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SEPTEMBER – OCTOBER 2018

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The 2018 Coffee and Chocolate Festival opened its gates at Montecasino in South Africa to an enthusiastic and hungry crowd of coffee and chocolate lovers.

ON THE COVER:

Almond Breeze Barista Blend is showcased at the 2018 Coffee and Chocolate Festival in Montecasino, South Africa.



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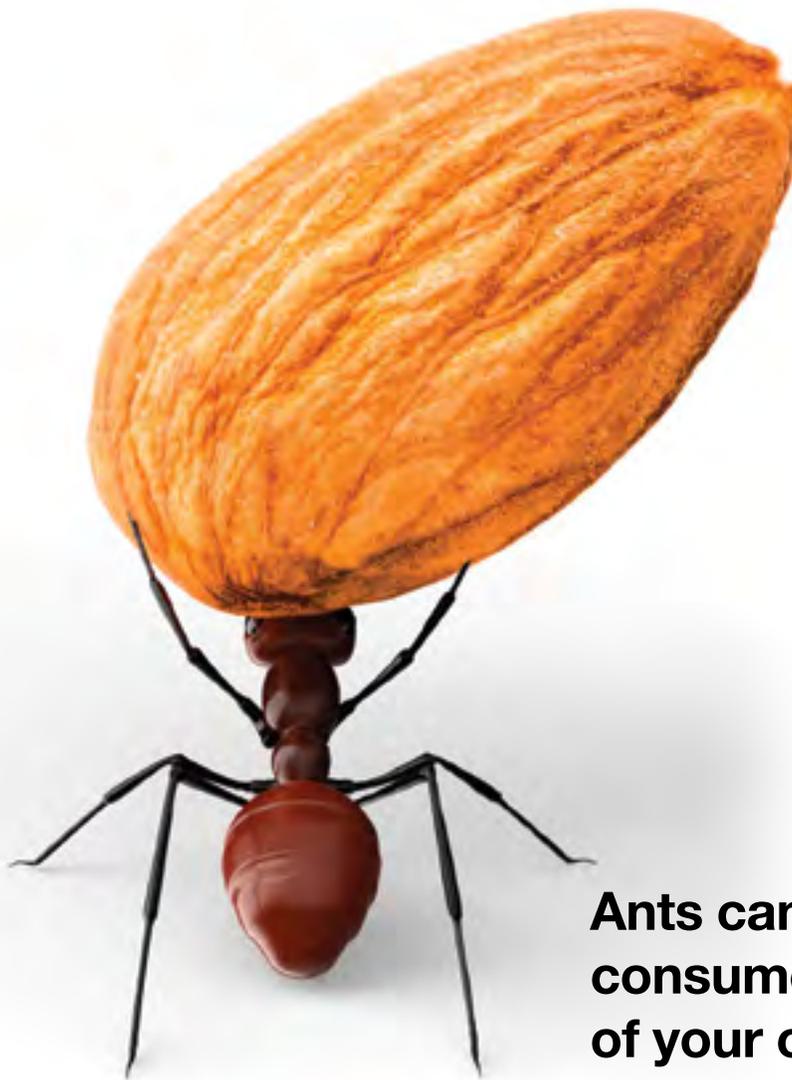
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Crop Year Success Against All Odds

Every crop presents its own set of challenges, and the 2017 crop was no different. Wet conditions at bloom and reject levels not seen in many years typified the 2017 crop. But you, our growers, and those of us at *Blue Diamond* tackled the challenges and together have produced a very successful year. This success is reflected in the final value of the 2017 crop below. Be sure to take the time to examine our published numbers for all varieties. The value of pollinators continues to rise as more product is used in manufacturing and consumer goods.



Blue Diamond 2017 Crop Returns Chart

Variety	Overall Average	Average of High Quality	Maximum Possible
Nonpareil & Sonora Inshell	\$2.95	\$3.00	\$3.02
Nonpareil/Supareil Meats	\$2.84	\$2.89	\$2.93
Independence Inshell	\$2.71	\$2.76	\$2.77
Sonora Meats	\$2.61	\$2.68	\$2.72
Independence Meats	\$2.35	\$2.40	\$2.42
Carmel & Winters	\$2.35	\$2.39	\$2.42
Monterey	\$2.27	\$2.31	\$2.34
California/Price/Fritz/Wood Colony	\$2.26	\$2.30	\$2.32
Butte and Padre	\$2.26	\$2.28	\$2.30
Mission and Neplus	\$2.17	\$2.19	\$2.22
Peerless Inshell	\$0.86	N/A	\$0.88

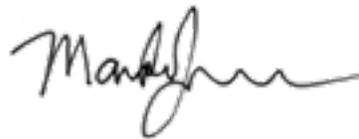
Note: The above rates do not include Volume Premiums, Domestic Production Activities Deduction (DPAD) or IC-DISC advantages.

Over the past few months, both the headlines and growers' attention have been focused on trade issues. The tariffs and subsequent uncertainty have resulted in market price reductions. Your *Blue Diamond* team has been very active in the discussions, ensuring that the federal government is fully aware of the almond industry's value to the U.S. economy. I want to personally thank each and every one of you for heeding the call and contacting the USDA and the White House on this important issue. Know that you have had an important impact on the discussion and are on the minds of our federal representatives and the USDA officials. The recently approved almond market facilitation payment of \$.03 a pound is appreciated and a positive outcome that reflects on our collective efforts for almond industry recognition.

The 2018 crop is coming in now. At this point, we can say that rejects are running at lower levels than last year. As expected, crop yields are varying dramatically

as a result of the freeze at bloom. Knowledge of the final volume of the 2018 crop is months away. However, production of the Nonpareil appears to be falling short of expectations.

I look forward to celebrating our accomplishments at the annual *Blue Diamond Growers* meeting on November 14 at the Modesto Centre Plaza. Please mark your calendars to come early to the event to attend seminars, walk the exhibit hall and visit with our team. I hope to see you there and share why the best is yet to come! ♦



SAVE THE DATE!



108th *Blue Diamond Growers* Annual Member Meeting

WEDNESDAY, NOVEMBER 14, 2018

Modesto Centre Plaza, 10th & K Streets

(Adjacent to the Modesto Doubletree Hotel)

Join us for seminars, lively exhibits, a membership luncheon and business meeting, all celebrating the continued success of *Blue Diamond* and its members.

