects of dust at pollination in 2016. Research was funded by California Pistachio Research Board and done at the request of Kern County farm manager Alan Scroggs and former Kings County farm advisor Bob Beede. Ferguson and Zhang began.

## Dust

Dusty conditions in pistachio orchards during bloom can also affect successful pollination. Recent research has shown University of California scientists Louise Ferguson and Lu Zhang, with funding from the California Pistachio Research Board, and at the suggestion of Kern County farm manager Alan Scroggs and former Kings County farm advisor Bob Beede began examining the effects of dust on pollination in 2016. They conducted both laboratory and field trials to determine if dust generated by wind or machinery damaged pollen viability, stigma quality or interfered with successful pollination.

A common springtime practice for pistachio growers is mowing the row middles for weed control; especially

after a wet winter. Once the ground is dry, however, considerable dust is generated by mowing the weeds and it can envelope the blooming and leafless tree canopy. Windy spring days in the Central Valley can also generate dust.

## Dust Size

Ferguson's research notes that the diameter of orchard dust is between 1-100 microns. The diameters of the female stigma and male pollen in pistachios are 500 microns and 20 microns respectively. Dust this size can easily compete with the pollen for space on the stigma. Field dust has been demonstrated to inhibit pollen load on the female floral stigmas in other crops. The result is poor pollination.

In addition, the female flower's

acidic stigmatic secretions that assist pollen hydration and germination can be damaged by alkaline dust. Earlier research has also shown that the application of lime sulfur at bloom inhibited pollen tube growth and reduced fruit set in apple crops.

## Research Trials

Ferguson and Zhang's trials in 2016 and 2017 demonstrated that dust during pollination damaged both pollen viability and stigma quality, resulting in significantly less successful pollination. Dust contaminated with herbicide residues was found to be particularly damaging.

The life span of the stigma of an

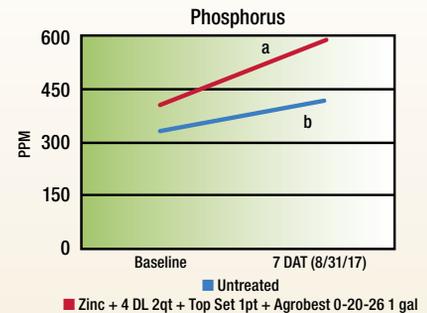
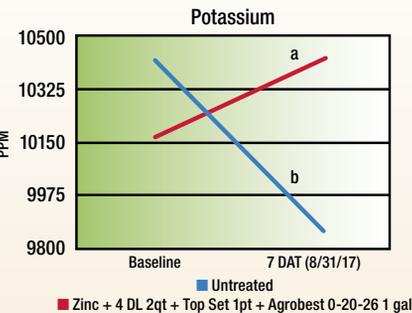
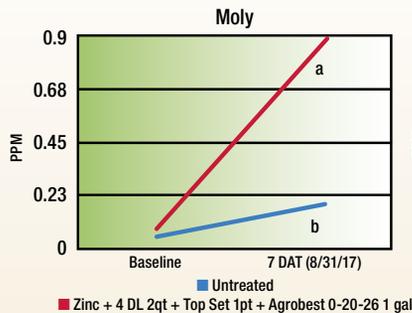
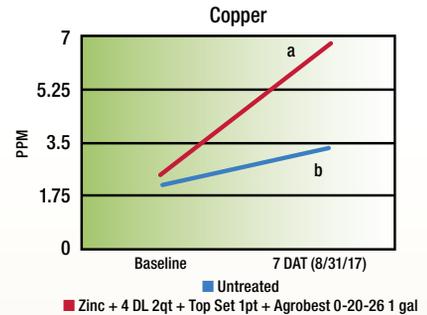
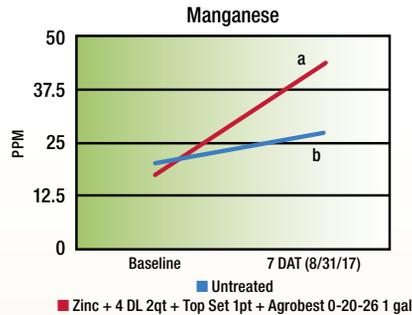
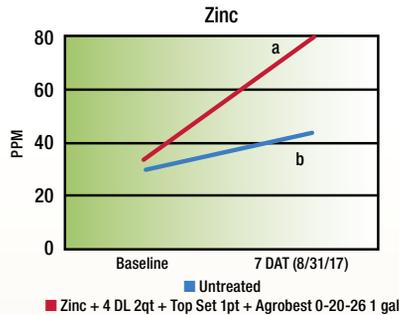
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**Table 1.** Viable pollen rate, fruit set, nut drop, blank and split rates of trials with pollen and dust mixtures in different ratios and treatments with male cultivar Peters and female cultivar Kerman in 2007. Values within the same column followed by the same letter are not significantly different according to Duncan's test (P=0.05).

Treatments	Viable Pollen Rate(%)	Fruit Set(%)	Nut Drop (% May Harvest)	Blank Rate(%)	Split Rate(%)
Control		3.62C	46.43B	83.33A	0.00B
Pollen	24.39	18.22AB	11.47BC	10.87B	51.65A
Dust	0.00	3.30C	0.00C	80.00A	10.00B
P:D 1:1	19.59	17.00AB	10.38BC	16.48B	61.72A
P:D 1:4	10.95	24.23A	15.35BC	42.58AB	30.87B
P:D 1:16	4.20	11.50BC	16.96BC	39.33AB	31.61B
1:1 toxic	2.54	5.23C	100.00A		
P-D 1-1		11.93BC	36.80BC	25.60B	43.60AB

# Do your foliar nutrients penetrate thick, waxy summer pistachio leaves?

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not penetrate well, especially from mid-summer onward after the pistachio leaf has hardened off and developed a thick waxy cuticle, making them ineffective. But Agro-K's **System**® and **Dextro-Lac**® foliar product lines are designed to rapidly and completely move through even the toughest, hardened off, waxy pistachio leaf – even in late summer, making them extremely effective nutrient delivery tools.

Agro-K's penetrating formulations allow growers to capitalize on the free-ride available with a summer Navel Orange Worm spray to apply the right nutrients, in right form, at the right time, in the right mix and in the right place – the 5 R's for foliar nutrition. Applying effective nutrients based on a "Science Driven™" approach which can penetrate leaf tissue will help maximize **nut size** and **splits** on this year's crop, increasing per acre

returns. In addition, foliar nutrient programs added to late season NOW sprays will also increase next year's crop. Even though this year's crop has not yet been harvested, by mid-season the tree is already building next season's crop. Take advantage of the free ride to influence it!

In an August trial a mix of Agro-K nutrients, both micro and macro, were applied to pistachio trees. Utilizing a novel SAP testing methodology over standard tissue testing allowed for analysis of "free nutrients" only; meaning those nutrients currently mobile within the plant's sap and immediately available for plant use. Conventional tissue testing measures what is already bound within the leaf structure and mostly immobile. Measuring sap nutrient levels effectively detects recent nutrient changes. The charts above show **statistically significant** changes in six different nutrients 7 days after application. Zinc, manganese, copper, molybdenum, potassium and phosphorus levels all increased statistically vs. the control in the week after application of **AgroBest 0-20-26, Top Set DL and Zinc +4 DL**.

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individual pistachio floret is two to three days. After that time the stigma quality deteriorates and cannot be pollinated. Research done in 2002 found that as a wind-pollinated species, the amount of viable pollen loaded on a stigma is the first step in pollination. It only takes 14-15 pollen grains per stigma for adequate pollination in pistachios.

### Pollination

When germination occurs, the pollen tubes grow the length of the female floret style to the opening in the ovary's outer layer. Fertilization is complete upon entry to the ovary.

Stigma condition, pollen tube growth, ovule longevity and the effective period between pollination—when pollen lands on the stigma—and growth of the germinated pollen tube through the style and fertilization of the ovule are all work together for successful fruit set.

In their research Ferguson and Zhang focused on how dust influences pistachio pollination, including if dust directly destroys the stigma, decreasing the pollen-stigma interaction.

Another area of study was the herbicide residues and their affect on pollination and yield. Finally, they looked at dust influence on pistachio nut growth and split rate.

### Dust at Bloom

In early spring of 2016 and 2017, pollen was collected from male Peters

pistachio trees in early blooming orchards. Pollen activity tests and a fruit set and yield investigation were initiated. Bagged Kerman flowers were hand pollinated on three successive days with dust, pollen and a dust and pollen mixture.

Ferguson's report noted that applying dust at bloom to the flower pistils sharply decreased fruit set compared to flowers dusted with pollen. At harvest the nuts on rachises treated with dust were virtually all blanks. In the 2016 study, the rachises receiving dust produced 32 percent fewer nuts by count and 38 percent in nut weight compared to rachises with applied pollen. In the following year, the pollen in dust mixtures with different volume ratios were applied to fresh flowers. Ferguson said that generally, the higher the dust levels of the mixtures, the lower percentage of fruit set and nut yield. While some of the pollen and dust mixtures produced a high fruit set, the filled and split percentages of the mature nuts were significantly lower than with the pure pollen application.

Compared to the mixed dust and pollen applications with ratios of 1:1 and 1:4, the fruit set of treatment of dust application followed by pollination, was significantly lower. This result, Ferguson said in the report, suggested that dust blocked the interface for the pollen-stigma interaction and fewer pollen grains were able to generate pollen tubes to complete fertilization. Among

all the treatments, production from the 1:1 trial with the herbicides were the worst with less than 5.23 percent fruit set and 100 percent nut drop before the harvest.

### Dust to Pollen Ratio

The study showed that the higher dust to pollen ratio, the lower the pollen viability. The strong relationship between pollen viability and blank and split rates suggests that poor pollen quality could be an essential factor in causing blanks and low split percentages in pistachio production. The percentage of viable pollen grains after application of the dust and herbicide mixture was significantly lower than pure pollen and the 1:1 pollen and dust. This demonstrates that herbicide residues introduced into the pollination process with dust can destroy pollen viability.

Results of the studies suggest that field dust, particularly dust containing herbicide residues can prevent successful pollination in pistachios and lower yields. To decrease the amount of dust entering an orchard or generated in the orchard, potential control measures include wind breaks where orchards are adjacent to open fields, not mowing middles during pollination and applying preemergent herbicides as early as possible.

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# Getting the Most Out of a Golden Hills Pistachio Harvest



By CRAIG E. KALLSEN | UCCE Citrus and Pistachio Farm Advisor, Kern County

**UC** | University of California  
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**P**RIOR TO THE RELEASE OF the cultivar Golden Hills, pistachio growers in the San Joaquin Valley (SJV) of California were accustomed to harvesting a single female cultivar

named Kerman. Since Kerman was the only female cultivar that most growers had any experience with, the way Kerman was harvested became synonymous with how pistachios, in general,

should be harvested. However, different cultivars have “individualities” that should be addressed to make a harvest more successful. What makes for a successful Kerman harvest is not, necessarily, that which makes for a successful Golden Hills harvest and vice versa. Although Golden Hills was released from the University of California breeding program to the pistachio industry in 2005, acreage did not begin to increase appreciably until 2012, when approximately 3000 acres were planted. Assuming all goes well in orchard establishment, pistachio require approximately five or six years to produce a crop worth harvesting. If we do the math, only in the past few years have significant numbers of Golden Hills orchards been harvested. With 65,000 acres of Golden Hills in the ground now, the objective of identifying practices for a more efficient and productive harvest of Golden Hills is well-worth pursuing.

Randomized and replicated research trials have demonstrated that trees just coming into bearing will harvest later than mature bearing trees. Since many of the older Golden Hills trees in the SJV are just coming into bearing, or have been bearing for just a few years, they will tend to harvest closer in time to older Kerman trees. However this will not continue. A finished harvest for a mature Golden Hills orchard is completed 10 days to two weeks before

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a mature Kerman orchard, if growing in the same valley location.

### Harvest Golden Hills in a Timely Manner

It is even more important to harvest Golden Hills when nuts are first ready, than it is for Kerman. Nuts of Golden Hills will not “store” on the tree while awaiting harvests as long or well as those of Kerman. Almond growers sometime use the term “dry down” to refer to the process of drying out the orchard, in particular the orchard floor, prior to harvest. Unless you have the soggiest, highest saturation-percent-age soils in the SJV, if you want clean, split nuts the term “dry down” is not applicable to pistachio production, especially so for growers of Golden Hills. Air temperatures are hot when Golden Hills is ready for harvest. The trees will be transpiring at very high rates. Hot temperatures will age mature nuts more rapidly than late summer or fall temperatures, and negative quality issues such as the hull adhering to the nutshell and dark shell staining will occur more rapidly. For many blocks, if you cannot get in and harvest the nuts within two or three days after shutting the water off, you need to fix the leaks in the irrigation system, correct the irrigation distribution inefficiencies, or adjust irrigation scheduling. If wet fields are not keeping you from harvesting but harvests have been late, it might be time for a serious talk with your harvest contractor, or if acreage warrants, maybe purchasing some harvesting equipment may be a possibility. There is no reason to have a “bone dry” root-zone prior to or after harvest. Heat stressed trees through and after the harvest period will cost you money, in terms of both nut quality and yield, this year and next year.

