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NEWS, VIEWS, AND INDUSTRY INSIGHT

MAY-JUNE 2022



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This June, Mash Ups are being introduced at Walmart. Grab one or both blends today to try two tasty flavors in one bag!

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Blue Diamond is committed to sustainability and serving our communities. Love Modesto, Love Turlock, and Day in the Dirt all proved to be great successes as team members rolled up their sleeves and acted in accordance with our values.

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Blue Diamond Regional Managers, Trent Voss and Justin Elam dive into what it means to farm in the difficult times we live in, touching on four foundational elements of almond farming: water, fertility, bees, and pest management.

ON THE COVER:

Blue Diamond team members volunteered at three different events to serve our communities and sustain the future. Group Collages from Day in the Dirt, Love Turlock & Love Modesto.



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Blue Diamond, the world's largest processor and marketer of almonds, exports to over 100 countries.

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Mark Jansen
President & CEO



Over the last few months we have been making up for lost time and it has been refreshing to attend in-person activities and events. I've personally valued once again meeting with the Grower Liaison Committees and talking with many of our growers face-to-face. I look forward to seeing many more of you at the District Meetings next month.

As I have shared with you before, I fully respect the challenges you, our growers, face given significant inflation on production inputs and weather-driven crop impacts. I want to assure you that *Blue Diamond* remains committed to honoring our grower progress payment schedule that you count on throughout the year. And I'm pleased that we expect to deliver higher payment levels than we did last year.

In our recent market update, you may have read that the USDA National Agricultural Statistics Service (NASS) subjective almond forecast for the 2022 crop came in at 2.80 billion pounds, which was in line with market expectations. More importantly, shipments over the past few months exceeded market expectations with new record highs set for the crop year. I'm encouraged by the improved conditions we're seeing in the shipping and logistics arena. I want to acknowledge the hard work and expertise of *Blue Diamond's* Supply Chain team in activating key partnerships and forging truly creative solutions to get our almonds into the market, and into our customers' hands.

With the return of global tradeshows, in May, *Blue Diamond* helped sponsor and played a key role in the INC World Nut and Dried Fruit Congress in Dubai – the largest international gathering of dried fruit and nut food professionals, suppliers, traders and buyers. Drawing 1,000 participants from more than 60 countries, INC was an excellent platform for networking, marketing and making deals for our growers.

While the weather this year has been anything but predictable, it's safe to expect that summer

will usher in another season of drought and water supply concerns for farmers throughout the state.

Anticipating increased media attention on the drought and water use, several *Blue Diamond* growers throughout the region are participating in professional media training sessions to better serve as resources for local journalists. Armed with key messages about our co-op and regional examples of sustainable farming practices, these growers will be well-equipped to share *Blue Diamond's* great story around sustainability. Thank you to all who are participating in this important outreach and education opportunity.

Perhaps the biggest, most visible chapter in *Blue Diamond's* sustainability story is strong grower participation in our Orchard Stewardship Incentive Program (OSIP) – a measurable commitment to sustainability and water efficient farming. In addition to the financial benefits to our growers, the increased enrollment and acreage in the California Almond Sustainability Program (CASP) as a result of *Blue Diamond* grower participation helps our industry as a whole.

Through these efforts and more, I hope you are as proud as I am of the positive impact *Blue Diamond* is making every day. I look forward to seeing you all soon.

A handwritten signature in black ink, appearing to read "Mark Jansen".