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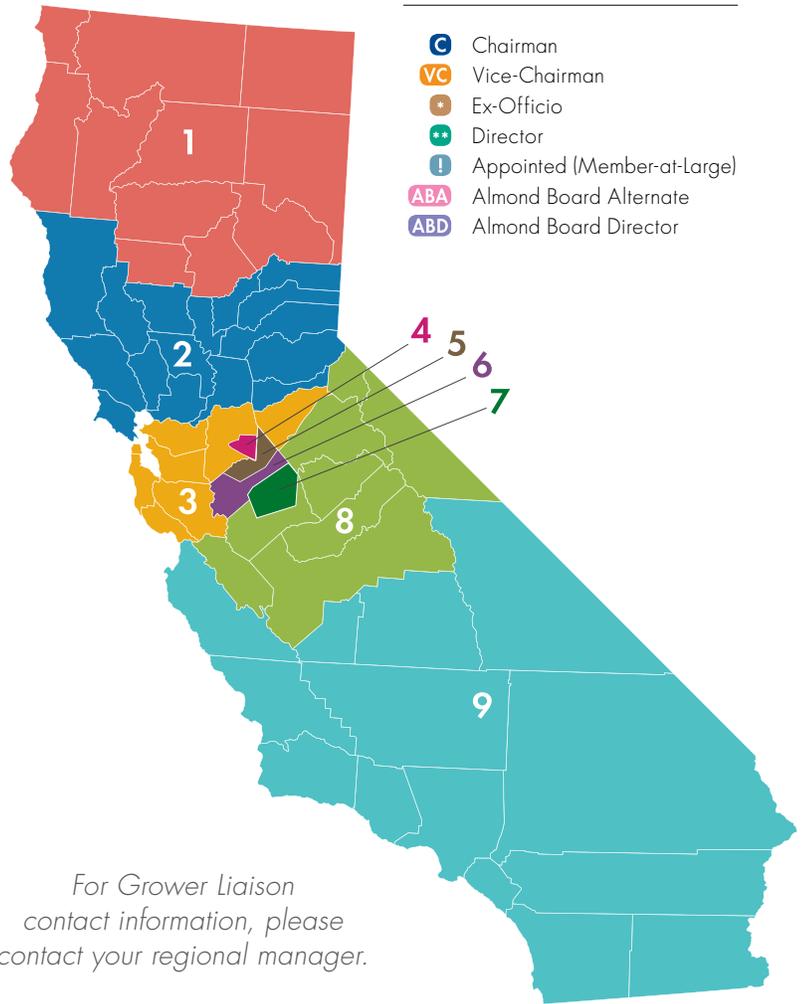
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Summer Ends with a Block Party

The end of summer usually brings a mix of emotions for many people. For some, it's the end of vacations, sun and fun. For others, fall is their favorite time of year as cooler temperatures settle in and pumpkins decorate and flavor everything. At *Blue Diamond*, we celebrate the end of summer and the end of another terrific crop year. Team members across all three sites shared success together and kicked off a new season with a *Blue Diamond Proud Block Party*. ♦

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American Red Cross Telethon

Blue Diamond team members in Sacramento volunteered their time for the American Red Cross, KCRA telethon to help victims of Hurricane Florence and raise money for disaster relief. Volunteers answered phone calls and collected donations in four-hour shifts. The co-op has been supporting the American Red Cross for the last several years with contributions to help with disasters affecting local, national, and global communities. ♦



Blue Diamond Meets Consul General of China

The new Consul General of China to San Francisco, Consul General Wang Donghua, visited Sacramento in late August to see the Mayor, California State Assembly and California Chamber of Commerce (CalChamber). As a member of CalChamber, *Blue Diamond Growers* President and CEO Mark Jansen was invited to join a small group meeting with other Chinese Consulates. The Chinese Consulate General believed the meeting was a good opportunity to get to know members of the business community and exchange views. CalChamber was the first Chamber of Commerce for the new Consul General to visit. ♦



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Ambassador Doud Visits *Blue Diamond*

Gregg Doud, Chief Agricultural Negotiator in the Office of the United States Trade Representative had the opportunity to meet with *Blue Diamond's* Leadership team. This visit provided an opportunity for Ambassador Doud to gain a better understanding and insight into *Blue Diamond's* priority issues and concerns involving global trade. ♦



We Have a Winner

The Salida campus held a t-shirt design contest after a team member suggestion. The design submitted by Frankie Sanchez, a packaging machine operator for the flour line, was chosen the winner. The inspiration for her design was *Blue Diamond's* mission to deliver the benefits of almonds to the world. Congratulations, Frankie! ♦



Welcome, Simone

A loyal fan of Wasabi and Soy snack nuts from the greater Atlanta area is making a move to Sacramento. The continued growth and success of *Blue Diamond* are creating opportunities to welcome new faces to the cooperative. Joining *Blue Diamond* in Sacramento is Simone Denny. She holds the position of senior vice president and general counsel and will serve as secretary to the Board of Directors.

After spending a 12-year career with Coca-Cola in Atlanta, Georgia, and four years overseas in London, England in roles with NCR Corporation and PA Consulting, Simone knows how to build on internal legal practices and is accomplished in matters associated with trademarks, contracts, and employment. Her experience as a leader and partner will bring value to the cooperative.

Simone is a graduate of Cornell University and earned her Juris Doctorate from George Washington University Law School. We are excited to have someone with Simone's depth and experience as part of our team. Welcome, Simone! ♦

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New Study Shows Morning Snack of Almonds Offers Benefits to Breakfast-Skipping College Freshmen

Almond snacking resulted in better post-meal blood sugar regulation and better preservation of “good” HDL cholesterol levels.



For parents sending their 18-year-old off to college for the first time, concerns about the food choices their young adults will make once out on their own are real. New and less healthy eating patterns tend to be the norm for those transitioning to college life.¹ In fact, research has shown that 20 to 43 percent of college freshmen report skipping breakfast, by far the most frequently skipped meal among this group.^{2,3,4,5} That’s an unfortunate statistic, because daily breakfast consumption may decrease cardiometabolic risk factors including blood sugar and insulin metabolism.⁶

A new study from researchers at the University of California Merced, funded by the Almond Board of California and published in the journal *Nutrients*, suggests

that for those college students who do skip breakfast, a morning snack of almonds — the ultimate easy, grab-and-go snack — is a smart option.⁷

Among predominantly breakfast-skipping college freshmen, including a morning snack — either of almonds or graham crackers — reduced total cholesterol and improved fasting blood sugar levels. But the benefits were greater with almonds. Those who snacked on almonds better-preserved HDL (good) cholesterol levels and improved measures of the body’s ability to regulate blood sugar over the course of the eight-week study.

In the study, 73 healthy, first-year college students (41 women and 32 men) were randomly assigned to one of two snacking groups:

- Almond group, which ate 56 grams (about two ounces) of dry roasted almonds, totaling 320 calories, per day.
- Graham cracker group, which ate 77.5 grams (five sheets) of graham crackers, totaling 338 calories, per day.

Over the eight-week study period, consumption of the assigned snack was supervised by researchers except on weekends and spring break, when compliance was monitored via text. Study participants tracked their calorie and nutrient intake using a validated 24-hour food frequency questionnaire.

Results showed that those in the almond group had better measures of several gluoregulatory and cardiometabolic health indicators, including:

“ *This study, the first among a college student population, shows that for those who skip breakfast, almonds are a good snack choice.* ”

- 13% lower two-hour glucose area under the curve (AUC).
- 34% lower insulin resistance index (IRI).
- 82% higher Matsuda index during oral glucose tolerance testing, which represents a gross estimation of insulin sensitivity. This index almost doubled among the almond snackers.
- Better protection of HDL (good cholesterol) levels. Both groups saw reductions in HDL cholesterol, but the almond snackers' levels fell by 13.5% compared to a 24.5% in graham cracker snackers.

"This study, the first among a college student population, shows that for those who skip breakfast, almonds are a good snack choice," says Rudy Ortiz, PhD, lead researcher of the study. "For almonds to double the Matsuda index over an eight-week period is profound, especially in a young, healthy population, illustrating the benefit in insulin sensitivity that almonds may provide. And almonds' effect on several of the other glucoregulatory and cardiometabolic health parameters shows their potential as a smart snack, particularly in this group."