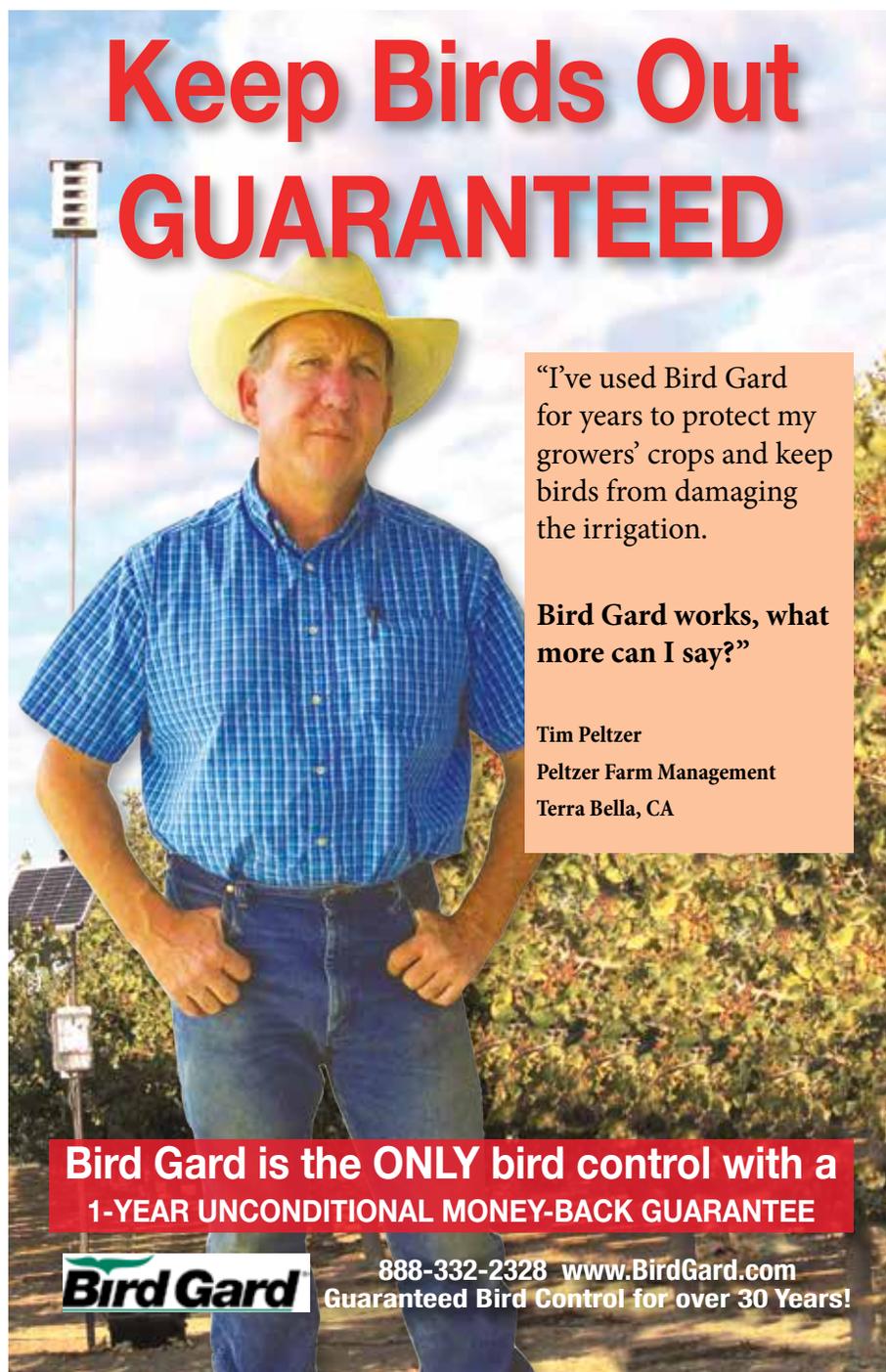
### Timing the Golden Hills Harvest

Once a majority of the hulls split harvest can begin. The greenish “stick-tight” hulls are most likely blank nuts (that is, do not have a kernel). Do not use hull tatter (that is, the early disintegration of the hulls) to gauge harvest with Golden Hills. The hull of Golden

Hills nuts do not tatter nearly to the degree as those of Kerman when ready for harvest. Most of the nuts will be split and ready for harvest even if many of the hulls remain intact. If you wait until most of Golden Hills’ hulls have tattered, you are harvesting too late. An advantage of intact hulls at harvest may be reduced navel orangeworm infestation compared to the nuts under the tattered hulls of Kerman.

*Continued on Page 30*

**Air temperatures are hot when Golden Hills is ready for harvest.**



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Continued from Page 29

## Golden Hills is Amenable to a “Single Shake”

Pistachio nuts never touch the ground. Machinery is used which shakes the tree trunk, catches the falling nuts and moves them to bins or vehicles for transport to trailers headed for the processing plant. An individual harvest, across the orchard, is called, commonly, a “shake”. For the purpose of this article, the definition of a double shake is when an orchard is harvested twice and approximately equal weights of nuts are harvested within each of the two shakes. A double shake is composed of a light, initial shake (commonly called a “bump” shake in which the rachis of the cluster remains attached to the tree) and a hard shake roughly 10 days or more later. Using this nomenclature, if more than 90 percent of the total nut load is removed during the first shake, the following shake is more of a “sanitation” shake and falls outside this definition of a double shake.



**Figure 1.** Golden Hills Nut Cluster—these nuts are ready for harvest. The hull may feel somewhat firm on some, but most will separate cleanly from the shell in the huller.

Bloom and harvest evaluations over many years have demonstrated that the relatively short bloom period for Golden Hills translates to more even nut maturity across the tree at harvest than is the case for Kerman or the cultivar Lost Hills. Because of the more even maturity of nuts across the tree, a double shake is unnecessary for Golden

Hills, unless bloom was extended abnormally due to poor winter chilling or cool harvest conditions. For mature trees, when the hulls of the most advanced nuts begin to slip and are ready for harvest, waiting an additional eight to ten days, will usually allow

*Continued on Page 32*

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the harvest of 95 percent or more of the nuts in a single shake. Do not rush harvest. If you shake the first nuts early for Golden Hills, when only 50 percent are ready, you will need to come back in a week or less to remove the remaining nuts and maintain nut quality. Most growers are not prepared to come back to the same orchard in a week or less for a double shake and nut quality can decline rapidly for a delayed second shake. By waiting a few more days for the first shake, until 95 percent or more of the nuts are ready, most of the crop will be at the processor before the first shake of Kerman, and suffer little if any loss in terms of nut quality even if compared to the results from two well-timed separate shakes.

If mature 'Golden Hills' trees are being harvested at the same time as Kerman in a given location, probably harvest timing did not go as well as it could have. Even if a second shake of mature 'Golden Hills' is necessary, normally, it will be completed before the first shake of Kerman for trees of the same age in the same location.

Assuming the nuts were processed at the plant in a timely manner, a high percentage of nuts having the hull adhere to the shell, or with dark stains on the shell, signifies that the harvest was later than it should have been. If only the percentage of adhering hull is high, and the percentage of darkly stained shells is low, it suggests that the harvest was too early.

Even if a second shake of mature 'Golden Hills' is necessary, normally, it will be completed before the first shake of Kerman for trees of the same age in the same location.

Figure 2. Do not begin a Golden Hills harvest too early. The nut maturation window is short and waiting a few days will allow most of the nuts to be harvested in a single shake.



### Post-Harvest Irrigation

The yield and nut quality data for Golden Hills in our studies were obtained in small trials within larger blocks of 'Kerman'. Golden Hills, after harvest, was irrigated based on the full irrigation requirements for Kerman, which had not yet been harvested. Thus, Golden Hills, typically, received a generous post-harvest irrigation.

The pistachio tree has been shown to produce and store significant quantities of carbohydrate in the fall for future nut production and growth next year. For optimal yields and if green leaves are present, continue to meet water requirements of the mature trees after harvest (which may be an additional month or six weeks). Attempting to institute post-harvest regulated deficit irrigation on Golden Hills, which, usually, is harvested by the end of August or early September in the southern SJV, may produce yield and nut quality results quite different from the fully irrigated post-harvest trees in our small experimental trials.

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# MACADAMIA PRODUCTION IN CALIFORNIA- who knew?

By SONIA RIOS | Subtropical Horticulture Farm Advisor- UCCE Riverside/San Diego Counties  
GARY BENDER | Subtropical Horticulture Emeritus Farm Advisor- UCCE San Diego County

**UC** University of California  
**CE** Agriculture and Natural Resources ■ Cooperative Extension

**M**OST OF THE NUT ACREAGE IN CALIFORNIA can be found in the San Joaquin Valley. There you can find almonds, pistachio, pecans, and walnuts, however what you won't find is the macadamia tree. The macadamia tree can be found in high humidity subtropical climates such as coastal Southern California and some parts of the central coast (Figure 1, see page 35). The bulk of the macadamias that are grown in California are grown in the

San Diego County area. Most of the crop gets sold at farmers markets and other local venues, and through a small cooperative, the Gold Crown Macadamia Association. Macadamia nuts have the hardest shells to crack. The process of cracking the nuts also makes them a rare and expensive treat. The macadamia nut tree is a medium-sized evergreen tree with heavy, dark green foliage that is native to Australia. Hawaii is the leading macadamia-producing state in the US, and major global competitors for macadamias include Kenya, Costa Rica, South Africa and Australia.

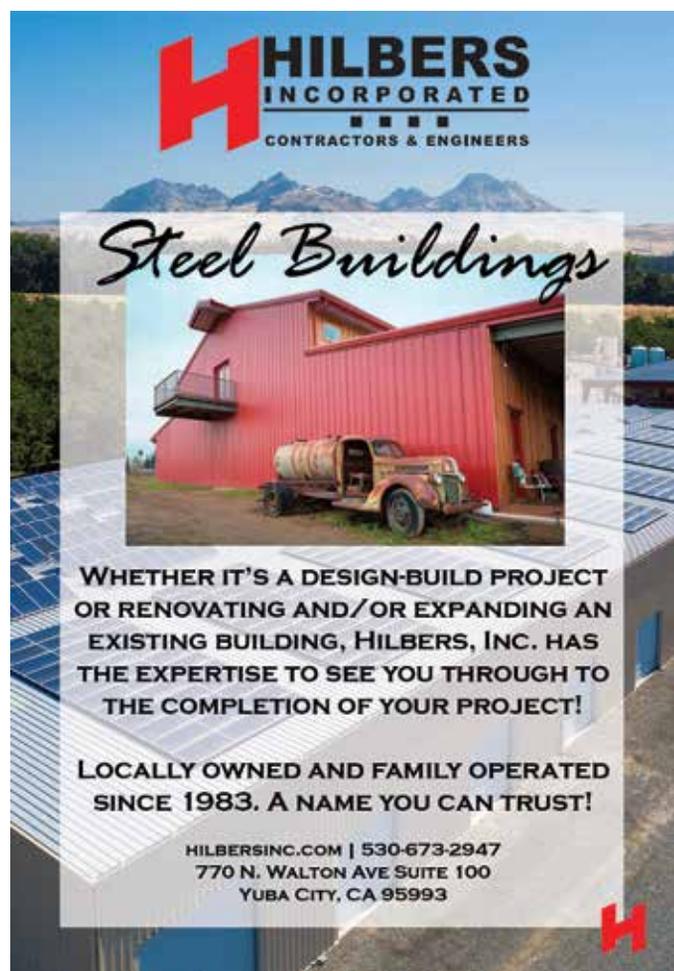
Macadamias are in the Proteaceae family, and the two species which are grown are *Macadamia integrifolia* and *M. tetraphylla*. The tetraphylla species is thought to be more tolerant of cold temperatures and is primarily used in California. The integrifolia species is more suitable for tropical countries and is grown in Hawaii for their macadamia industry.

## California History

In 1879 Professor C. H. Dwinelle of the University of California, Berkeley obtained seeds of *M. integrifolia* in Australia and planted the first known trees in the state along a creek in Berkeley. However, it wasn't until around 1910 that two nurserymen in Southern California, Ernest Braunton and Charles Knowlton placed the first macadamia seedling tree, a tetraphylla selection for sale. Though trees had been sold in Southern California for a few decades, it wasn't until 1946 that Wells W. Miller and Vernon A. Nuthall founded the M and N Nursery in Vista, California and became the first to specialize in and promote the macadamia as a replacement for avocados that had died on phytophthora root-rot infested lands. Currently, the California macadamia industry has three major varieties that are used, 'Cate' (*M. tetraphylla*), 'Beaumont' (a hybrid between *M. tetraphylla* and *M. integrifolia*) and 'Vista' (a hybrid).