Mark Jansen
President & CEO



Regional Managers

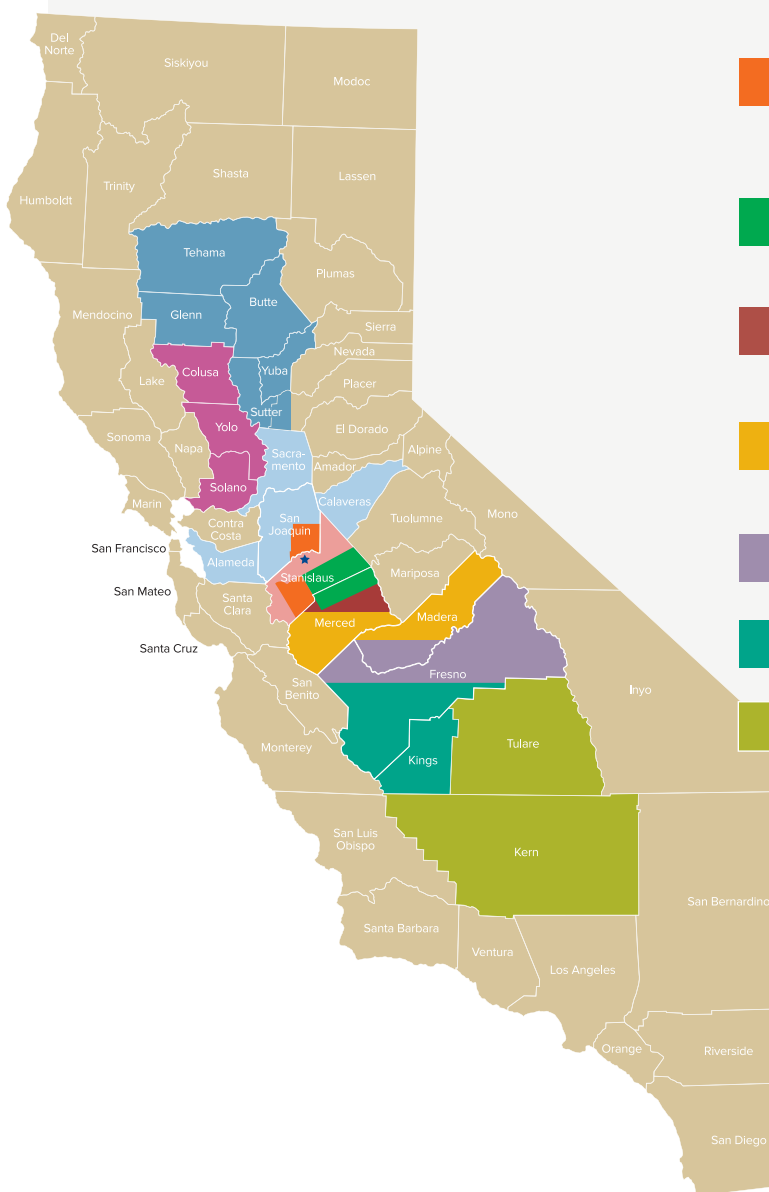


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 Allen Sipma
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 Zack Reinstein **!**
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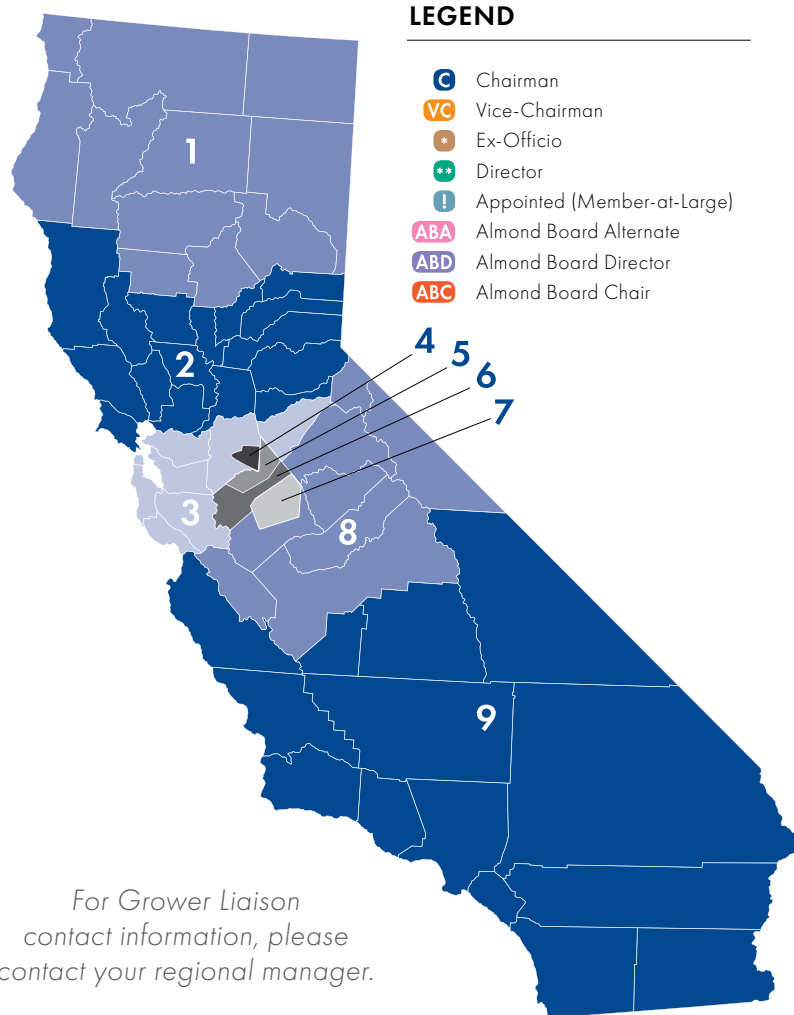
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- C** Chairman
- VC** Vice-Chairman
- *** Ex-Officio
- **** Director
- !** Appointed (Member-at-Large)
- ABA** Almond Board Alternate
- ABD** Almond Board Director
- ABC** Almond Board Chair



For Grower Liaison
 contact information, please
 contact your regional manager.