Results also showed that both groups gained a minimal amount of body mass over the course of the study, but that's not surprising. New college students are prone to modest weight gain.^{8,9} Several studies suggest that weight gain in college is associated with a decrease in physical activity.^{10,11,12} Despite the minimal increase in

STUDY AT A GLANCE

THE STUDY:

In an eight-week randomized controlled, parallel-arm intervention, 73 healthy college students (41 women, 32 men) consumed either a snack of dry roasted almonds (56.7 g/day; 320 calories) or graham crackers (77.5 g/day; 338 calories). Changes were assessed from fasting serum/plasma samples at baseline and after four and eight weeks. Acute effects were assessed during a two-hour oral glucose tolerance test (OGTT) at eight weeks.

RESULTS:

Almond snacking resulted in a smaller decline in HDL cholesterol over eight weeks (13.5% vs 24.5%, $p < 0.05$), 13% lower two-hour glucose area under the curve (AUC), 34% lower insulin resistance index (IRI) and 82% higher Matsuda index ($p < 0.05$) during the OGTT, when compared with the cracker group. Both groups had similar modest body mass gains over eight weeks. In general, both almond and cracker snacking reduced fasting glucose and LDL cholesterol.

STUDY LIMITATIONS:

- The lack of a "no morning snack" group is a limitation that precludes assessment of breakfast skipping physiological responses. However, other studies have previously demonstrated the physiological effects of breakfast skipping among various populations.⁶
- Although the body mass gained in both groups was mostly fat-free mass (0.6 kg), the limitations of bioelectrical impedance analysis in accurately assessing body composition, particularly in individuals with obesity, and the limitation of accelerometers in assessing activity during strength training should be considered while interpreting this finding.
- Researchers did not conduct the same five-time point OGTT prior to the intervention, as done at eight weeks for a pre-post intervention assessment. However, there were no differences in baseline fasting insulin sensitivity between groups.
- The seven-day spring break that immediately followed the mid-point of the intervention was a limitation. However, the lack of remarkable differences at week four that were ultimately captured at week eight implies that the impact of such an interruption at the mid-point was not profound.

CONCLUSION:

Incorporating a morning snack in the dietary regimen of predominantly breakfast-skipping, first-year college students had some beneficial effects on glucoregulatory and cardiometabolic health. Almond consumption has the potential to benefit postprandial glucoregulation in this cohort. These responses may be influenced by cardiometabolic risk factor status.

body mass observed in this study, fasting blood sugar decreased over the eight-week trial, indicating benefits to including a morning snack — either almonds or graham crackers — in this population. Both groups also had similar beneficial decreases in harmful LDL cholesterol levels. ◆

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Pumpkin Streusel Muffins

Prep Time: 15 minutes

Cook Time: 25 minutes

Makes: 12 muffins

Ingredients

- $\frac{2}{3}$ cup canned pumpkin
- $\frac{1}{4}$ cup *Blue Diamond Almond Breeze* Almondmilk
- 3 tablespoons canola oil
- 1 teaspoon vanilla extract
- 1 egg + 2 egg whites
- $2\frac{1}{4}$ cups *Blue Diamond* Almond Flour
- 2 tablespoons ground flax seed
- 2 tablespoons *Blue Diamond* gluten-free flour blend
 - 2 cups brown rice flour
 - 2 cups white rice flour
 - 2 cups tapioca flour
 - 1 cup corn starch
 - $\frac{1}{4}$ tablespoon xanthan gum
- $\frac{1}{2}$ cup sugar
- 2 teaspoons baking powder
- 2 teaspoons pumpkin pie spice
- $\frac{1}{4}$ teaspoon salt

Streusel

- 3 tablespoons *Blue Diamond* Almond Flour
- 3 tablespoons packed brown sugar
- 3 tablespoons old fashioned oats
- 2 tablespoons butter, softened
- $\frac{1}{2}$ teaspoon pumpkin pie spice



Directions

1. Preheat oven to 375°F. Line 12 muffin cups with paper liners or lightly coat with butter.
2. Beat together pumpkin, almondmilk, oil, vanilla extract and eggs in a medium bowl.
3. Stir in remaining muffin ingredients and mix well. Spoon into prepared muffin cups.
4. Stir together all streusel ingredients with a fork in a small bowl and sprinkle over muffins.
5. Bake for 25 minutes or until a toothpick inserted into the center comes out clean. Let cool completely.

GIVING TUESDAY TUESDAY, NOVEMBER 27, 2018



For many, our FFA jacket still hangs in the closet or is tucked away in a box for safe keeping. They remain adorned with pins, ribbons, and proudly display not only the highest office achieved, but the wear and tear reflective of the experience! Unfortunately, not all California FFA members can afford a jacket to share in that experience.

To meet this need the California FFA Foundation and Blue Diamond Growers will be participating in #GivingTuesday on Tuesday, November 27, 2018.

For every \$75 received, a jacket and tie/scarf will be gifted to a California FFA member who may not otherwise be able to afford one. Blue Diamond Growers will match your donation, up to 200 FFA jackets.

“My family is proud that I get to wear an FFA jacket. With their support and this jacket, I will go far.”

- MUAKONG, FLORIN FFA

“The jacket gives them more opportunities to participate in FFA activities, which really is a safe haven for students in our community.”

- ADVISOR, PATTERSON FFA

“I know I am not able to pay for a FFA jacket with money, but I will pay for it with commitment and dedication to my chapter. I will wear this jacket with pride and confidence.”

- MARIBEL, ANDERSON VALLEY FFA



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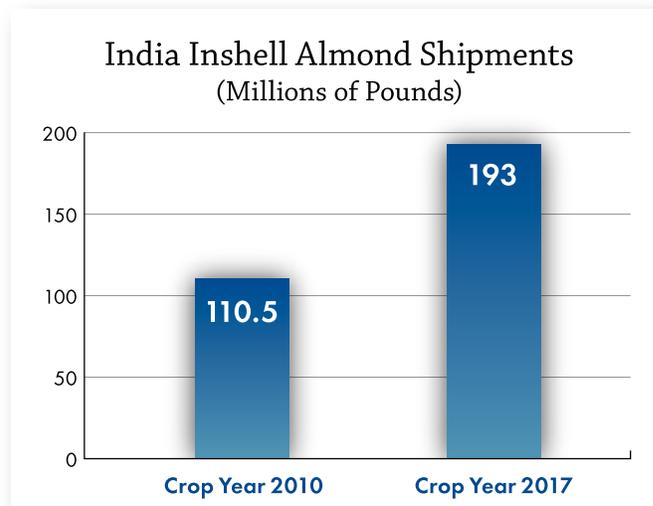
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Almond Appetite in India and China Continues to Expand

Each year as harvest commences *Blue Diamond* quickly gears up for early Nonpareil inshell shipments. Typically, the first shipments of the crop year are to India and China. Our production can be nonstop, 24 hours a day for weeks, or even months, to meet demand in these markets. *Blue Diamond* has been the trailblazer in opening these markets over the years and is the preferred brand, earning a premium over our competitors. Consistency in quality, service, and scale of supply has made our brand the gold standard in the industry.