## Biology

For commercial production the trees are propagated by grafting. Macadamias are a long-term crop taking an average four to five years from planting before cropping commences,



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Figure 1. Mature macadamia orchard. Photo courtesy of Jim Russell.



Photo courtesy of Sonia Rios.



Figure 2. Green, fibrous husks and hard, outer shells called pericarps protect the nut. Photo courtesy of Sonia Rios.

"Macadamias are a long-term crop taking an average four to five years from planting before cropping commences, seven years before commercially viable yields are produced and 10 to 12 years before breakeven."

seven years before commercially viable yields are produced and 10 to 12 years before breakeven. However, they have been known to live up to and keep producing up to 100 years old. The trees are evergreen and everbearing; they have leathery leaves much like holly that are shiny and 7-12 inches long. Integrifolia leaves are smooth sided and the tetraphylla leaves are somewhat spiny along the edges. The trees themselves can grow up to as much as 60 feet high in the tropics, but usually about 25-30 feet high in California. Many of the selections are alternate-bearing, meaning alternate years produce light then heavy crops from a single tree. The 'Cate' variety does not show very much alternate bearing and is the preferred variety in California.

They produce clusters of flowers

(known as racemes) that are white or pink; about 300-600 flowers appear in sprays. The flowers are perfect but incomplete, they lack petals. The flowering of the trees occurs over a four to six-month period. The trees are bee-pollinated flowering, so beehives are usually imported into the orchards. Each flower spray produces up to 20 nuts, which have green, fibrous husks and hard, outer shells called pericarps (Figure 2). The shells do not split in the tetraphylla selections on the tree, but sometimes split as the nuts ripen on the trees in the some of the hybrid selections. Each nut (including the kernel in its shell) is approximately 1/2 inch to 1 inch in diameter. The nuts mature at different times over the course of the year but most of the crop in California will fall to ground from late fall through spring. It

is recommended to collect the nuts from the ground because shaking the trees will knock down immature nuts.

Common Cultivation Practices

Macadamia trees require rich soil, about 50 inches of rain per year (in the tropics) or supplemental irrigation in California (about equal to an avocado tree) and temperatures that are not only frost-free but that vary within a limited range. The soil must also drain well as the trees do not do well in clay soils as the trees' tap roots cannot survive in such heavy soils (most of the tree roots are located on the top three feet of the soil line). Most growers use drip systems or micro-sprinklers in their orchards to conserve water. It is

Continued on Page 36

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Continued from Page 35

highly recommended to use mulch to reduce water loss and tensiometers or other types of moisture-monitoring equipment will be helpful with irrigation management. The ideal soil pH for macadamias are 6 to 6.5. To raise pH levels, one would add either lime, wood ashes, organic matter, or seaweed. If pH levels are too alkaline, growers will add sulfur, peat moss, evergreen needles, or ground bark.

As mentioned, ripened and un-ripened nuts look identical, so growers usually wait until the nuts fall to the ground and harvest multiple times a season. The nuts are harvested through a complicated process that includes clearing weeds and debris from underneath the trees, gathering by hand or picking them with a mechanical picker (including golf-ball retrievers). In Hawaii, blowers are sometimes used to blow the nuts and fallen leaves into windrows so they can be collected by

machine, but this can seldom be done in California due to the hilly terrain. Nuts are immediately run through a de-husking machine and then air dried on racks for two to three weeks (**Figure 3, see page 37**). The drying is necessary to prevent mildew and rot. Heat drying is then usually done to finish the process. This could be done at temperatures of 95 to 110 degrees for about two to five days. The nuts are then packed in heavy plastic bags for storage and shipping.

### Pests

Macadamias are susceptible to vertebrate pests such as squirrels, gophers, and rats. Squirrels and rats can cause erosion and damage the developing macadamia nut. Gophers will chew on the roots, weakening them making it to susceptible to root rots. Traps seem to be the most commonly used practice in the industry.

Stink bugs and navel orangeworms (NOW) are considered moderate pests of macadamias but usually not to the

point where treatment has to occur. Navel orangeworms can be quite a challenge to control because the larvae live inside and cause damage in the growing nut making it difficult for pesticide application. Green stink bugs can also cause havoc in a macadamia orchard. They use their stylet to pierce through the nut causing mold and pathogens to reproduce, resulting in a discolored ruined nut. Stink bug damage can be reduced by removing compost piles away from the orchard, they use these piles for reproduction and shelter.

Besides being a tasty treat macadamia nuts are an excellent source of iron, calcium, vitamin B, and phosphorus. Although they contain 73-80 percent fat, the fat is monosaturated or "good" and as acceptable as olive oil in many diets. So the demand for local macadamias is at an all-time high. However, macadamia production in California will continue to struggle and be threatened due to water and land prices in San Diego County. They are a labor-intensive

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commodity and will take many years for growers to get a return profit. In our experience, California macadamias growers seem to enjoy growing their nuts and despite the slim profits look forward to working the farmer's markets and the companionship of the other farmers and their customers.

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Figure 3. Drying racks. Photo courtesy of Jim Russell.

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# IRRIGATION BY VARIETY IN ALMOND ORCHARDS

By KELLEY DRECHSLER | PhD Student in Biological Systems Engineering, UC Davis

**UC** | University of California  
**CE** | Agriculture and Natural Resources | Cooperative Extension



Aldrich variety used in the irrigation by variety research. Photo courtesy of Kelley Drechsler.



Butte variety used in the irrigation by variety research. Photo courtesy of Kelley Drechsler.

**A**S FARMERS FACE INCREASING pressure to use water wisely due to environmental and policy changes in California, the importance of developing site-specific irrigation practices has never been more important.

## Site Specific Irrigation

Site-specific irrigation management can account for heterogeneous soils, variable topography, diverse tree varieties and ages, changing environmental conditions, and more. In almond orchards, which typically have two or three varieties to improve cross-pollination, diverse tree varieties offer a potential application of site-specific irrigation management.

My major advisor, Dr. Isaya Kisekka, and I have begun an experiment to investigate the potential of irrigation by variety as a form of site-specific irrigation. Could farmers improve quality, yield and/or crop per drop by independently irrigating tree varieties?

The motivation to study irrigation by variety comes from the growth patterns of almond trees. Different almond varieties experience critical growth stages, such as bloom, hull-split, and harvest, at different times during the year. When one variety has certain water requirements, another variety in the same orchard may be in a different growth stage with different water requirements.

## Hull Split

For example, the timing of hull split varies among almond varieties. An almond farmer may strategically reduce

irrigation (i.e. regulated deficit irrigation) to promote the onset of hull split, reduce the risk of hull rot, and decrease water use. However, it can be difficult to determine when to reduce irrigation in almond orchards with multiple varieties without an irrigation system that offers farmers the ability to implement regulated deficit irrigation in one variety and not the other(s).

As a result of conventional irrigation systems that have only one line supplying water to all varieties within the orchard, irrigation strategies are geared toward the needs of highly profitable varieties, such as Nonpareil. For example, a farmer might cut back irrigation in all varieties to promote the onset of hull split in the Nonpareil even though late-maturing varieties in the same orchard may not be ready for reduced irrigation. When Nonpareil is in the hull split stage and could benefit from reduced irrigation, late-maturing pollinator varieties may still be in the kernel development stage and would prefer well-watered conditions

## Reducing Harvest Complications

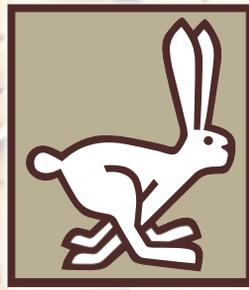
Irrigating multi-variety almond orchards around harvest is also tricky. Farmers need to reduce irrigation immediately before harvest to avoid bark-splitting during shaking, but this is also a critical time for some varieties when buds are internally splitting into next season's buds and need water. Furthermore, after the first variety has been harvested, almonds are drying

on the floor, limiting irrigation in all varieties, even the ones that haven't been harvested. Irrigation systems that offer flexibility to independently irrigate varieties may reduce complications that occur during harvest.

In micro-irrigated orchards arranged with whole rows alternating among varieties, irrigation management by variety could be straightforward to implement. Independent submains could supply water to each variety. Alternatively, individual rows could be interfaced with independent valves that could be opened/closed depending on the needs of the tree variety. During the harvest period, double-drip laterals could be modified into single-drip laterals by blocking one side and shaken almonds could be blown to the other side to allow half the row to be irrigated while the other half stays dry. The irrigation system could be modernized to allow each side of the row to be independently irrigated. This would offer greater flexibility for irrigating at the right place, at the right time, and the right amount, depending on variety-specific growth stages and harvest-related constraints.

While the potential benefits of irrigating by variety may seem apparent, a full-on experiment is needed to back up the notion. As a part of my PhD research, my goal is to determine if irrigating by variety could offer potential quality, yield, productivity, and

*Continued on Page 40*



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profitability improvements to almond growers.

## Regulated Deficit Irrigation Research

In 2018, we conducted a regulated deficit irrigation experiment in a mature almond orchard at Nickels Soil Lab near Arbuckle, California. The four-acre orchard alternates among Butte, Aldrich, and Nonpareil varieties. We interfaced a remotely controlled irrigation system to the orchard that allowed us to implement four different irrigation treatments in each variety. The four irrigation treatments were (1) 100/100/100 percent ET (evapotranspiration), (2) 100/75/75 percent ET, (3) 100/75/100 percent ET, and (4) 100/50/125 percent ET, where the first number was pre-hull split treatment, the second number was the hull split to harvest treatment, and the third number was the postharvest treatment. We replicated each combination of variety and irrigation treatment five times.

From the onset of hull split to the end of postharvest irrigation, we measured midday stem water potential in all replicates once every irrigation period to assess how the varieties physiologically responded to the irrigation treatments. We found that during the hull split to harvest period, the Aldrich stem water potential was significantly lower (more negative) than the Butte and Nonpareil. This was an interesting finding that encouraged us to look more closely at whether irrigation by variety could improve quality, yield, productivity, and profitability.

In order to test the hypothesis that irrigation by variety could improve yield, quality, and profitability, we will begin a modified study in 2019 where we compare 50 percent and 75 percent ET hull split treatments implemented according to (1) Nonpareil hull split and harvest timing and (2) according to variety-specific hull split and harvest timing. The former case simulates an orchard without the ability of irrigating by variety (i.e. everything is based on Nonpareil needs) whereas the latter case simulates an orchard with the ability to

“Irrigation by variety could be a potential application for emerging remote irrigation control systems on the market that conveniently allow farmers to compartmentalize their orchards into different treatment zones.”



Nickels Field Day. Photos courtesy of Isaya Kisekka.

irrigate by variety.

After the Nonpareil harvest, the shaken almonds will be blown to one side of the rows. The dripline on the side with the almonds will be blocked and only the other side will be irrigated by doubling the runtime as though it were double dripline. This will allow us to continue irrigating in the Butte and Aldrich varieties while Nonpareil almonds are drying. During this time, we will intensively monitor soil water content using transects of neutron probe access tubes on both the irrigated and non-irrigated sides in each variety. We will determine yield and quality in all treatments. Quality parameters to be measured include navel orangeworm, mold, blank, double, twin, shrivel, gum, sealed shell count, kernel count, and kernel dimensions. We will conduct statistical analyses to determine if there are any significant differences in yield, quality parameters, and stem water potential between irrigating by variety and not irrigating by variety at the two hull split regulated deficit irrigation

levels (50 percent and 75 percent).

We also plan to conduct an economic analysis on irrigation management by variety. The cost of modifying the irrigation system to allow for independent irrigation by variety and resulting changes in net profit from production will be considered. How can we re-engineer the irrigation system of an almond orchard to implement variety-specific irrigation and what is the return on investment? Irrigation by variety could be a potential application for emerging remote irrigation control systems on the market that conveniently allow farmers to compartmentalize their orchards into different treatment zones.

Results from this year will be presented at the Almond Conference in 2019. Funding for this project came from the Almond Board of California.

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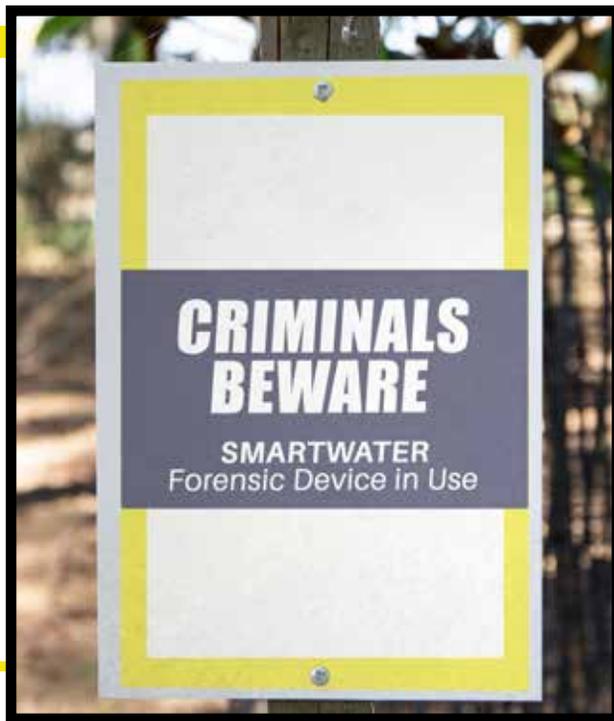
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# Theft Prevention and SmartWater

If something is easy to steal and easy to sell, a crime will be committed in rural California.