Blue Diamond Reaches New Heights!



Through the efforts of Takao Watanabe (*Blue Diamond* Regional Manager of Japan and Asia), and our Nepal distributor, Vishal Group, *Blue Diamond* snack almonds are now available at the gateway to Mt. Everest: the highest retail point in the world!

We are always striving to rise to higher heights on our pathway to global distribution of our brands. This is one stop we just couldn't miss and the Himalayan Ridge smiles at *Blue Diamond* being available in its foothills. ◆

Alicia Rockwell Receives CMTA's "Outstanding Women Making California" Award

California Manufacturers & Technology Association (CMTA) chose to recognize the incredible work of women within California's manufacturing industry at their first "Women Making California" event. CMTA honored the contributions of Alicia Rockwell, *Blue Diamond Growers'* Chief Government Affairs Officer, and Kit Cole, of Kit Cole Consulting, with the debut of their "Outstanding Women Making California" award. The pair was honored with the award and Rockwell also moderated a panel of women legislators for the event where *Blue Diamond's* Sacramento Site Director, Amy Vedmore, and Government and Public Affairs Manager, Mallorie Hayes were also in attendance.

"Women have a long history of stepping up and leading the production line when called upon, with WWII's Rosie the Riveters illustrating the resolve and capability of women across the country to manufacture goods for home and abroad," Rockwell stated. "Events like today's prove that women not only have a necessary place in manufacturing right now, but that this industry is made stronger because of the dynamic, hard-working women who show up and get to work every day. From the factory floor to the C-suite, the path forward for future generations is made that much better as more women once again step up and take their place at the table and on the production line."

Blue Diamond has been a member of CMTA for two years and has supported in other ways prior to taking membership. ♦



Left to right: Alicia Rockwell, *Blue Diamond Growers* and Kit Cole, *Kit Cole Consulting*

About CMTA

The California Manufacturers & Technology Association (formerly the California Manufacturers Association) works to improve and enhance a strong business climate for California's 30,000 manufacturing, processing, and technology-based companies. Since 1918, CMTA has worked with state government to develop balanced laws, effective regulations, and sound public policies to stimulate economic growth and create new jobs while safeguarding the state's environmental resources. CMTA represents 400 businesses from the entire manufacturing community — an economic sector that generates more than \$300 billion every year and employs more than 1.2 million Californians.

INC 39th World Nut and Dried Fruit Congress 2022

May 11-13 | Dubai | 1000+ Attendees | 60+ Countries

The annual INC World Nut and Dried Fruit Congress was held in Dubai in late May and is the largest international gathering of food professionals, suppliers, traders, and buyers dedicated to the nuts and dried fruits business. Sessions provided industry statistics, crop forecasts, supply, consumption, and market dynamics. Laura Gerhard, VP of Global Ingredients Division (GID) for *Blue Diamond* chaired the Almonds Roundtable presentation and panel discussion for over 800 attendees. GID Sales Directors, Bobby McCuan and Chris Cummings received a graduation certificate from the INC Council for completing the INC Academia Executive Education Program for the Nut and Dried Fruit Industry. ♦



Left to Right: Chris Cummings and Chris Cromwell, Global Ingredients Division (GID) Directors; Mark Jansen, President/CEO; Laura Gerhard, VP of GID; Sean Allen, VP of Sales (Americas); Warren Cohen, VP of International Sales (GID); Larry Steinbach and Bobby McCuan, Sales Directors (GID)

2022 Board of Directors & Grower Liaison Committee Election Reminder



Note: New Deadline for Applications is August 1

Starting this year, the election cycle for *Blue Diamond*'s Board of Director and Grower Liaison Committee seats will move up approximately one month to allow more time for election ballots to be received and processed prior to the co-op's Annual Meeting in November. Given the new timing, interested candidates must submit their petitions by August 1, 2022.

Board of Directors:

Interested and eligible growers from Districts 2, 8, and 9 are encouraged to run for District Director. A petition signed by 15 *Blue Diamond* members from their district **must be filed by August 1**. To learn more about eligibility and the responsibilities of a Director, please contact any current Director.