For India, just about all almond shipments are Nonpareil inshell. The shipments to India are very heavy through the late summer and early fall to meet the demand for Indian New Year (Diwali) and the wedding season. Almonds are an auspicious gift to present during these times and demand is strong. Besides the festival season, almonds are also considered brain food for children and a necessary food during exams. Snacking on almonds and use as an ingredient in many foods is also growing.

Almost all almonds are cracked by hand in India and then sold in kernel form. It is estimated that there are over 60,000 people employed in the cracking industry in India. All almonds shipped and cracked in India are also consumed in the country and demand for almonds continues to grow. In 2010, industry shipments to India



were 110.5 million pounds. For crop year 2017, shipments were over 193 million pounds.

With larger California crops on the horizon, India is also expected to grow in almond consumption by at least 15 percent each year as its middle class and economy continue to expand, and its appetite for almonds grows larger.

For China, brown, manufactured and inshell almonds are all shipped to this market. Specifically, for inshell, they are consumed as a snack and gifting item. In retail outlets, one can see many different brands of inshell California almonds sold in a myriad of different flavors. For the China market, the inshell almonds are not shelled but roasted and flavored in the shell and sold as a popular snack nationwide. The paper-thin shell of the Nonpareil is perfect for easy cracking. The demand is growing rapidly in a country that loves snacking.

In crop year 2015, inshell shipments to China (including Hong Kong and Vietnam) was 80.6 million. For crop year 2017, the shipments were 117 million pounds. Additionally, the middle class in China is now over 200 million people and continues to grow. Like India, this market is expected to grow over 15 percent each year as larger California crops are harvested.

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Of course, as we enter the 2018 crop year, we have our challenges with the recent tariffs implemented against China and repercussions from this action. However, looking forward both China and India present excellent potential to grow with inshell and all almond products as we see larger crops on the horizon. These are indeed very exciting markets, and *Blue Diamond* is well positioned to enjoy the benefits of being the preferred brand. ◆

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South Africa Festival is Almond Breezey

The 2018 Coffee and Chocolate Festival opened its gates at Montecasino in South Africa to an enthusiastic and hungry crowd of coffee and chocolate lovers. An estimated 40,000 visitors looked to enjoy themselves and all tastings, treats and entertainment being offered.

Blue Diamond participated in the festival and successfully exhibited *Almond Breezey* and snack nuts. The festival also hosted an epic, exciting and fun-filled first leg of the *Almond Breezey* Breezey Masters Challenge.

The Coffee and Chocolate Festival was also used as the perfect opportunity to introduce three new flavors being launched in the country — Sweetened Vanilla, Unsweetened Vanilla and Sweetened Chocolate. The new flavors are being added to the existing line of *Almond Breezey* in the market that includes Unsweetened, Original and Barista Blend.



The first leg of the Breezey Masters set a high standard for the Durban and Cape Town regions to follow and match. 16 of the top baristas from Johannesburg competed head-to-head to create the best heart, tulip, rosetta and free pour designs in just six minutes. The competition was steep and in the final knock-out round, a very excited Kyria Sasa from Starbucks took the title.

The Breezey Masters Challenge was a huge success and had the baristas all vying and eagerly fighting for a place in the grand finale in Melbourne later this year. ♦



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That's a Wrap: Legislature Adjourns and Elections Heat Up

On Friday, August 30 the legislature gavelled down and formally adjourned the two-year legislative cycle by the constitutional “sine or die” deadline of midnight. The close of this session marks the ending of Jerry Brown’s historic fourth term as Governor. His legacy will be marked by his driving brand of environmentalism that prioritized the issue of climate change, often at odds with the agricultural and business communities. He will also be remembered for being a voice of temperance and fiscal restraint to his fellow Democrats — both at the beginning of his first term while in the belly of the Great Recession towards this year when the economy had fully recovered. And now all eyes turn towards the mid-term elections, with both state and federal candidates running against each other. The stakes are high in both state and federal races.

While top of the ticket races like U.S. Senate and governor are all but certain to be won by Democrats (there is not one Republican candidate in the Senate race between Dianne Feinstein and Kevin De León), in a number of congressional races California could well decide which party controls power in Washington.



Many districts from the Central Valley down to the Inland Empires will play a major role in determining whether Kevin McCarthy or Nancy Pelosi becomes the next Speaker of the House.

Democrats need to pick up 24 seats from Republicans to win back the House for the first time since 2010. About half a dozen of the nation’s most closely-watched seats are in California, with two in the Central Valley. If Republicans retain control, it will be a big win for Congressman McCarthy (R-Bakersfield), who is a candidate to replace Paul Ryan as Speaker. If they lose, it could mean a return to the Speaker’s office for Nancy Pelosi despite calls from some in

her party to step aside for a new generation.

A looming question for pollsters is if our country’s increasingly divisive politics are beginning to change voter attitudes and registration. The California Department of Motor Vehicles (DMV) recently released the results of its voter registration services since April 2018, and the data shows that three out of five previously unregistered voters chose “No Party Preference” (NPP) rather than identify with an established party. Both Democrat and Republican parties lost over a third of previously registered voters to NPP status. Although this data is limited to voters who registered through the DMV over the course of

nearly four months, it does provide a snapshot of the moment and captures voters' increasing frustrations with divisive politics. It remains to be seen if the NPP voter will be a reflection of the moderate that feels abandoned by party platforms, and if so, whether they turn out to polls to cast their lot.

What is crystal clear is that the Central Valley will play a significant role in the outcome of the November general election and could play a pivotal role in deciding which party controls the House of Representatives next year. As always with mid-term elections, voter turnout will play a pivotal role. California conservatives are counting on the potential repeal of the controversial gas tax on the ballot to help with voter engagement. One thing is certain, all eyes will be watching the clock and poll returns come November to see what course lies ahead for California and U.S.

Where do you stand on the election and candidates? I welcome your questions and comments and can be reached at staff@almondalliance.org. ♦



Andrea York,
Manager,
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Blue Diamond Program Builds Future Leaders

In 1994, *Blue Diamond* created the Young Leader Program to cultivate and educate the cooperative's next generation of leaders. This program is designed to inform young growers and industry members about *Blue Diamond*, the almond industry and agriculture as a whole. Participants are exposed to industry experts, experience the legislative arena, gain an in-depth understanding for the issues facing almonds and agriculture, and learn the inner workings of their cooperative. Since its inception the program has seen more than 500 participants, many of which joined leadership positions within *Blue Diamond* thereafter, contributing to the overall success of the cooperative and its ability to maintain the role as the almond industry leader.

The Young Leader Program is a yearlong program with three events — January (Sacramento), June (Salida) and November (Modesto). Attendance to each event is necessary for completion of the program.

“*Blue Diamond’s Young Leader Program is very educational and eye-opening about behind the scenes of processing almonds.*”



Goal

To prepare participants for leadership roles in *Blue Diamond Growers*.

Objectives

- To develop communication and leadership skills.
- To familiarize participants with the structure and operations of *Blue Diamond*.
- To develop an awareness of advantages of *Blue Diamond* Membership.
- To meet and become acquainted with other almond growers.
- To encourage participation in *Blue Diamond* activities.
- To assist participants in the development and operation of a successful farming business.
- To familiarize participants with external factors that affects their business.

Eligibility Requirements

1. A current member, or child of current member, to *Blue Diamond Growers* and/or an employee of a financial company that provides agricultural financial services.
2. Interested in pursuing a career within the almond/ agricultural industry.
3. Attendance to each Young Leader event.