By CECILIA PARSONS | Associate Editor



**HIGH VALUE COMMODITIES** such as almonds, pistachios and walnuts have been stolen in bulk by sophisticated thieves. Quads and batteries on farms go missing when a criminal wants to make a quick buck. Either way, said Tulare County Sheriff's Sergeant Bobby Rader, someone believes they can get away with committing a crime.

## Good Verification

Nut thefts became big news in California several years ago when organized crime rings managed to drive away from processing facilities with truck and trailer loads of nuts. Rader, who supervises the Ag Crimes Unit at Tulare County Sheriff's Office, said thieves took advantage of gaps in the verification process and succeeded in stealing truckloads of nuts. Losses were sometimes not discovered until the intended buyers called to ask where their shipments were.

"It is imperative that a processor has a very good verification process that is always followed," Rader said. The fact that only one bulk nut theft was reported in the past two years shows that processors and handlers have stepped up security, he said. Rader is adamant, that if a weakness in the verification process can be identified, there

is a thief who will take advantage of it.

A much tighter verification process is in place at nut processing facilities due to law enforcement networking, Rader said. In the past there were few challenges to a truck driver who showed up with paperwork to pick up a load of nuts.

Taking photographs of drivers, trucks, license plates and fingerprinting drivers is now standard practice at many processors. Rader said it is also a good idea to verify the legitimacy of the buyer at the other end of the phone call.

"Google is not good enough," Rader said about making sure the buyer is a legitimate company. Unless the person handling sales for the processor personally knows the buyer, some investigation of the company is warranted. Follow up calls to get complete information on the trucking company and driver is important.

When the truck shows up, he advised, call the company buying the load before the truck is loaded to verify the identity of the correct driver and trucking company while they are on the premises.

Documents such as bills of lading can be altered, Rader warned, trucking companies can be fake and drivers can be accomplices.

If all gaps in the verification process are closed and the process is followed for each load, Rader said he does not expect to see many cargo thefts this year.

## Signs of Criminal Activity

Besides catching the bad guys, Rader's job is to promote pro-active policing to assist farmers and their employees in recognizing signs of criminal activity and what they should do to prevent theft.

The big heists of valuable almonds and pistachios garnered lots of attention

**"When the truck shows up, he advised, call the company buying the load before the truck is loaded to verify the identity of the correct driver and trucking company while they are on the premises."**



Tulare County Sheriff's Department Sargent Bobby Rader checks position on a motion sensor camera in an almond orchard. The device was placed after a report of suspicious activity in the orchard. All photos courtesy of Cecilia Parsons.

technology available to prevent theft, Rader said.

### SmartWater

Tulare County made headlines when it became the first county in the state to adopt the use of SmartWater. This is a water-based, inorganic traceable liquid that contains a unique forensic signature. When applied to vehicles, tools or equipment it cannot be washed off. Rader said its use is primarily to

identify the owner when stolen property is recovered. It can only be seen with the use of a specific UV (ultraviolet) light. Signage on the property that SmartWater is in use can be a deterrent, Rader said, because, at least in Tulare County, thieves are aware of it.

The Ag Crimes unit has also used SmartWater to catch crooks.

Continued burglaries at a worksite

*Continued on Page 44*

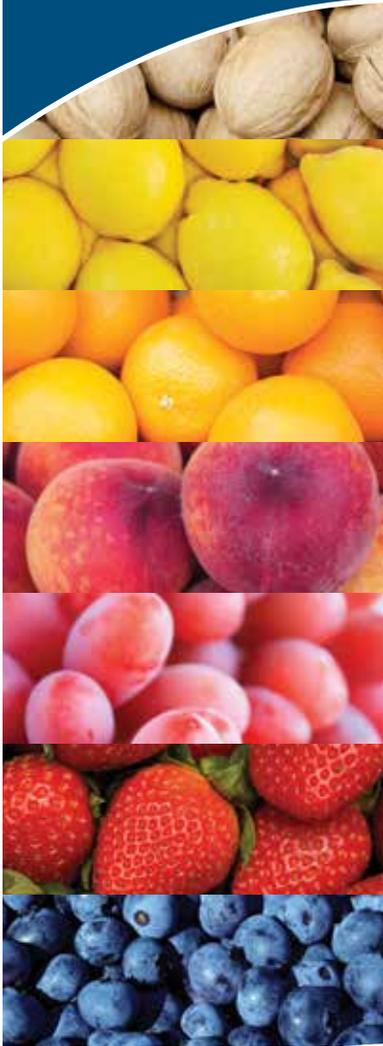
from law enforcement, processors and growers, but property theft from farms and ranches is the single biggest crime in rural areas Rader confirmed.

Presently, thieves have moved on from copper wire theft to battery theft. Prices for copper and scrap metal have declined, but batteries are a hot item with thieves. When there are numerous reports of theft of a particular item, Rader said, there are three issues. In one, a person puts out word that they will pay cash for batteries. That sets up petty thieves to find and steal. In another, a thief will see an unattended battery and know they can sell it to an unscrupulous recycler. Finally, Rader said that when there is a demand for batteries in Mexico, thieves with connections to buyers act accordingly.

It's not just the loss of the \$200 battery, Rader said. It's the cut cables, the loss of work and downtime, probably three times the actual value of the battery.

The high cost of theft is a primary reason to step up and adopt the

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"Prevention of theft can also be as simple as educating employees to report suspicious activity on the property in a timely manner."

Tulare County Sheriff's Department Sargent Bobby Rader checks images on his phone to monitor unauthorized vehicle travel in a Visalia area almond orchard.

*Continued from Page 43*

led them to apply SmartWater to a valuable piece of equipment which was subsequently stolen.

When the suspects were identified, he said they professed their innocence—until the UV light shone on their hands proved they had taken the equipment.

### Motion Sensing Cameras

In order to prevent theft of equipment, tools or vehicles, Rader said use of motion sensing camera systems to keep track of who is coming on the property could be helpful. These systems can pick up suspicious activity and alert the owner or farm manager. More sophisticated systems have a live video that can be accessed. Signs alerting trespassers that cameras are in use can also be a deterrent.

Having a video or photo of a suspect is a huge help to law enforcement when they are called to investigate a crime, Rader said.

### Theft Prevention

Prevention of theft can also be as simple as educating employees to report suspicious activity on the property in a timely manner. When employees come to work in the morning and see items missing or evidence of a break in, they should know to call and report right away. Employees should also be trained to notice and pay attention to people who don't belong on the property. Thieves are less likely to return if they know someone has noticed them and can describe or identify them later.

"Our mission in the Ag Crimes Unit is to protect property on farms and ranches, and we do our best to share information on preventing crime, but if these techniques are not implemented, theft will happen."

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# ORGANIC ACIDS— ARE THEY WORTH THE MONEY?

By RICH KREPS | CCA



Rich Kreps and his dog Callie checking the soil. "Know what's in your soil." All photos courtesy of Rich Kreps.

**WE HEAR LOTS OF TALK** about organic acids. What do they do? How are they made? Are they effective? Are they organic in the growing practice sense, or organic because they are carbon based? The best question is, "Are they worth the money?" Let's dive into them a little and just when the chemistry blows past the proverbial ludicrous speed and your eyes roll back in your head, we'll put it in laymen's terms to help you draw your own conclusions.

## Acids

We think of acids in terms of sulfuric acid: dangerous to handle, highly reactive and not recommended to spice up your evening cocktail. Acids actually come in many different strengths and reactivity. Ron Helland, the man who created a system to isolate hydronium acid (heavy water) without using a nuclear device, almost gave me a coronary on an acid demonstration. He dribbled some on a calcareous rock so we could see it fizz and bubble as it turned the carbonate into CO<sub>2</sub>. He then made water seem to instantly boil when he added baking soda to a glass of water and hydronium acid. Then he stuck his finger in pure hydronium and licked it. As we waited for his eyes to roll back and watch his tongue dissolve, he proclaimed, "It tastes kind of like vinegar." I sat there in astonishment like trying to figure out a David Copperfield trick when I realized, I don't know as much about acids as I thought. Which brings me to my point. Neither do soil scientists when it comes to humic acid, but they are figuring it out.

## Humic Acid

Humic acid is described in Wikipedia as: "A new understanding views humic

substances no more as high-molecular-weight macropolymers but as heterogeneous and relatively small molecular components of the soil organic matter auto-assembled in supramolecular associations and composed of a variety of compounds of biological origin and synthesized de novo by abiotic and biotic reactions in soil.[4] It is the large molecular complexity of the soil humeome [5] to confer to humic matter its bioactivity in soil and its role as plant growth promoter.[6]

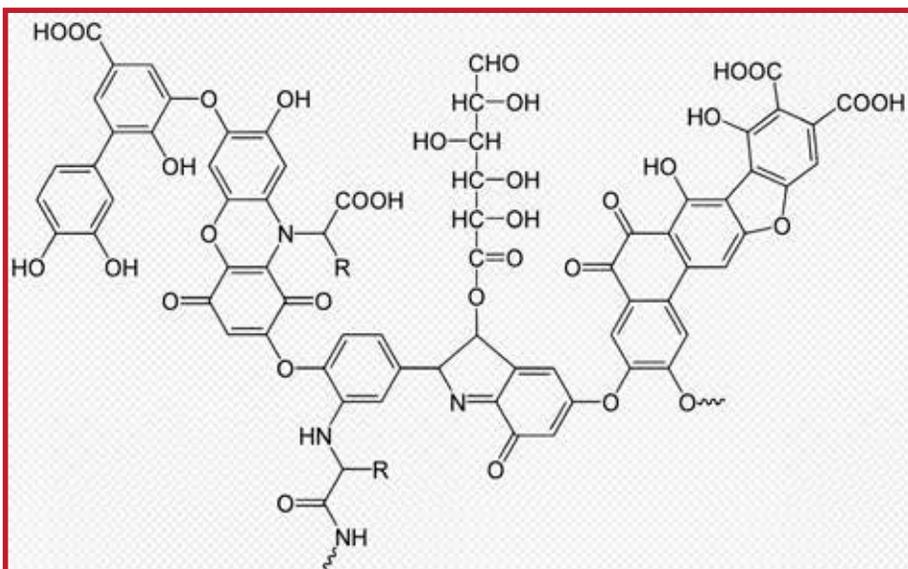
*Wikipedia contributors. "Humic substance." Wikipedia, The Free Encyclopedia. Wikipedia, The Free Encyclopedia, 16 March 2019. Wednesday 5 June 2019.*

Clear as mud right? I'll include a 2 dimensional picture of humic acid. It looks like a honeycomb with a TV antenna. However, in 3D, it winds and bends it way through space. Think of it

as a soil docking station with "Star Wars tractor beams". Scientists have been fighting for years over whether humic is actually used by the plant or it's just the plate off of which they eat. They are starting to think it is probably both. Why as farmers, do we care?

## Soil Organic Matter

When we add nutrition to our soils to feed our plants, they don't just drink it all. That nutrition usually has to attach to something like calcium to nitrate. Many times, its organic components



The "humic molecule."

(carbon based) have to be broken down into inorganic forms to be assimilated. That's where humic acid comes in. Soil humus is often referred to as the soil's organic matter (OM). Think of carbon as the jacks kids used to play with. Each of those points are attachment points for other elements to latch on to. There are multiple forces at play that "hold onto" those elements either strongly or weakly. This helps us get more nutrition into the soil and keep it in a form a plant can eventually use without tying up or leaching through the soil. And all that carbon feeds the soil microbiome as well. Those little critters eat that nutrition and transform it into plant ready forms.

### Other Benefits

There is another benefit. Humic acid is reported to hold 20x's its weight in water. That's a pretty big deal in California, where every drop counts. Soil organic matter holds the moisture and the nutrition in the root zone. Applying humic acid is like skipping the middle-man on compost applications or tilling

in last years detritus. I'm certainly not saying don't do that! It all helps bring up our western low OM soils. But it takes a long time for soils to break big chunks like grindings, leaves, compost and shells, into humic substances. You can do yourself a favor and add some to multiple applications per year in a fertigation event. Humic acid also breaks down further into fulvic components. In California, we aren't allowed to list the percentage of fulvic acid in a humic substance, but many manufacturers isolate fulvic for nutritional blends. While I compare humic acid to a plate, I associate fulvic acid as the fork that gets food into your system. Fulvic acid is a small enough molecule to translocate through leaf surfaces as well so it's a great nutrient carrier foliarly.