Grower Liaison Committees:

Three Grower Liaison Committee (GLC) positions in each district are up for election. Interested and eligible candidates must file a petition signed by 5 *Blue Diamond* members from their district **by August 1**.

More information on the candidate process including application forms and election deadlines will be mailed and emailed to all Blue Diamond members in June.

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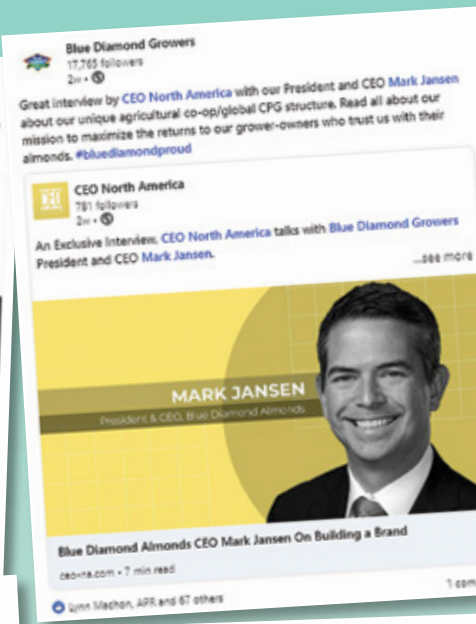
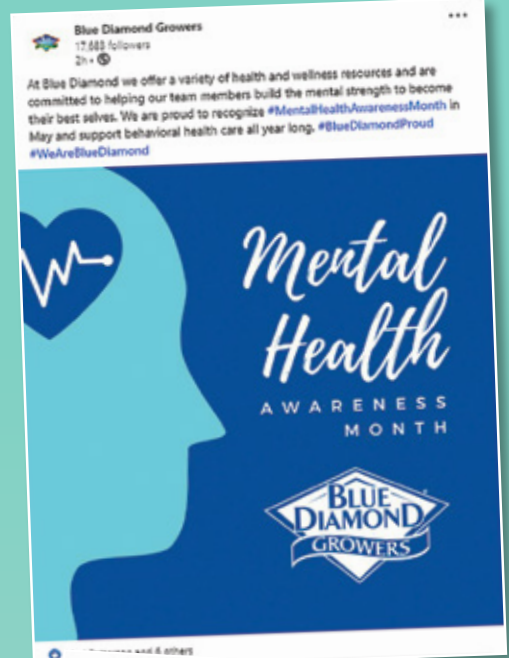
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#WeAreBlueDiamond Social Media Activity



This month, *Blue Diamond* served at Love Turlock, Love Modesto, and Day in the Dirt events where we allowed our actions to speak of our passion for our communities. We celebrated our President/CEO, Mark Jansen's interview with CEO North America where he spoke of our unique co-op/CPG structure. We hired McKinney as our new agency of record. Our golf tournament in Stockton proved to be a success for raising funds for the *Blue Diamond* Foundation, a scholarship program supporting the next generation of ag leaders. And finally, a black bear stopped by to sample some *Blue Diamond* almonds fresh from the tree in Mark Palla's orchard in the Buttonwillow area! ♦



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Creamy Polenta with Roasted Beets

Prep Time: 135 minutes Cook Time: 135 minutes
Difficulty: Medium Servings: 2

Ingredients

- 6 to 8 small, red beets
- ½ Chioggia beet sliced into 8 paper-thin slices
- ½ small, red onion sliced into wedges
- 1 cup cooked chickpeas, drained and rinsed
- 4 cups fresh spinach
- 2 tablespoons crumbled feta cheese (*optional*)
- 2 cups *Almond Breeze* Unsweetened Original Almondmilk or Extra Creamy Almondmilk

Directions

1. Preheat the oven to 400°F and line a baking sheet with parchment paper. Wrap the whole red beets in a sheet of aluminum foil with a drizzle of olive oil and a pinch of salt. Place on the baking sheet and roast for 40 to 50 minutes, or until soft and fork-tender. The timing will depend on the size and freshness of the beets. Set the sliced Chioggia beet aside as it will be served raw.
2. In a medium saucepan over medium-high heat, bring the Unsweetened Almondmilk, water and a ½ teaspoon salt to a gentle boil. Add the polenta and whisk to combine. Reduce the heat to low and simmer, stirring every 5 to 10 minutes. Be careful that the mixture does not start to bubble. This will scorch the polenta and leave a bitter taste.
3. Continue stirring for about 45 minutes or until the polenta has thickened but is still soft and creamy. Stir in 1 tablespoon of olive oil and more salt and pepper to taste. Remove from the heat and set aside.
4. Meanwhile, line another baking sheet with parchment paper and toss the onion wedges and chickpeas with a drizzle of olive oil and generous pinches of salt and pepper. Roast for 25 to 30