Application Process

To apply for the *Blue Diamond Growers* Young Leader program, please visit bluediamondgrowers.com/scholarship-program to complete an application.

Once submitted, participants will be selected by a committee of Board Members, Advisory and Liaison Committee members and field supervisors within respective applicants' district, with subsequent approval of *Blue Diamond's* Board of Directors.

Questions?

Contact your field supervisor or the membership office at 209.545.6225. ◆

From Shaking to Stockpiles — Moisture Management is Critical

As harvested almond kernels, hulls and shells start to travel from the orchard to the huller/sheller, it is essential for industry members to take steps to protect this year's crop from potential threats.



When choosing where to stockpile almonds on the farm, look for an area where you can have a raised or sloped bottom. This encourages any moisture to drain away from the stockpile. Image courtesy of the Almond Board.

Proactive steps are particularly important once the harvested crop is ready to be stockpiled before the hulling and shelling process begins. Too high of a moisture level in a stockpile can lead to a number of serious quality issues, from aflatoxin, a food safety concern, to concealed damage via the browning of almond kernels.

Aflatoxins are naturally occurring chemicals produced by *Aspergillus* fungal molds. A significant factor in the growth of *Aspergillus* is moisture content. When in-hull almonds are windrowed or stockpiled, moisture in the almonds combined with hot

weather can create a breeding ground for the molds to grow and produce aflatoxins. By monitoring and adjusting the amount of moisture in windrowed and stockpiled almonds, it is possible to limit the amount of moisture and prevent the growth of mold.

Simple Solutions for High Moisture Levels

If your crop is bound for stockpiling, monitoring moisture levels before sweeping is a good practice and can be achieved through sampling. There is variability in the moisture levels of the crop that is drying on the ground, and it is important to

focus on almonds with the highest moisture content while sampling. Prior to sweeping, the “worst-case” high moisture content almonds are those that are on the north side of the canopy next to the trunk. For windrows, moisture levels are higher among the bottom layer of almonds. Practical tip: Do not stockpile your crop if the hull moisture content exceeds 12 percent, the kernel moisture content exceeds six percent or the total fruit (in-hull almond) moisture content exceeds nine percent.

Another threat to almond quality, and an additional cause of high

If rainfall occurs after your crop has been windrowed, one option is to condition the nuts by picking them up and putting them back on the ground while blowing out leaves and other trash. Image courtesy of the Almond Board.



moisture levels, is rain at harvest. While rains cannot be avoided, growers and custom harvesters can mitigate moisture-related damage in the orchard. If rain is in the forecast, shaking should be put on hold until after the rains have passed, as wet nuts dry faster on the tree than on the orchard floor. However, if rain is in the forecast while the nuts are on the ground to dry, a number of steps can be taken:

- If you've already shaken your orchard, but the nuts are still too wet to pick up, blow them away from tree trunks and don't windrow.
- If nuts have been windrowed, condition them through a drop chute of a harvest machine. This involves picking them up and putting them back on the ground while blowing out leaves and other trash. This helps dry nuts faster even under dry conditions. Conditioning your crop both before and after rainfall promotes the most rapid drying; however, a greater benefit is seen when conditioning after rainfall.
- Maintaining optimum moisture levels before stockpiling is critical to limiting mold growth and concealed damage. If moisture or relative humidity levels are too high to stockpile, another option is to move the crop to a dry area, or machine dry.

The Trick is in the Tarp

It is important to cover a stockpile with a tarp, but this can increase the humidity and moisture levels within the stockpile. When choosing a tarp, keep the following key points in mind:

- A white-on-black tarp is the best choice to minimize temperature fluctuations, which lead to condensation and eventual mold growth.
- Clear tarps allow the greatest temperature fluctuations, but should only be used on dry, in-hull almonds that are well below the moisture threshold.
- White tarps fall between white-on-black and clear tarps in terms of temperature fluctuations.

Controlling the relative humidity (rH) in a stockpile is critical to food safety. If you find that moisture levels are too high in a stockpile, open the tarps in the daytime to allow moisture to escape, and close them at night, when relative humidity tends to increase. Also, pay close attention to the outside of the piles, where large changes in temperature and condensation can increase moisture levels.

When stockpiling is necessary, visit almonds.com/growers/in-the-orchard for more valuable information on best practices for creating piles and managing stockpile moisture. ♦

Article contributed by the Almond Board of California

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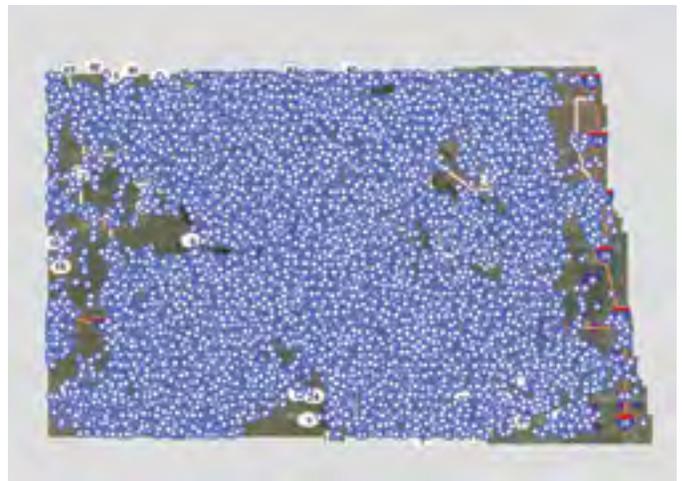


A common sighting in North Dakota, a typical honey producing bee yard. Browning Honey Co. Bee Integrated Yard

THE BEE BOX

The Last Best Place for Bees

North Dakota is home to over half a million honey bee colonies, and is the number one honey producing state in the United States for the past 30 years. According to the North Dakota Department of Agriculture, in 2017, North Dakota produced 33 million pounds of honey valued at over \$65 million. The vast expanse of land, as far as the eye can see, offers a dense and rich clover forage, a favorite of the honey bee. It is therefore no surprise that more beekeepers want to bring their bees to the Peace Garden State each year. In contrast, corn and soybean are gaining popularity in the agricultural landscape of North Dakota, replacing some of the more traditional grain crops of the past. As a result of these two opposing landscape factors, beekeepers in North Dakota report



Map of North Dakota bee yards. Each blue dot represents a registered apiary (bee yard) Source: <https://beemap.ndda.nd.gov/>

an increase in honey bee colony density and a decrease in forage for the pollinator. Zac Browning of Browning Honey Co. warns that North Dakota is the “Last Best Place for Bees.”

The Bee Informed Partnership (BIP) Midwest Technical Transfer Team based at the University of Minnesota services beekeepers throughout the Dakotas, traveling long distances to cover both territories. In addition, the Texas Technical Transfer Team also follows their more southern beekeepers up to South and North Dakota during their migration in search of honey producing pastures. The two teams are kept busy in August and September making the sampling rounds assessing colonies during and after honey production.