### Cost

There are many manufacturers that make humic acid and you need to make sure your advisor is giving you what you pay for. Of course, there are multiple price points as well. The more refined

it is, usually means the more costly it is. The good news is, it doesn't take much to have an effect. When you're already spending good money on nutrition, you want to keep as much of it available and in the root zone as possible. It is my opinion that organic acids will do that.

Once again, I recommend verifying the claims. Single out a piece of your blocks. Watch your soil moisture sensors and test your foliage. See if more or less nutrition assimilation and water holding capacity is being realized. It shouldn't take long to start seeing benefits of a solid organic acid campaign to increase tree health and yields. Of course, there are so many limiting factors to feeding our trees, but a lack of soil organic matter shouldn't be one of them. A solid program of incorporating organic acids into your nutritional practices should go a long way to keep you from getting burned.

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# NAVIGATING THE WATERS

By CECILIA PARSONS | Associate Editor

“Increased coordination and cooperation between agencies and landowners will be key to their success,” Hanak said.

**CALIFORNIA'S LARGEST AND MOST** productive farming region faces unprecedented challenges and changes with the implementation of the Sustainable Groundwater Management Act (SGMA).

“The San Joaquin Valley is at a pivotal moment,” said Ellen Hanak, director of the Water Policy Center at Public Policy Institute of California and lead speaker at the Almond Board’s Navigating the Waters event.

Multiple experts on water policy, water markets, and the use and quality of this resource in the context of the

Sustainable Groundwater Management Act spoke in Tulare to assist almond growers in making management decisions about their water and land use.

## Groundwater Basins

Many of the valley’s groundwater basins have been determined to be critically overdrafted with an average deficit of two million-acre feet of water annually. Plans for bringing the basins into balance are moving forward but many questions remain about water transfers, recharge opportunities and costs of implementing the plans.

Hanak shared some of the solutions for bringing the valley’s groundwater resources back into balance. This will require more recharge of overdrafted basins or less water use—or a combination of both, she said.

The most promising approaches to achieving a balance between overdraft of groundwater and recharging the underground aquifers include flexibility, incentives and leveraging multiple benefits of fallowed land.

“Increased coordination and cooperation between agencies and landowners will be key to their success,” Hanak said.

While the Sustainable Groundwater Management Act has been focused on less water extraction, there are other considerations with groundwater. Those include providing safe drinking water, managing nitrogen loading and managing salt loading. Hanak said there are potential synergies with these issues along with trade-offs alongside basin balancing.

## Fallowed Acres

The exact number of acres of land that will be fallowed over time when SGMA is fully implemented is not known, but 500,000 acres has been one estimate. What happens to those fallowed lands must be considered, Hanak said. Uses under consideration are wildlife habitat, solar and recreation. Current planning efforts however, only account for a third of

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land likely to be fallowed under SGMA. The goal, she said should be stewardship of all idled lands.

### Water Supply Management

On the water supply management side, approaches that are being examined are capturing and storing more local runoff, increasing local runoff with headwater management, increasing Delta imports, reducing exports to other regions and reuse and re-purpose of local supplies.

Demand management options are: reduce net farm water use, reduce net urban water use, and increase flexibility of water deliveries. Options not examined are reducing net water for open space and wetlands and reducing water loss from infrastructure.

Hanak pointed out that supply options vary greatly in potential yield and affordability. New water supplies from supply management can affordably fill about 25 percent of overdraft. Affordable water, she noted, is in the \$300 to \$500 per acre-foot range.

Flexibility is key to managing farm water demand. Hanak said inflexible water use is most costly and local water trading slashes costs. Valley-wide surface water trading can cut costs further. Trading and new supplies will also reduce land fallowing.

### Safe and Reliable Drinking Water

According to the Public Policy Institute of California, the near term priorities for stakeholders in the San Joaquin Valley are to promote a comprehensive framework for safe and reliable drinking water solutions. The transition to groundwater sustainability should pilot efforts for innovative approaches to trading, recharge and land stewardship.

Growers will have a chance this year to comment on draft groundwater management plans, said Stacie Ann Silva, a resource analyst for New Current Water and Land, a law firm that specializes in consulting on water issues. Growers need to know which GSA they belong to and

where that Groundwater Sustainability Agency (GSA) stands on water markets. Not all GSA plans for groundwater management are similar, she said. Most are handling the plans themselves and all are going in different routes.

Silva, who monitors SGMA activity

between Chico and Bakersfield, said growers also need to know their GSA's plan for water trading. If the plan allows for marketing and transfer of water, the demand reduction option of land retirement has the potential for compensation.

*Continued on Page 50*

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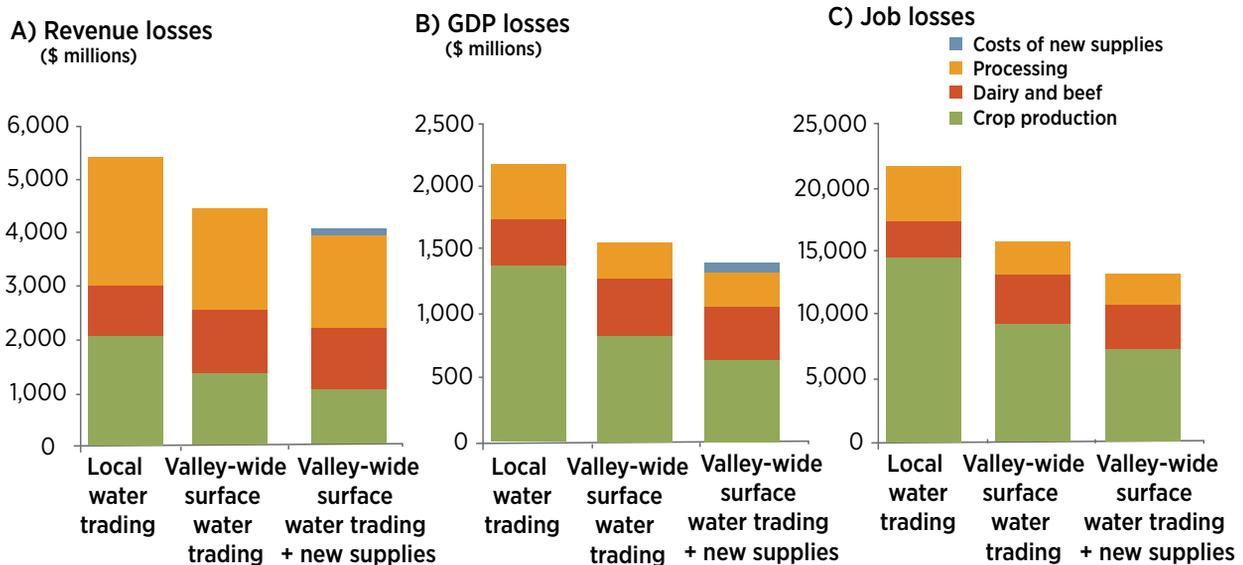
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# A portfolio approach can minimize regional economic losses



## Gradually ending overdraft ("glide path") can also help



PPIC WATER POLICY CENTER 16

A graph from the Navigating the Waters ABC event. Courtesy of The Public Policy Institute of California.

*Continued from Page 49*

Purchase of flood water supplies can be a supply improvement option.

### Groundwater Markets

Groundwater markets that may evolve due to SGMA are largely untested in California and current water rights laws complicate the matter. The 264 GSAs in California, Silva said, will have to figure out how to share the available groundwater. Markets are one way of efficiently sharing and managing this resource. If they cannot, communities, especially disadvantaged communities, will suffer.

Markets start with GSA policies on allocation of sustainable yields, establishment of a credit system, allowing transfers and trading and crediting landowners for recharge.

The big issue, Silva said, will be to avoid undesirable results from water transfers. Those include chronic lowering groundwater levels, land subsidence and degradation of water quality.

### Groundwater Recharge

San Joaquin Valley grower Don Cameron has a goal of achieving

groundwater recharge on 18,000 acres of Valley farm ground. Cameron, a pioneer in using floodwater to recharge groundwater basins, has been flooding row crop and permanent crop ground with Kings River flows on average every three and a half years. With SGMA restrictions looming, recharge has even more value.

With recharge, Cameron said he thinks the groundwater decline can be mitigated and water quality improved.

Cameron has partnered with Kings River Conservation District, to apply and distribute floodwaters, risking health of his grapevines by leaving them sitting in water for several months. In 2017, he flooded pistachio orchards and almonds during the months of April and May. Other than not being able to get into the orchards for routine cultural practices, he said there have been no long-term issues with tree health. University of California Davis researchers have been actively looking for negative environmental impacts due to the flooding of field and orchards and monitoring wells were drilled to determine water movement.

Cameron said that groundwater recharge is one of the potential tools for making pumping allocations and

water transfers possible. The ability to market and transfer water creates value, recognizes the scarcity and incentivizes innovation. Transfers are a mutual benefit for sellers and buyers.

Public policy, Cameron said, provides a framework that allows for efficient and respected markets to emerge. Key components of an efficient water market include clear rules and compliance, transparency and equal information, excludability and transferability and voluntary buyers and sellers.

### Groundwater as a Tradable Asset

Groundwater can be a tradable asset, Cameron said, but stakeholder outreach, input and discussion are necessary. Water use would have to be accounted for, there would be limitations and penalties for misuse and local impacts and undesirable results would have to be managed.

A sharing system, Cameron said, can be the framework that shares access to a basin's groundwater with eligible uses and allows for markets to emerge.

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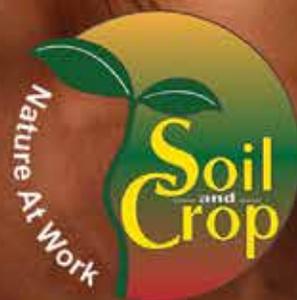
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# MAXIMIZING WALNUT QUALITY TO IMPROVE VALUE IN A LOW- PRICE YEAR

By ELIZABETH FICHTNER | UCCE Farm Advisor, Tulare County

CARLOS CRISTOSTO | CE Specialist, Postharvest Physiology

BRUCE LAMPINEN | CE Specialist, Plant Sciences

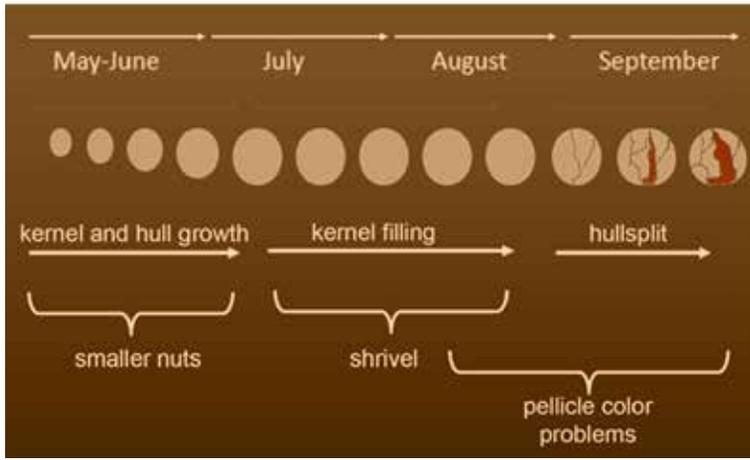
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## **T**HE OVERALL VALUE OF A WALNUT

crop is based on yield and nut quality. Commodity prices are depressed, improving nut quality may be the determining factor influencing orchard profitability. Irrigation management is the single most important factor that can be adjusted for increasing kernel size and improving kernel color, two key components of quality. Nuts with a larger kernel size and lighter color pellicle (outer coating on the kernel) garner the highest prices in the market.

### **Irrigation Management**

The most important irrigation management decision of the season is when to start irrigating in spring. Initiating irrigation too early in the season has been shown to predispose trees to stress at harvest. University of California (UC) research trials have demonstrated that withholding irrigation until trees reach a midday stem water potential about 2 bars below the fully-watered baseline is best for maintaining overall tree health and higher edible kernel weights after crackout, which favors a higher price per pound. When irrigation was initiated earlier (at the baseline or 1 bar below), the trees exhibited more stress later in the season when irrigation was cut off in advance of harvest. The pressure chamber is the best tool for determining when to initiate irrigating in the spring and should be used throughout the season to schedule irrigation events based on plant stress. The pressure chamber can be used to directly measure midday stem water potential on a subset



of trees in an orchard. A number of short articles detailing how to utilize the pressure chamber in walnuts, almonds, and prunes can be found at: [sacvalleyorchards.com/manuals/stem-water-potential/](http://sacvalleyorchards.com/manuals/stem-water-potential/).