- 1 cup water (more as needed)
- ½ cup stone ground polenta corn grits (not instant)
- 1 tablespoon extra-virgin olive oil (more to taste)
- 1 small clove garlic, minced
- 2 tablespoons lemon juice
- ¼ teaspoon Dijon mustard
- Sea salt and freshly ground black pepper

minutes or until the chickpeas are crisp and the onions are soft.

5. In a small, shallow bowl, whisk together the olive oil, garlic, lemon juice and Dijon mustard. Season with salt and pepper. Place the raw Chioggia beet slices in the dressing and let them marinate until you're ready to plate.
6. Remove the roasted red beets from the oven, unwrap the foil, and set aside to cool. When they are cool to the touch, peel the skins. Slice the beets in half, sprinkle with a pinch of salt, and set aside.
7. In a medium skillet, heat 1 teaspoon of olive oil over medium heat. Add the spinach and a pinch of salt and pepper and toss. When the spinach starts to wilt, reduce the heat and add the garlic and a squeeze of lemon. Toss and remove from heat.
8. Assemble plates with a scoop of polenta, the sautéed spinach, roasted onions, roasted chickpeas, roasted beets, raw beets and feta cheese, if using. Drizzle the remaining Lemon Dijon dressing over the vegetables. Finish with chopped Roasted Salted *Blue Diamond* Almonds for added crunch, freshly ground black pepper and a pinch of sea salt, if desired.

Paleo Almond Coconut Cake

Prep Time: 90 minutes Cook Time: 90 minutes Difficulty: Medium Servings: 10

Ingredients

For the Cake

- ½ cup coconut flour
- ½ cup *Blue Diamond* Almond Flour
- ½ teaspoon baking soda
- ¼ teaspoon sea salt
- 7 eggs
- 1 cup melted coconut oil
- 1 cup maple syrup
- 2 tablespoons vanilla extract
- ¼ cup *Almond Breeze* Almond Coconut Unsweetened Original

For the Frosting

- 8 ounces unsweetened baking chocolate
- ¼ cup coconut oil
- ⅔ cup maple syrup
- 1 cup almond butter
- 2 tablespoons vanilla extract
- ½ cup *Almond Breeze* Almond Coconut Original

Directions

1. Preheat oven to 350°F
2. Mix dry ingredients in a bowl. In another bowl whisk together all wet ingredients. Pour the wet ingredients into the dry mixture and mix well. Pour batter into greased pans and bake for 20-25 minutes.
3. When the cake is fully cooled, top with frosting. A single batch of frosting creates a “naked cake” look. Double the frosting recipe if you want to coat the entire cake

Frosting

1. Melt chocolate and coconut oil in a thick saucepan or double boiler. Stir and remove from heat when melted. Stir in maple syrup. Allow to cool. Transfer mixture to mixing bowl and beat in almond butter until a thick frosting is formed. Add vanilla extract. You can add the almond coconut milk now to thin it out, or if it's a bit loose, refrigerate it until an hour before use.
2. An hour before frosting the cakes, remove the frosting from refrigerator and bring the frosting to room temperature. Pour the almond coconut milk into the frosting and beat into a whipped consistency.



Mashing Up the Norms

Blue Diamond is mixing things up a bit by introducing Mash Ups, a new line of snack almonds that combines two intense flavors, doubling the deliciousness in every bag. *Blue Diamond* Almonds Mash Ups are sure to deliver an exciting, multi-dimensional snacking experience every time. Mash Ups are available in two mouthwatering flavor blends: Cinnamon and Maple Almonds, and Dark Chocolate and Chili Pepper Almonds which will both be available at Walmart this June! ♦



About Cinnamon Maple Mashups

Sugar and spice just got twice as nice! Get real cinnamon flavor combined with the rich sweetness of real maple flavoring. Whether you're snacking or baking, this mashup of Cinnamon and Maple Flavored Almonds is a match made in flavor heaven!



About Dark Chocolate and Chili Pepper

Take your sweet with a side of heat. We've mashed up the rich, dark chocolate you love tossed with the deep umami kick of chili pepper. Just try a few Dark Chocolate and Chili Pepper Flavored Almonds and Bam! It's like a dare transformed into a delight.