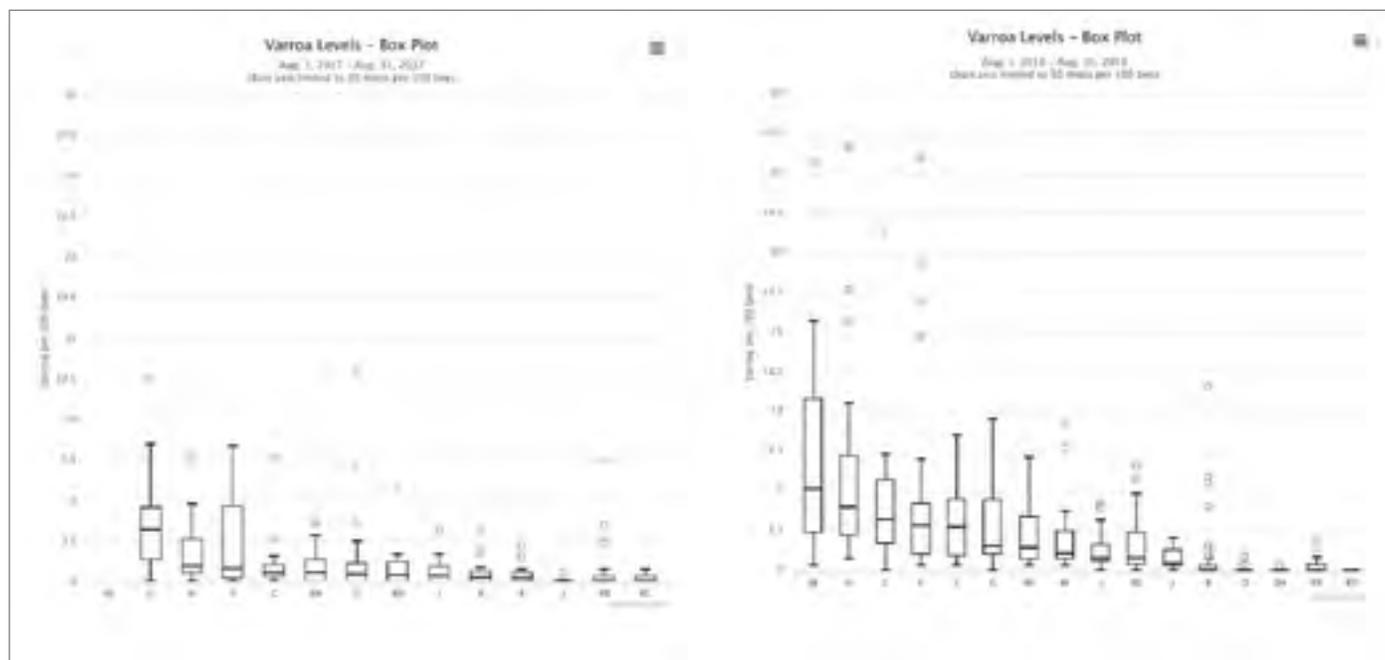
The honey producing season in the Dakotas starts in June after colonies come out of winter, most likely made the trek to California for the almond bloom in February, get split, treated for varroa mites, fed and left to grow strong workforces for the nectar flow back in the Dakotas. Come June, the honey supers go on and bees work tirelessly from dusk until dawn to collect nectar, store it

and evaporate it into honey. Usually during this period, varroa mite treatments are withheld until the honey

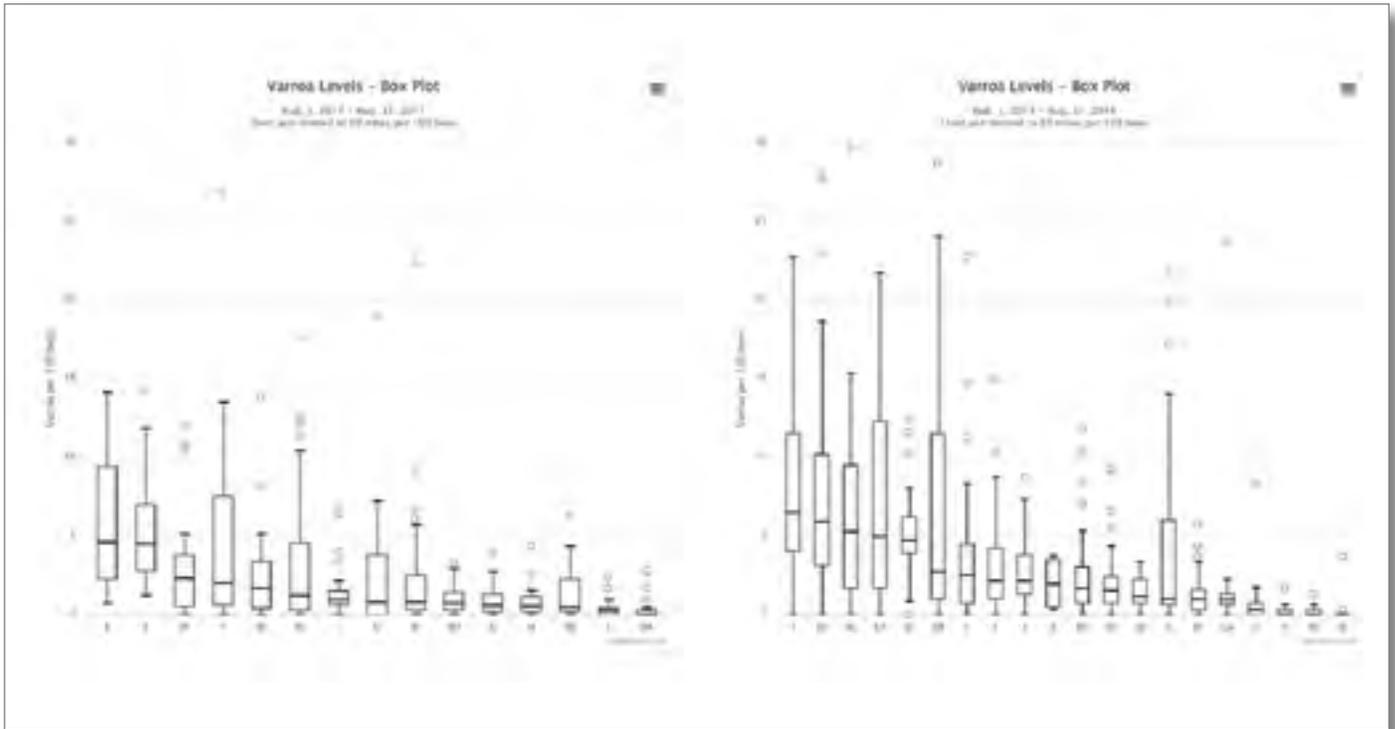
“North Dakota is the last best place for bees.”

supers come off in August, due to the lack of treatment options available for use during honey production for food safety reasons. This leaves the colonies vulnerable to experience spikes in varroa mite infestations and the variety of viruses they vector to the honey bee population in the late summer.

This year, both the Texas and Minnesota BIP Technical Transfer teams noticed higher varroa mite levels compared to last year for the same period (see graphs). Different variables could account for these numbers. For example, a warm spring and early build up, low efficacy treatments and colony density in the region could all partially explain the early spikes in varroa mite loads.



This graph represents the Varroa mite levels for Texas (TX) beekeepers from August 2017 (left) compared to August 2018 (right).



This graph represents the Varroa mite levels for Minnesota (MN) beekeepers from August 2017 (left) compared to August 2018 (right).