**Research**

UC research trials have shown that carbohydrate deprivation can cause darkening of the kernel pellicle. It can result from either excess or lack of water, as well as from shaded conditions in the inner canopy, which itself is exacerbated by either water deficiency or excess. The influence of carbohydrate

*Continued on Page 54*

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

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

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

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

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

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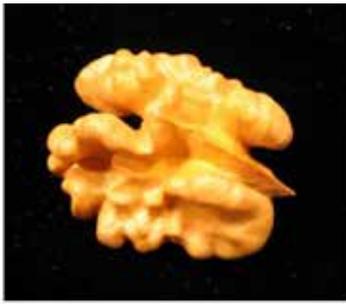
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Yellow



Bronze



Black

Continued from Page 53

deprivation on nut quality varies over the season; the diagram below characterizes the symptoms on Chandler at different phases of nut development and highlights the importance of irrigation management at all times during the season to maximize nut size, nut fill, and quality.

Historically, dark kernel color has been associated with water-stressed trees resulting from under-irrigation. However, more recent research has shown that it is now most often

associated with trees maintained either close to or above the fully watered baseline (more wet) in mid to late summer. These studies indicate that optimal kernel color can be achieved by maintaining orchards at a midday stem water potential of approximately 2 bars below the baseline (more dry) during mid- to late summer.

### Conclusions

Howard and Tulare are very sensitive to pellicle color problems resulting from carbohydrate deprivation derived

from either poor irrigation management or shading. Chandler is relatively immune to these problems. Maximize your profits by paying attention to water management at all times during the season. Early-season stress can result in reduced nut size while stress later can result in kernel shrivel and pellicle color problems.

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# An End to Chlorpyrifos in California

By JODI DEVAURS | Director of Regulatory Affairs, Western Agricultural Processors Association (WAPA)

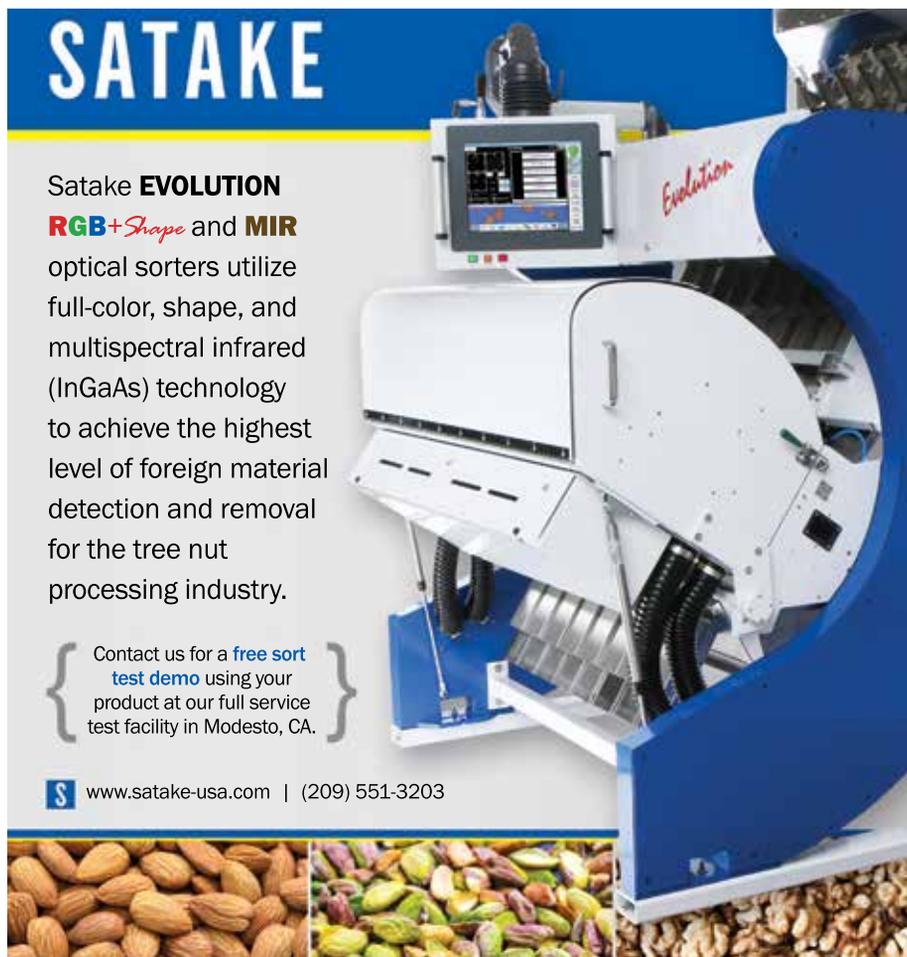
**A**S WE REPORTED AT THE END OF LAST YEAR, CHLORPYRIFOS, commonly known as Lorsban, has been the target of several state and federal agencies as the latest crop protection tool to be potentially regulated out of existence. Well, as the new administration has been taking form in California State Capitol the final nail in the coffin for this product was driven.

## Chlorpyrifos Registration

In a press release issued in early May, Jared Blumenfeld, Secretary of California Environmental Protection Agency announced that California would be taking action to cancel registration of all products containing chlorpyrifos. This comes after the Department of Pesticide Regulation, working with other state agencies, found that additional regulations for the product would not mitigate the exposure concerns identified when it was listed as a Toxic Air Contaminant. In the announcement, Secretary Blumenfeld outlines that the cancellation process is anticipated to take anywhere from six months to two years, during this time a working group will be established to include a variety of stakeholders who could be from the agricultural community, cooperative extension, environmental arena, etc. This working group would be tasked with coming together to holistically look at “alternative pest management solutions”. Additionally, the governor has budgeted roughly \$5.7 million specifically to look for “safer, more sustainable alternatives”.

## Impact on Almonds and Walnuts

What does this all mean for growers in California? This announcement came as a devastating blow as many commodities, including almond and walnut

The advertisement features a large blue and white Satake Evolution nut sorter machine. The machine has a control panel with a screen and various buttons. Below the machine, there are three piles of nuts: almonds on the left, walnuts in the middle, and a mix of nuts on the right. The background is a light blue and white gradient.

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## ADDITIONALLY, THE GOVERNOR HAS BUDGETED ROUGHLY \$5.7 MILLION SPECIFICALLY TO LOOK FOR “SAFER, MORE SUSTAINABLE ALTERNATIVES”.

producers, who rely on chlorpyrifos as a critical use tool for numerous pests including twig borer, navel orangeworm, mites, codling moth and walnut husk fly. Frankly, the \$5.7 million dollars and the two years into seeking out alternative solutions will not get a new product online or research completed to find a tool suitable to replace what is being lost. California remains one of the largest users of the product nationwide, using nearly one million pounds annually as of 2016. Other states including Hawaii and New York have taken action to ban the product within the next two to three years, however with California as the largest agriculture producing state in the nation, this cancellation is significant and sets the stage for how crop protection tools as a whole will be governed in our state.

### Effects of the Cancellation

Perhaps an unforeseen, yet monumental, effect that the cancellation causes is continuing to put the California grower at a competitive disadvantage with the rest of the country and the world. Chlorpyrifos continues to be registered in nearly 100 different countries across the globe and used on nearly 8.5 million acres. With regulatory and legislative actions such as the additional agriculture overtime, rising minimum wage, energy rates skyrocketing, fuel taxes being piled on... most growers before they can even start to market their product are in the hole by several dollars comparative to other states and agricultural producing regions.

### Future of Crop Protection Tools

As for California, the questions remains. What's next? Signals from this

current administration have indicated that the state will be evaluating not just the use of chlorpyrifos, but the use of all crop protection tools and how they can be “safer and less injurious”. Chlorpyrifos is not only globally accepted but stands as one of the most widely studied products with approximately 5,000 studies on health and environmental impacts along with having a ten-fold safety factor in the risk assessments. A product that has study after study, proving it is not only

the last line of defense for many pests in California, but also has a host of scientifically reviewed studies backing up its safety when used properly. And yet, it will be cancelled. The Western Agricultural Processors Association believes it is important to not only listen to the conversations being had in this cancellations process, but more importantly engage in the discussions. Because we are not just talking about a single product anymore, we are talking about ALL products. The discussions throughout this cancellation process will become a precedent setting action for not only the Department of Pesticide Regulations but for this administration.

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# Are you Ready for a Pesticide Inspection?

By ANNA GENASCI | Assistant Director of Education, AgSafe



**U**SING PESTICIDES IS JUST one tool in a grower's toolbox to help ensure a successful crop. However, it is important to remember that we use pesticides

to kill a pest, which means if not handled correctly, it has the potential to harm the applicator. This is why the Environmental Protection Agency (EPA), has established the agriculture

worker protection standard (WPS), a set of guidelines that protect employees who work with and around pesticides. More specifically in California we have the Department of Pesticide Regulation (DPR), which has pesticide regulation enforcement authority under the California Code of Regulations (3CCR). Take it from this former pesticide inspector, it doesn't have to be so complicated.

Everyone knows this scene. You have just finished mix-loading your tank, you are making your first turn at the end of the field and then you spot it, the little white pickup with the county logo. Are you ready for the inspection? The answer to that is easier than you might think and can be found by reviewing the most frequently violated pesticide application regulations.



Do you have the proper license and permit?

To apply agricultural pesticides in California you need to have one of the following permits through the County Agricultural Commissioner's Office: 1) an Operator ID (OID), for use of non-restricted materials, 2) a Restricted Materials Permit, if you wish to apply restricted materials yourself, or 3) a Pest Control Business Only Permit, where



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restricted materials can be used on your property, but only by a licensed and registered pest control business (PCB). Grower licenses are not required for an OID or a PCB permit, but if you wish to use restricted materials yourself and store them in your locked chemical storage shed, you must pass either a county licensing test or a DPR licensing test. For more information as to which pesticides are categorized as California restricted materials, visit: <https://www.cdpr.ca.gov/docs/enforce/dpr-enf-013a.pdf>.



Employers are required to train their employees that will be handling or working around areas where pesticides have been used. Photo courtesy of AgriLife Today.

**2**

Have you worn, or provided to your employees, all of the required personal protective equipment (PPE)?

Under 3CCR, Sections 6738-6739, the requirements for PPE are laid out in great detail. It is important to note that even growers have to wear PPE. The PPE required for a grower is listed on the pesticide label. However, in addition to the label-required-PPE, employees must also wear PPE as outlined in the regulation previously noted. These code sections cover topics ranging from the employer needing to provide all PPE, to selection of proper PPE, and respirator requirements. One of the most notable requirements is when an employee is making an application or mix-loading, they must wear protective eyewear and chemical resistant gloves, even when not required by the label. There are a few exemptions to this, but in general this rule applies. For the full text of this code section, visit: <https://www.cdpr.ca.gov/docs/legbills/calcode/030302.htm#a6739>.

**3**

Have you trained your employees who will be performing handling tasks, such as pesticide application or mix-loading?

Employers are required to train their employees that will be handling or working around areas where pesticides have been used. Since this focuses on

*Continued on Page 60*

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application inspections, it's important to consider handler requirements. All handlers need to be trained annually on pesticide safety topics outlined in 3CCR, on all pesticide product labels they will handle, and any time a new pesticide is added to the pest control program. Recently DPR adopted new training topics in response to EPA's update to the WPS. Those updated training topics can be found under 3CCR, Section 6724: <https://www.cdpr.ca.gov/docs/legbills/calcode/030302.htm>.

4

Have you provided proper decontamination supplies for employees who are performing pesticide handling task?

The employer is responsible for providing decontamination supplies. These supplies include the following items: 3 gallons of water, 1 pint of eye wash, soap, paper towels, and an extra set of coveralls. The decontamination supplies can be at the mix-load site and no more than 0.25 miles from the handler. The best practice is to include these items in a soft-sided tote that can be carried in the tractor cab. If an employee gets pesticide on his or herself, immediate proper decontamination can be the difference between an emergency or not. In addition to the decontamination supplies, employers must provide at the mix-load site immediate access to at least one system capable of delivering gently running

water at a rate of least 0.4 gallons per minute for at least 15 minutes, or at least six gallons of water in containers suitable for providing a gentle eye-flush for 15 minutes for emergency eye-flushing. These systems must also be available when using a product with labeling that requires protective eyewear or using a closed mixing system. The full text on decontamination supplies is under 3CCR 6734 and can be found at <https://www.cdpr.ca.gov/docs/legbills/calcode/030302.htm>.

5

Have you posted emergency medical care information?

Employers are required to plan for providing emergency medical care in advance. The employer must locate a facility where emergency medical care is available for employees who will be handling pesticides. The employees must be informed of this information. In addition, the following information must be posted in a prominent place at the work site: the name, address and telephone number of the medical facility able to provide emergency care. An easy solution is to post the information in the cab of the tractor on a sticker. For the full requirements under 3CCR Section 6726, visit: <https://www.cdpr.ca.gov/docs/legbills/calcode/030302.htm>.

Finally, let's discuss what to expect. The inspector will ask you to stop the application allowing the two of you to run through all of the elements required during a pesticide application. You can

be more prepared by addressing the items we have covered here. In addition, you may want to run your employees through a mock inspection, to get them more comfortable with the process. A sample inspection form is available from DPR: <https://www.cdpr.ca.gov/docs/enforce/prenffrm/prenf104.pdf>. Please note, this form does not include every element that may be looked at during an application inspection, but it is a great place to start.