Blue Diamond Selects McKinney as AOR

Blue Diamond has selected McKinney as their Agency-of-Record (AOR) for all strategy and creative across their *Blue Diamond* Almond products. This new partnership will focus on expanding our reach to further showcase the healthy, flavorful, and satisfying product choices *Blue Diamond* offers. McKinney demonstrated an in-depth understanding of the industry and how purchase decisions are made, ultimately turning simple human insights into attention-grabbing creative work.

"When searching for a new creative agency, we knew we wanted more than just an agency. We wanted strategic partners who shared *Blue Diamond* Growers' values and goals. The McKinney team stood out as the best partner throughout this entire process," said Raj Joshi, Senior Vice President, Global Consumer Division at *Blue Diamond* Growers. "Working with McKinney will enable us to showcase our commitment to excellence, innovation, and high-quality in visionary and creative ways." ♦

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Community Giving Grant Cycle is Open!

The *Blue Diamond* Community Giving 2022 – 2023 grant cycle is open from **June 1, 2022 – July 15, 2022**.

Every year, *Blue Diamond* provides funding for small grant requests, typically between \$500 – \$15,000, for nonprofit organizations that meet the two pillars of our Community Giving Program: **Agricultural Education and Health & Wellness**.

Eligibility Requirements

Funding requests must focus on at least one (preferably both) of the following areas:

- **Agricultural Education** – *Blue Diamond* supports programs and projects that provide youth education in the areas of agriculture, including how food is grown, processed, packaged, and distributed.
- **Health & Wellness** – *Blue Diamond* supports programs and projects that address hunger, improve nutrition, and increase the overall well-being of youth and families in the community. ♦

Is there a local nonprofit organization you are passionate about? Please have them visit our webpage to see if they meet our eligibility requirements and to apply. The grant cycle is open through July 15, 2022.



Blue Diamond
Community Giving
Website

www.bluediamond.com/community-giving



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2022 *Blue Diamond* Leadership Program

The *Blue Diamond* Leadership Program kicked off its 2022 class with a robust, two-day spring session in Sacramento. To date, more than 500 almond growers have participated in the program! This year, the class—comprised of thirteen growers and eight banking and industry representatives—received an in-depth teaching on the history of our cooperative and the importance of legislative advocacy. In the evening, Kent Stenderup (Board of Directors), Dan Cummings (Chairman of the Board), and our President/CEO, Mark Jansen, greeted the class before they absorbed a special message from Warren Cohen (VP of GID Sales) over dinner.

The following day, the class toured the Sacramento plant and the world-class Almond Innovation Center, followed by a meet and greet with the *Blue Diamond* Board of Directors and Dean LaVallee, *Blue Diamond*'s CFO and COO. The program welcomed several special

guest speakers, including Heath Flora and Blanca Rubio (Assemblymembers, District 12 and District 48), Tricia Geringer (VP of Government Affairs, Ag Council), Matt Roman (Niemela Pappas & Associates), and Nichole Morgan (State Water Resources Control Board) who each shared their industry expertise and knowledge. *Blue Diamond*'s own team members shared about the Global Ingredients Division, Global Consumer Division, Production Economics, California Water, Government Affairs, Finance, and Sustainability.

Attendees expressed their deep excitement at the program's return this year. The summer session is scheduled for June 23 and 24 in Salida. The class looks forward to what's next in the *Blue Diamond* Leadership Program and how they can each be leaders and advocates for this vital, California industry that is so dear to each of us. ♦

To date, more than 500 almond growers have participated in the program!





Ag Council Leads Coalition Requesting State Dollars to Reduce Fees at State Water Board

Also Working to Secure Funds for the Food Production Investment Program

While farmers face the extraordinary challenges of drought, supply chain obstacles, skyrocketing energy costs and more, some state officials are predicting an approximately \$68 billion budget surplus in 2022–2023.

Ag Council views the budget surplus as an opportunity to tackle issues the agricultural community faces. Our team is working to secure funding on several fronts, and while the overall drought issues remain a priority, I'll highlight two additional, unique opportunities for you:

- 1) a funding request to lower water board fees and
- 2) support for the existing Food Production Investment Program (FPIP).

Seeking Funds to Reduce Water Board Fees

Ag Council is actively engaged with leadership at the State Water Resources Control Board (SWRCB) to explore creative ways to address budget challenges and curb the sharply rising fees and compliance processes impacting our members.