A significant advantage in using the BIP Technical Transfer Team program is to detect these high varroa mite spikes early and assess the severity of the issue regionally. This early detection system provides the hard numbers that help beekeepers decide if they need to treat and when, perhaps earlier than they typically would have, in hopes to lower their varroa mite loads in time for the colonies to produce their winter bees. Similarly, BIP sampling post treatment will ensure that the treatments did produce the desirable effects and/or that colonies did not get re-infested by nearby bee yards. In short, the BIP Technical Transfer Team program can detect the levels of infestation early in hopes to mitigate damage and colony losses. A colony saved in the fall usually means one more that can make it through the winter into the following year, decreasing costs and increasing revenue to the beekeeper while providing a valuable pollinating unit the following year.

We know that colonies die from high varroa mite infestations. We also know that mites travel on bees and infest other bee colonies. These early high varroa mite infestation levels are alarming, and even more so in a region as densely populated (in bees) as North Dakota. The North Dakota Department of Agriculture and honey producing beekeepers are doing great work to implement strategies to improve bee forage and management across the state. Together with renewed vigilance and sampling efforts from the Bee Informed Partnership, we can continue to call North Dakota the last best place for bees. ♦



**Anne Marie Fauvel,
BIP Technical Transfer
Team Coordinator**

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TIME TO CONSIDER

As the hustle of harvest finally recedes, late September and October provide a time to finish up a few orchard practices and begin the process of re-developing any orchard blocks. This period also provides an opportunity to evaluate what went well and identify areas of improvement for 2019 while the trees have leaves. An overview and update of some of the practices are included below.

Postharvest Nitrogen

Postharvest nitrogen budgets should be evaluated. Work at UC Davis has indicated that 15–20 percent of the nitrogen demand occurs from harvest through the postharvest period. This suggests that somewhere between 20–30 pounds of nitrogen is utilized during this period, which could be sourced from residual nitrate in the soil or postharvest applications. A further breakdown of the uptake curve shows that less than eight percent of the annual need occurs after September, suggesting the importance of timeliness in application [Figure 1].

Applications of nitrogen in the postharvest tend to be relatively inefficient due to several factors, including tree defoliation, leaching by early rains or long

irrigations, shorter days and lower water use. This suggests that more nitrogen may be needed to achieve a 20–30 pound uptake, but studies in Kern County failed to see a response from applications greater than 50 pounds per acre of nitrogen applied after Nonpareil harvest (mid-August). Rates should not exceed this amount and applications made in September and October should be significantly reduced.

Mid-July leaf nitrogen and residual soil nitrate should be taken into consideration when determining the amount. Nitrogen applications to trees with adequate or excessive mid-July leaf nitrogen levels (greater than 2.5 percent) are most likely not needed. This is supported by research conducted by Franz Niederholzer (UCCE Yuba/Sutter/Colusa) who has shown that mid-September or later postharvest nitrogen applications to trees with mid-July leaf nitrogen at or over 2.5 percent did not improve crop yields the following year. Trees were followed for four years within this study and nitrogen applied in these situations was lost to leaching.

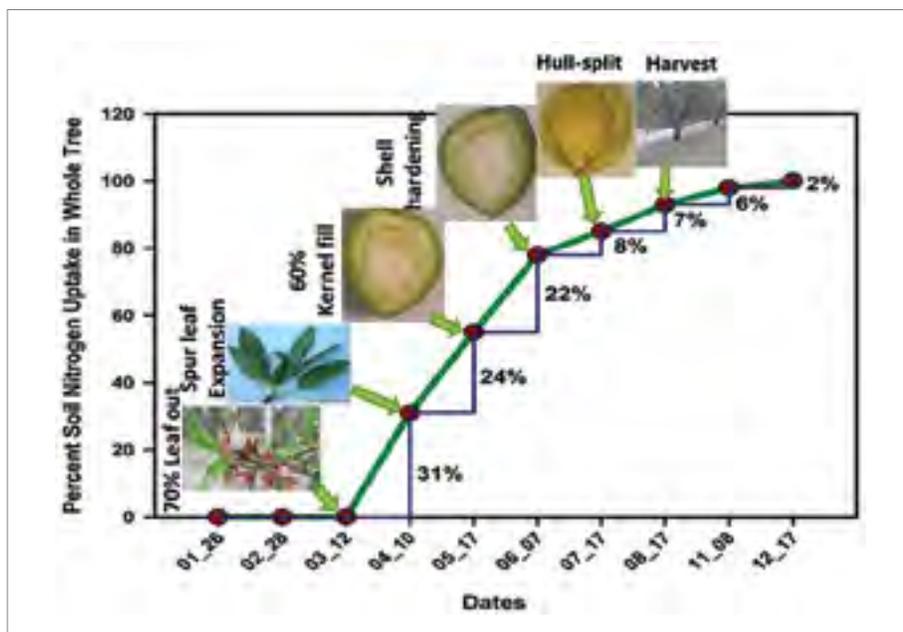


Figure 1: Rates of nitrogen uptake vary during the year. During the postharvest period, less than 15% of the total year's nitrogen uptake occurs, with less than 8% occurring after August. Reduce postharvest nitrogen rates if applications are made late in the fall. Figure courtesy of Dr. Saiful Muhammad and Dr. Patrick Brown, UC Davis.

Postharvest Orchard Review

With the hustle of harvest slowing down, late fall is a good time to walk the orchard and look for any issues that can be addressed in the following months. Take time to reflect on the challenges of the season and be on the lookout for the following:

Navel Orangeworm (NOW)

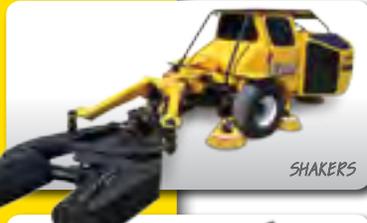
Was damage higher than expected? Were field samples collected and cracked out? The damage reported from the processor is often 50 percent less than what was experienced within the field. This is due to the harvesting process and that damage percentage is measured by weight, not count, at the processor. Remember, every one percent of damage is 25 pounds per acre if averaging a 2,500 pound per acre crop. If damage was high, were the trees winter sanitized? Mummy nuts serve as the only food source for NOW between last year's and this year's crop. Was a hull split spray applied? Which material and at what volume? What type and how fast was the rig speed? If this is unknown, better notes should be taken.

Stick Tights

Are there more than expected? Does one variety have more stuck nuts than the other? If so, what symptoms are observed? The protracted bloom experienced in February of 2018 often leads to a delayed harvest timing, leading to reduced nut removal. Gumming can occur with hull rot, boron toxicity, or diseases such as anthracnose or bacterial spot. Dead shoots often are due to hull rot. Stick tights could also be due to uneven ripening from a protracted bloom (common in self-pollinating varieties), poor shake timing, or incorrect water management. Sanitizing these mummies will need to occur to reduce NOW pressure the following season.

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Weeds

What weeds presented a challenge to manage this past year? Were applications of glyphosate or glufosinate ineffective due to resistance or lack of activity on weed spectrum? Are these weeds beginning to spread across the field? Even more concerning, is there a new weed problem emerging? The weeds present and issues experienced will help with post and pre-emergent selection, timing, and rates.



Soil crusting and reduced water infiltration rates are common in irrigated orchards. Soil samples from the top few inches should be analyzed to determine which amendments should be applied.