What if there are violations found? Most counties will follow-up a violation with a headquarter inspection. This is a scheduled inspection to review your pesticide paperwork. Fines may be applicable depending on the amount and severity of the violations found. There is an appeals process if you find the violation and/or fines to be unfounded.

For more information about pesticide safety or any worker safety, human resources, labor relations, or food safety issues, please visit [www.agsafe.org](http://www.agsafe.org), call (209) 526-4400 or email [safeinfo@agsafe.org](mailto:safeinfo@agsafe.org). AgSafe is a 501c3 nonprofit providing training, education, outreach and tools in the areas of safety, labor relations, food safety and human resources for the food and farming industries. Since 1991, AgSafe has educated over 85,000 employers, supervisors, and workers about these critical issues.

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To meet the requirements outlined in 3CCR Section 6726, post the required emergency medical care information on a sticker in the tractor cab. Photo courtesy of AgSafe.



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# AMERICAN PECAN COUNCIL 101 SERIES: MARKETING STRATEGY 101

By ALEX OTT | Executive Director, American Pecan Council (APC)

**U**NDERSTANDING CONSUMER trends and preferences is essential to understanding the future of the market. As consumer behavior changes and generations establish their likes and dislikes, industry marketing, education techniques, and technologies must also adapt or be left behind.

Consider the following: traditional TV viewing is down across all major age groups. According to the latest Q3 2018 Nielsen data, TV consumption is down 17.2 percent among US adults ages 18–34 and down 6.1 percent among those 35–49 years old, compared to the year prior. Additionally, 43 percent of the time young adults 18–34

spend consuming media is via digital platforms, while adults 35–49 spend 39 percent of their media consumption time on digital platforms.<sup>1</sup> With the rise in internet streaming services—such as Netflix, Amazon Prime, and Hulu—and more consumers using mobile devices to view media, marketers are exploring new channels and platforms to reach their target audiences beyond traditional broadcast advertising.

So, what does this mean for modern marketing? The impacts of new forms of media—and ways to consume media—are impacting all industries, including ours. In order to be effective in today's climate, the pecan industry must

leverage tools and channels that reach consumers where they spend most of their time.

## Informing our Message with Consumer Trends

With new technology, our ability to understand the perspectives and preferences of a specific consumer base is stronger than ever. The American Pecan Council has engaged in consumer research to better understand the people we hope to reach. For example, consumers in our target audience are seeking healthy ingredient and snack options. Studies conducted by Boston Consulting Group as part of our strategic planning process in December 2018 indicated that healthy snacking and pairing (where a commodity is combined with another food to create a healthy snack) are growing at faster rates (3-10 percent) than other food consumption categories, meeting the needs of consumers seeking nutritious diets.

Tree nuts, especially pecans, are well positioned to address these trends. In fact, there were 17.9 average weekly snacking “occasions”—moments in the week when consumers reported having snacked—reported in 2017, up from 14.7 in 2014.<sup>2</sup> Additionally, the consumption of plant-based proteins has increased 24 percent since 2015.<sup>3</sup> There is no doubt that the health-conscious segment presents the greatest opportunity to increase pecan consumption in response to stronger messaging around health benefits.

However, the question remains—how do we reach consumers with our

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<sup>1</sup>Nielsen, Total Audience Report: Q3 2018, 2019.

<sup>2</sup>ABC, State of Snacking in the US, 2017.

<sup>3</sup>The NPD Group, National Eating Trends, 2018.

message to make them aware that pecans, traditionally thought of as a baking ingredient, are part of the healthy ingredient and snack category?

In order to get the messaging out to our consumers, the industry must look at the best approaches and technologies to capture the attention of customers and create the awareness needed to drive the purchase of pecans. As mentioned, this includes leveraging new advertising channels—like social media and other online sources—to reach consumers in an increasingly digital and mobile world.

### Connecting With Our Best Audience

Just as important as our message, and the channels we use to share it, is the audience we target with our message. The American Pecan Council (APC) has analyzed consumer trends in food consumption, purchasing and preferences to zero in our target audience for

marketing American Pecans.

You may wonder why we need a target audience—surely, the end goal is to tell everyone about the great taste, versatility and nutrition benefits of pecans, right? While we certainly want all consumers to eat pecans, there are certain groups who will be easier to reach and convert to pecan lovers with a more efficient use of resources. Identifying a target audience allows the APC to efficiently use industry funds by focusing marketing efforts on those consumers who represent the greatest opportunity for expanding the purchase and consumption of American Pecans.

This means that we are not targeting segments that are already aware of and frequently purchase pecans. It's for this very reason that industry may not see as much of our marketing efforts as other consumers.

Instead, we focus on groups who, though they may not be as familiar

with all the benefits of pecans, are more likely to convert to pecan purchasers after they hear our marketing message. When determining our target audience for American Pecans, we looked for consumer segments who:

1. **Cook at home frequently and/or have multiple mouths to feed.** These consumers are more likely to purchase large quantities of a single ingredient.
2. **Are concerned about health and nutrition.** Nutrition is a critical piece of our pecan story, so our target audience is also health conscious and looking for ways to make their weekly snacks and meals more nutritious.
3. **Have purchasing power in their household.** We must reach the consumers who make the decisions about what

*Continued on Page 64*

<sup>1</sup>"Dining Out Dayparts," Mintel  
<sup>2</sup>"Cooking enthusiast" Simmons American Time Use Survey

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their families eat in order to get on their weekly shopping lists.

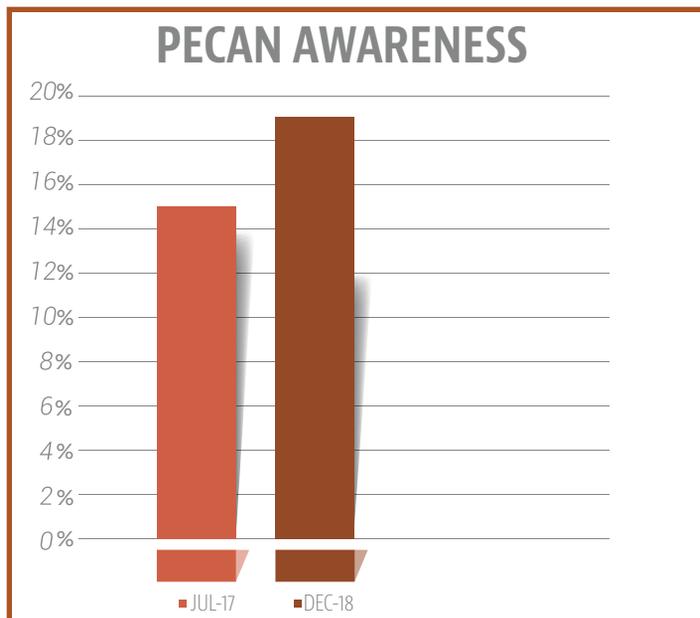
Based on our research, the group that embodies each of these characteristics is moms in Generations X and Y (ages 25-54). According to consumer research from Mintel, 56 percent of moms with children 18 or younger cook at least three meals at home a week and have “healthy foods” listed as a “MUST” when building their shopping lists.<sup>4</sup> These moms also love learning about new ingredients and are interested in trying new recipes—60 percent of moms look up new food ideas while they are cooking. Finally, 78 percent of Gen X and Y moms are in a grocery store at least once a week, indicating they hold the food purchasing power for their households.<sup>5</sup>

With our target audience identified, we are able to optimize our marketing tactics to reach this high-potential group with a message that resonates, via channels they consume on a daily basis.

### Seeing an Impact

Since the American Pecan Council has implemented a message targeted to our identified audience and increased our presence on social media platforms, we are seeing measured results. When we first began marketing efforts in July 2017, research conducted by our marketing partner Weber

Shandwick indicated that consumer recall of pecans was at 15 percent. Since the brand launch in April of 2018 and the Pecan-A-Thon in the fall of 2018, awareness has increased—Boston Consulting Group found that consumer awareness of pecans was at 19 percent when it conducted its consumer research as part of our strategic planning process last year. This means that, in just a short time, we’re already seeing measurable results of our marketing efforts.



### What's Next?

The American Pecan Council kicked off its Superweeks marketing campaign in April as an evolution of the previous Super-fy campaign, which showed consumers how adding pecans can make their recipes more nutritious and delicious. With Superweeks, we are capitalizing on the popular meal planning trend by creating weekly line-ups of pecan-inspired recipes the whole family can enjoy. Our goal is to change their perception of pecans from a specialized ingredient—something they purchase occasionally for a single, specific recipe—to a staple snack and ingredient that is part of their meal planning and on their grocery list every week.

To develop each week’s recipe plan, we’re working with bloggers our target audience follow to showcase delicious new snack and meal options featuring pecans. To maximize the reach of this campaign, the meal plans will be shared on APC social media, on the APC website, and on the bloggers’ own websites and social channels.

Super-fy and Superweeks are just the latest examples of how the APC is driving awareness by showcasing the taste, versatility and nutrition benefits of pecans via the digital channels and platforms that consumers use most. With finite resources, it is important to maximize the messaging to reach as many consumers at the lowest costs, and we continue to see results that clearly indicate our success to date. We look forward to continuing our momentum and sharing results of our Super campaigns in the months to come.

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# Turning the Invisible into the Visible

By THE ALMOND BOARD OF CALIFORNIA



**IT'S BEEN SAID THAT SETTING** goals is the first step in turning the invisible into the visible, and when it comes to growing food, today's consumer expects full transparency. Recognizing this dynamic, the Almond Board of California (ABC) Board of Directors met in early 2018 to take that first step and set goals for continuously

improving the way we grow almonds. The Almond Orchard 2025 Goals establish targets in the areas of water use efficiency, zero waste from the orchard, adoption of environmentally friendly pest management tools and reductions in dust produced at harvest, all of which contribute to the sustainability of California's almond orchards. Each pegged to the year 2025, the goals set the destination for the industry's journey to the almond orchard of the future.

### Almond Orchard 2025 Goals

- Further Reducing the Water Used to Grow Almonds. Over the past two

decades, California almond farmers have successfully reduced the amount of water used to grow a pound of almonds by 33 percent via improved production practices and adoption of efficient micro irrigation technology. **By 2025, the California almond community commits to reduce the amount of water to grow a pound of almonds by an additional 20 percent.**

- Achieving Zero Waste in Our Orchards. Almond hulls and shells are coproducts traditionally used for livestock bedding, dairy feed and electricity generation. Changing markets for these coproducts are spurring innovation for higher value uses, both economically and environmentally. **By 2025, the California almond community commits to achieve zero waste in our**



"Resilience, innovation and a strong work ethic have gotten us where we are today," said ABC President and CEO Richard Waycott. "Those same qualities that have driven our success in the past will lead us into the future." All photos courtesy of ABC.

*Continued on Page 68*

**"By 2025, the California almond community commits to reduce the amount of water to grow a pound of almonds by an additional 20 percent."**

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**orchards by putting everything we grow to optimal use.**

•Increasing Adoption of Environmentally Friendly Pest Management Tools. Responsible almond farming requires protecting the crop and trees from bugs, weeds and disease through an integrated pest management approach. This means using tools and techniques like beneficial insects, habitat removal, mating disruption and, when necessary, pesticides. **To further protect our orchards, employees and communities, by 2025, we commit to increase adoption of environmentally friendly pest management tools by 25 percent.**

•Improving Local Air Quality During Harvest. The process of harvesting almonds, specifically the shaking and sweeping steps, can create visible dust in our local communities and also



California Secretary of Agriculture Karen Ross commends the almond industry for its leadership in setting goals that challenge and drive progress at The 2018 Almond Conference.

exacerbate issues with disease and pests, including mites. To address this nuisance, **the almond community is taking short- and long-term steps to reimagine how we harvest and, by 2025, commits to reduce dust during harvest by 50 percent.**

**Why Set Goals?**

While the almond industry has been on a journey of continuous improvement for many years, these goals will help prioritize resources to find ways to responsibly grow more almonds and meet growing global demand. There are several benefits to establishing goals that are ambitious and attainable in equal measure.

From an industry standpoint, it's important to unite around a clear set of goals to prioritize areas for improvement to continue providing the world with a high-quality, sustainably grown crop.