California historically allocated general fund taxpayer dollars to offset costs of the SWRCB. However, over a decade ago the funds were stripped from the budget as the state experienced record deficits during the Great Recession. Ultimately, the SWRCB moved to a 100 percent fee-based system, and the board passed all administrative, program and regulatory costs onto the regulated community, with increases every year.

This is where our members are feeling the pinch and paying ever increasing costs for certain SWRCB programs not related to agricultural programs.

At a meeting at the SWRCB last fall, Chair Joaquin Esquivel expressed concerns with the “cyclical” nature of the fee process and asked for a specific look at how to evaluate potential changes.

To explore ways to reduce costs on all fronts, Ag Council has held meetings with SWRCB leadership to analyze the budget process and learn about the technology challenges and compliance costs of its regulatory programs. Ag Council continues to regularly conduct these meetings.

Those conversations led to where we are today, and Ag Council is now urging Governor Gavin Newsom to utilize a portion of the state’s budget surplus to: 1) assist in offsetting certain foundational costs of SWRCB programs that generally benefit the public statewide and 2) assist in building a more robust reserve to be utilized during tough economic times, a concept similar to a “rainy day fund.”

Specifically, Ag Council seeks a three-year general fund allocation of \$150.9 million, which would cover programs such as Basin Planning, Groundwater Ambient Monitoring and Assessment and beach monitoring.

Additionally, as the SWRCB strives to keep a five percent reserve fund, Ag Council is seeking a 10 percent reserve to allow more flexibility within the fee system. A one-time allocation of \$24.9 million is requested for 10 percent reserve.

If secured, the funding is not an elimination of state water board fees. Instead, the dollars would ensure those programs that benefit the public statewide are being paid for by general fund dollars, rather than by the farming community. Meanwhile, farmers would continue to pay for the operation of specific agricultural programs, such as the Irrigated Lands Regulatory Program.

Ag Council's overall goal is to provide some relief to the out-of-control fees that are seemingly limitless each budget year.

Ag Council reached out to a broader coalition to assist in this work to alleviate the fee burden, and we sent a joint letter to Governor Newsom and the State Legislature to formally ask for General Fund dollars in the state budget.

Food Production Investment Program (FPIP) Remains a Budget Priority

In addition to seeking a reprieve on fees, Ag Council is supporting Governor Newsom's allocation of \$85 million in his budget plan to fund FPIP and is requesting that legislators provide this funding in the state budget.

FPIP assists food producers in reducing energy use and lowering carbon emissions by replacing high energy equipment with advanced technologies and equipment. The matching grant program accelerates the adoption of state-of-the-art energy technologies to considerably reduce energy use and associated greenhouse gas emissions.

The program came to fruition during negotiations to reauthorize cap and trade in 2017 when Ag Council advocated strongly for a program to help California food processors leverage state dollars with private funding to lower emissions through the implementation of more energy efficient technologies. The outcome of those conversations with former Governor Jerry Brown and his staff was the creation of FPIP at the California Energy Commission (CEC), an initiative spearheaded by Ag Council.

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Blue Diamond Growers was successfully awarded a FPIP grant in 2019 to modernize a steam boiler system for plant production and sanitation at its Sacramento facility. The over \$746,000 grant covers more than half of the upgraded equipment costs.

The boiler system is set to save 1,350 metric tons of greenhouse gas emissions (GHGs) per year, equivalent to the amount of carbon sequestered by 21,000 trees for 10 years. Additionally, it is saving up to 250,000 Therms per year, equivalent to 149,000 gallons of gasoline consumed and 47,000 kWh per year, equivalent to 169 million smartphones charged.

Importantly, 85 percent of FPIP funding is going toward projects located in disadvantaged and low-income communities in California and lowering emissions in these critical areas.

The return on investment for the state is substantial with the Energy Commission highlighting FPIP as placing in the top 10 of all 71 California Climate Investment programs in terms of total greenhouse gas (GHG) reductions and cost per ton of GHG.

Ag Council is leading the effort to support Governor Newsom's allocation of \$85 million in the state budget for FPIP. We greatly appreciate his commitment to this program and are actively urging legislators to provide this funding in the state budget.

Ag & Water Programs in the State Budget

Other water and agricultural programs in the state budget continue to be a focus of Ag Council support, as well, such as: groundwater recharge projects, canal repairs for the Friant-Kern Canal, Delta-Mendota Canal & the California Aqueduct, the Pollinator Habitat Program, Healthy Soils Program, SWEEP (irrigation technologies), and FARMER (upgrading ag equipment engines).