Water Infiltration Issues

Water infiltration problems are becoming more common due to increased water applications, low quality water, reduced cover crop usage, compaction, and varying soil characteristics. After an irrigation, are there visible puddles and signs of soil crusts? Does water appear to run off the field? Does the water create saturated zones underneath the emitters? These problems are not easy to resolve, but reducing and preventing is critical to maintain high yields. Areas with problems should be sampled to identify the underlying soil chemistry issue. The irrigation water should also be sampled.

Appearance of Salt Toxicity

Are leaves exhibiting signs of brown, crispy, or “burnt” edges? This could be evidence of sodium or chloride toxicity. Review leaf tissue samples from July to determine the element of concern. Sample soils to compare to previous year’s samples to identify any emerging salinity issues. Utilize this information to develop a leaching program, which may include early winter irrigations to refill the profile and leach and applications of soil amendments to assist with the leaching process.

Underperforming Areas

Trees that are growing at a slower rate than other areas could be indicative of a soil texture change or poor

irrigation distribution. It is difficult to manage soil texture differences, but emitters could be changed to apply water over a larger wetting pattern to increase the soil volume. In these cases, try not to change the emitter flow as this may impact distribution uniformity (DU). Pump and irrigation line maintenance will help improve DU. Check pressure at the emitter to determine if flows are reduced. If lower pressures are observed, check the flow rate of the pump to see if it may have dropped or not properly set, inspect lines for leaks and clogged screens and emitters for precipitation build-up, and flush the lines.

Timing of Orchard Pruning

Over the past few years, there has been an increase in wood canker pathogens infecting pruning wounds, wind cracks, and damaged areas of young almond trees. Infections start off slow, but eventually girdle limbs, killing scaffolds and impacting production. These pathogens are most active right before, during, and immediately after rain events as they require the humidity to sporulate and the wind-splashing of rain to spread. To prevent pruning wound infections, pruning of young trees should not occur when rain is in the forecast. Cutting of limbs on primary scaffolds of mature trees should also not occur at this time.

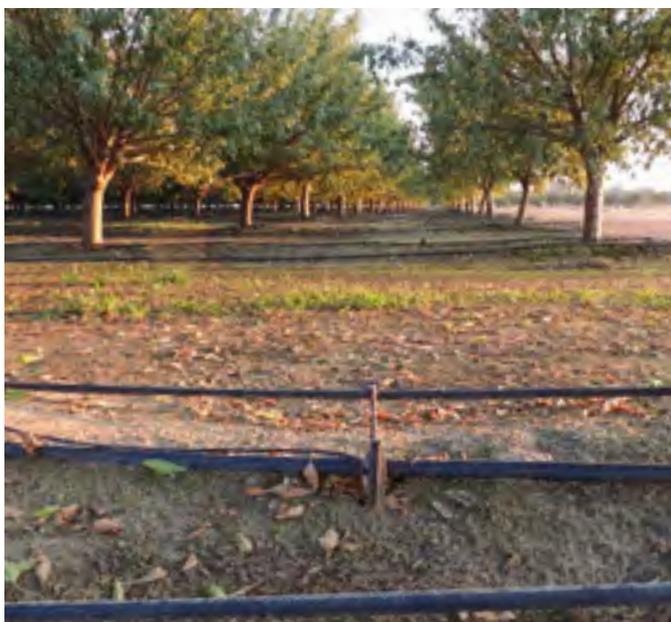
Planning to prune young trees around the weather may delay pruning. Research performed in Yolo County has shown no impact when pruning as late as full leaf expansion (late March). In this study, the growth was followed over three years and no differences were observed in the various treatments, including a winter dormant pruned control. Research on how early pruning can begin isn’t as clear. Starting too soon can spur unwanted growth. Pruning once the days are cooler and shorter should reduce the risk of secondary bud break.

Pruning of mature trees can begin shortly after harvest. Pruning should be minimized as multiple long-term studies have found that it can reduce yield and increase orchard operation expenses. Nevertheless, limbs that

are blocking equipment access, creating a safety hazard, or are dead or dying should be removed. Selective limb removal also has been shown to increase spray coverage, reduce sticks at harvest, as well as reduce foliar diseases.

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Orchard Removal and Replanting

If planning to redevelop a block, consider harvesting the later varieties earlier to allow more time in the process. Nematode sampling should occur prior to removal to determine which species are present and assist in rootstock selection. This can be done one to two years prior to removal. Line up the resources for orchard removal, which can be done by tub grinders, whole orchard incorporation, or removal for firewood. Once removed, the field should be ripped to the depth of 30 inches or greater several times to assist in root removal and reducing compaction. Some cases, ripping deeper should occur to assist with breaking or re-breaking hardpan. Backhoeing has been shown to be effective in increasing tree growth with or without fumigation in sandy soils and is recommended for these conditions.

After soil modification, the field should be disked and spring-toothed to assist in root removal and leveling. After settling, the ground can be leveled and berms can be pulled. Fumigation should be considered, especially for sandy loam to sand soils to manage Prunus Replant Disease and plant parasitic nematodes. If fumigating, most of the land prep should be done prior to fumigation, with the exception of pulling the berms. Moving soil around after fumigation defeats the



When replanting an orchard, pre-plant fumigation should be considered to manage biological replant problems. Rootstock selection should consider the types of nematodes present and soil factors including salinity and pH.

purpose of fumigating. The field should be prepped and the irrigation system installed or ready to be installed immediately after planting. Bare root trees should be planted as soon as possible. Potted trees have more flexibility in planting timing.

Fumigation should be considered in areas with high population of plant parasitic nematodes (Ring, Lesion, or Rootknot) or a history of Prunus species (peach, plum, almond, cherry, etc). A matrix to assist with the decision is provided in the table. Although not a true replant scenario, almonds following grapes often struggle with high counts of Ring and Rootknot nematode and fumigation with Telone-II should be considered. In other soil types, replanting Prunus species after other Prunus species creates not only nematode problems, but also issues with Prunus Replant Disease. In these situations, a nematode analysis can help determine if chloropicrin, mixture of chloropicrin and Telone-II, or Telone-II should be used.

The Final Thought

There seem to be many complaints regarding NOW damage this past year. Winter sanitation is the first and primary means of reducing NOW populations. I often hear how expensive it is to winter sanitize, but rarely do people consider the cost of not sanitizing: every one percent NOW damage for a 2,500 pound per acre crop is \$62 per acre in lost production, excluding the loss of processing bonuses. Plan to remove mummies to less than two per tree this winter in areas Merced County and north, and less than one mummy per tree Madera County and south. ♦



**David Doll, UCCE Pomology
Farm Advisor, Merced County**

	Not Advised	Rowstrip Telone-II	Broadcast Telone II	Rowstrip or Spot Chloropicrin	Rowstrip C35, Chloropicrin
No Orchard History, Fallow Field, No Nematodes	X				
No Orchard History, with Nematodes		X – Population dependent	X – Population dependent		
Orchard History with No Nematodes, Sandy Loams or Coarser				X	
Orchard History with No Nematodes, Silt/Clay Loams or Finer	Possible			X	
Orchard History with Nematodes			X – Population dependent		X – Population dependent
Orchard History with Aggressive Pathogens				Some benefit	Some benefit

When considering to fumigate, consider the orchard history, presence of nematode species, and soil type.



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Contact: Tom (209) 648-7267 or (209) 669-1869

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