“As an individual grower, each goal solves a problem or challenges, and creates an economic benefit,” said Holly A. King, chair of the ABC Board of Directors. “As an industry, proactively

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*Continued on Page 70*

# Looking to Increase Almond Yields in 2020?

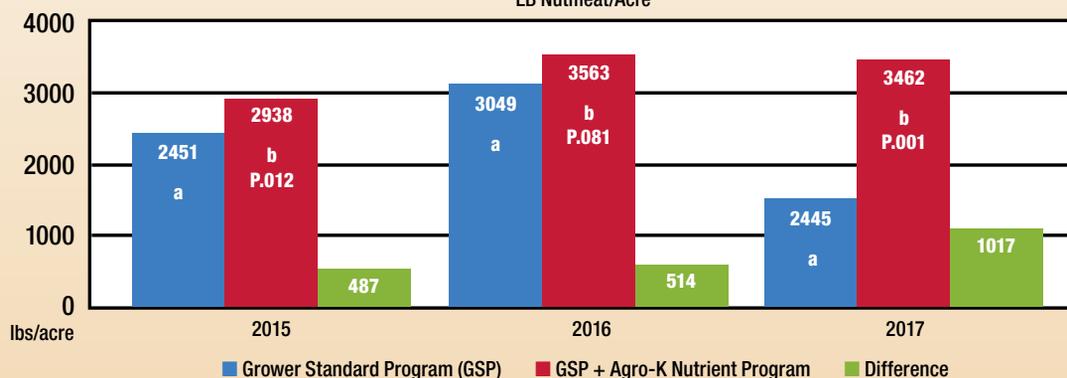


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Building nutrient levels in the buds this year, leads to more uniform bud break, faster early growth with larger leaves that have more photosynthetic capability and stronger flower buds for increased nut set. In addition, trees that are not nutritionally stressed experience less post bloom nut drop. **Maximizing yield starts with nut set and post bloom nut retention.**

Ensuring peak nutrient demand timing is met leads to higher nut set and retention. The end result... higher yields, larger and heavier nuts next season.

Building nutrient levels this year sends trees and buds into winter with more strength and energy reserves that will be available to the tree next spring at bud break when cool soils limit uptake and nutrient availability. Applying **System Finale** with **AgroBest 0-20-26** and **Top-Set D.L.** at hull split will ensure the tree has sufficient levels of critical early season nutrients needed ahead of spring peak demand timing to support leaf and root development. By beginning to manage next year's nutrient needs at hull split, **System Finale, AgroBest 0-20-26** and **Top-Set D.L.** help prepare your trees for the race to higher yields while minimizing alternate bearing issues.

**System Finale, Top-Set D.L.** and **AgroBest 0-20-26** are compatible with most pesticides and foliar nutrient tank mixes. For more information, call 800-328-2418, visit [www.agro-k.com](http://www.agro-k.com), or email [info@agro-k.com](mailto:info@agro-k.com). Your Agro-K distributor and PCA can provide guidance on all Agro-K products needed to increase your 2020 yields.



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setting goals allows us to shape our own future—to tell our story rather than having others tell it for us.”

Beyond the industry, these goals serve as a platform for the almond community to communicate the industry’s sustainability journey to consumers around the world in a highly visible way.

“The goals feed into the general interest of consumers who want to know more about their foods and how they’re raised and how they’re grown,” said Richard Waycott, ABC president and CEO. “The same interest is coming through from our customer base down the supply chain.”

### Focusing Resources

Focusing on four key areas helps the ABC board, committees and workgroup members make tough decisions about the allocation of limited resources such as research funding. This focus also helps guide Almond Board staff in developing programs that align with the goals.

Having the goals in place has already prompted discussions about prioritizing resources at the Almond Board. The recent decision to invest \$1 million dollars in Navel Orangeworm (NOW) Sterile Insect Technique (SIT) research, the single largest production research project ever funded by ABC, is a prime example. While there are many compelling reasons to find new ways to control NOW—the primary insect pest for almonds grown in California—the SIT project fits clearly within the goal to increase the use of environmentally friendly pest management tools.

“This was one of the first major decisions regarding the use of resources that was influenced by the goals set by the board last year,” noted ABC Board Member George Goshgarian, Jr., Goshgarian Farming Company. “It definitely had an impact on my decision to approve the funding.”

### Measuring Success

Setting goals is just the first step in the journey. When organizations, individuals or entire industries set goals and

measure progress against goals, they can better determine if they are headed in the right direction and make necessary adjustments along the journey to make sure they are staying on track. Setting the Almond Orchard 2025 Goals prompted much-needed discussions amongst ABC staff, board members and workgroup and committee leaders about setting baselines and measuring progress. These conversations may never have happened if the board had not set goals.

For example, setting the goal to reduce harvest dust led to an impromptu research project during harvest 2018 to study various ways to measure visible dust. This research project was needed to determine how best to measure progress against the goal, but also gave researchers insight into ways to better control visible dust.

### Delivering on Transparency

Today’s consumer is hungry for more information on where their food comes from, how it is grown and who is growing it. In consumer focus groups the zero-waste goal struck a chord with consumers who are also trying to “reduce, reuse and recycle.” People liked hearing that the California almond industry shares a similar commitment to be good stewards of the resources needed to grow food while protecting the environment for future generations.

By publicly announcing the goals to customers and consumers, the California almond industry is committing to an open and transparent discussion on the challenges facing the industry, as well as efforts to address those challenges. This ongoing discussion will help ensure consumers feel good about choosing almonds.

### What’s Next?

When food safety issues created challenges more than a decade ago, the almond industry responded by creating its own mandatory pasteurization program. When the California drought brought a new level of attention to the industry, it responded by doubling down on efforts to increase water use efficiency.

**"By publicly announcing the goals to customers and consumers, the California almond industry is committing to an open and transparent discussion on the challenges facing the industry, as well as efforts to address those challenges."**

Almond growers and handlers have a history of overcoming difficult challenges and view the Almond Orchard 2025 Goals as the first step in a remarkable journey.

“Yes, these goals are bold and ambitious, but we believe they are also achievable, thanks in part to the significant contributions of growers, processors and others who serve on our Almond Board workgroups,” Waycott said.

“Resilience, innovation and a strong work ethic have gotten us where we are today,” Waycott said. “Those same qualities that have driven our success in the past will lead us into the future.”

*Comments about this article? We want to hear from you. Feel free to email us at [article@jcsmarketinginc.com](mailto:article@jcsmarketinginc.com)*

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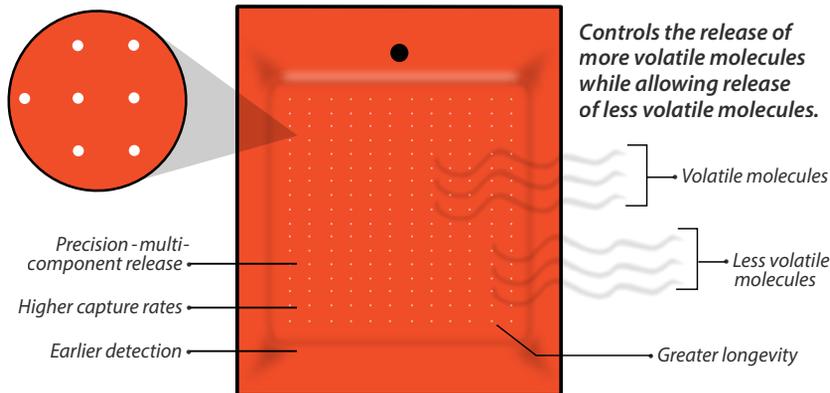
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# WALNUT GROWERS & HULLERS: PLAN TO BE INSPECTED THIS HARVEST

BY THE CALIFORNIA WALNUT BOARD



Walnuts drying.

**T**HE CALIFORNIA WALNUT BOARD (CWB) attended the annual Safe Food Alliance food safety conference in April and learned the California Department of Food and Agriculture (CDFA) plans to conduct walnut grower and huller/dehydrator inspections this upcoming harvest. Steve Patton of CDFA said the purpose of these inspections will be to judge the compliance to the new Produce Safety Rule (PSR) that is now in effect. In his presentation Steve stated that California has over 25,000 farms, including over 4,800 walnut farms.

Inspections have started in April for those crops already being harvested. The inspections will be scheduled with the grower (no unannounced

*Continued on Page 74*



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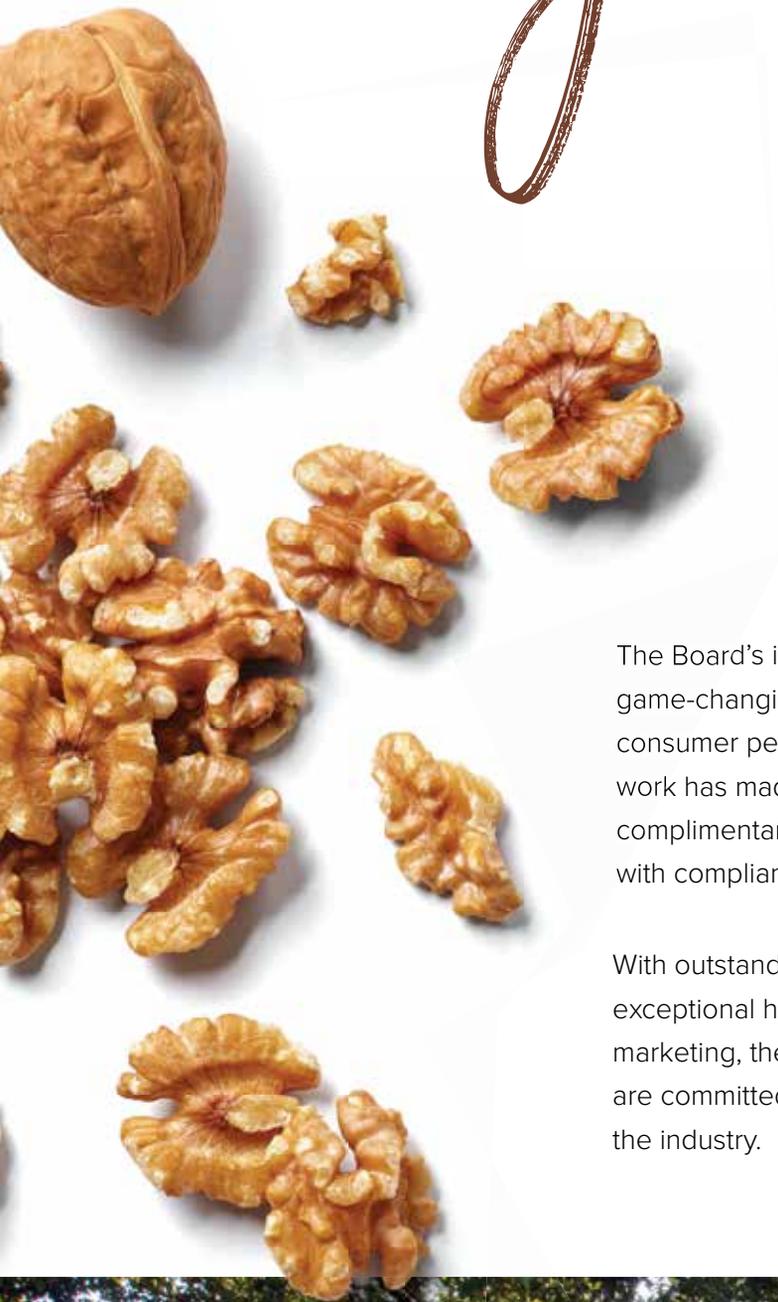
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- ▶ **Integrated marketing programs to increase awareness and drive retail purchase**
- ▶ **Concept development of innovative new products and shelf life testing**
- ▶ **Promotions featuring walnuts with restaurants such as Sizzler® and Wendy's**
- ▶ **Defending against burdensome industry regulations and federal and state tariff/non-tariff trade barriers**
- ▶ **Advocating for industry through USDA's food purchase and distribution program**
- ▶ **Securing USDA grants to bolster export market promotions through MAP and ATP funding**

The Board's investment in production research has resulted in new game-changing varieties. The Commission's health research has shifted consumer perceptions about the health benefits of walnuts. Regulatory work has made great strides on behalf of growers. And we continue complimentary FSMA food safety training for growers to help with compliance.

With outstanding production research, exceptional health research, and strong marketing, the Board and Commission are committed to a resilient future for the industry.



[walnuts.org/working-for-you](http://walnuts.org/working-for-you)



Continued from Page 72

inspections are planned) and last approximately one and a half hours. They will take place during harvest activities on the farm and at the huller dehydrator. CDFA will try to make these inspections educational for the growers and educational for the CDFA inspectors as well. Each farm must have a dedicated employee that received the PSR training and the food safety program will be evaluated.

Shelly Phillips, also with CDFA, discussed the most common improvements needed since the April inspections started. So far they have found 10 percent of the farms with corrective actions needed. The most common non-compliance observations are:

- Not requiring visitors to sign in and know what the Good Manufacturing Practice (GMP) rules are.



- Not keeping track of soil amendment applications.
- Not doing an animal intrusion risk assessment.
- Not having clear instructions (corrective actions) when something happens that could impact food safety for the walnuts.
- Cleaning and sanitizing records.
- Employee health and hygiene records.

Walnut growers have been taking advantage of the CWB's funding for the mandatory Produce Safety Rule (PSR) 8-hour trainings being performed by Safe Food Alliance and several other firms for the past three years. We hope you have attended one of these trainings and good luck if your operation is inspected this harvest.

*Comments about this article? We want to hear from you. Feel free to email us at [article@jcsmarketinginc.com](mailto:article@jcsmarketinginc.com)*



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