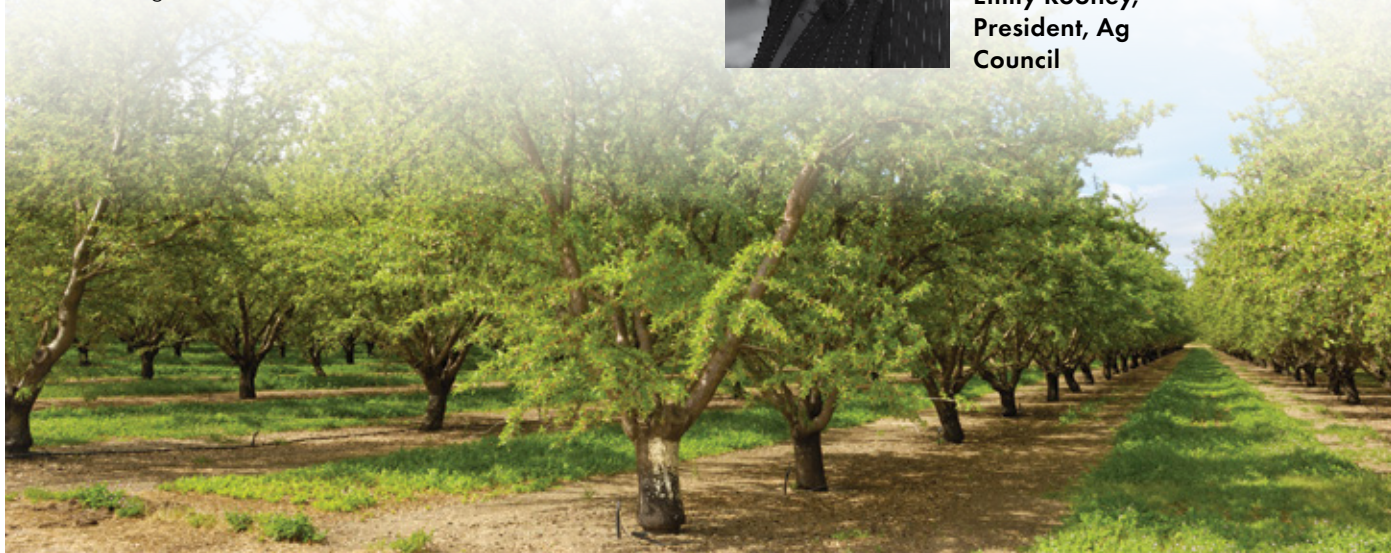
Governor Newsom has provided funds for each these programs within his proposed budget plan, and we will know the outcomes once budget negotiations conclude this summer.

Given the success of these programs in assisting farmers and food processors in attaining the high environmental standards set by California, our support is an ongoing effort.

Ag Council looks forward to continuing to work on your behalf on crucial state policy issues, so you can focus on and thrive in your business. Please contact me at emily@agcouncil.org with any comments or questions.



**Emily Rooney,
President, Ag
Council**





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Caring for our Communities

Sustainable practice is a core belief for *Blue Diamond*. We are strongly committed to caring for our planet and being good stewards of the land we farm. Along with this, we are committed to being good neighbors in our communities. As this year's focus for Earth Day was "Invest in Our Planet" our three sites invested in community events that reinforce our culture of sustainability. But more than just being good neighbors, Earth Day is about investing in the future, and leaving the planet in a healthy state for the next generation. Learn more about *Blue Diamond's* sustainability efforts at the newly launched webpage: www.bluediamond.com/sustainability or scan the QR code with your phone to visit.



Scan the QR code with your smartphone to visit the NEW Sustainability webpage!

Day in the Dirt

On April 20, three shifts totaling about 60 team members, visited The GreenHouse Educational Garden in Sacramento (one of *Blue Diamond's* 2021 Community Grant recipients) to get their hands dirty for a good cause! The team built planter beds, cleared debris, spread mulch, weeded, and helped local children pick and plant vegetables. The GreenHouse staff expressed their gratitude and that *Blue Diamond's* visit has paved the way for a successful gardening season for their young students.



“We are still basking in the glow from our garden workday with Blue Diamond. This great investment of time, people-power, and energy helps us take the next step in our Educational Garden programming. We’re already scheduling new family cooking and gardening workshops for the summer so parents and families can harvest, cook, and enjoy fresh produce together. Thank you again, Blue Diamond, for your hands-on investment in our community’s health and well-being!”

—Rena Crocker, Executive Director, The GreenHouse

The GreenHouse Mission:

Our mission is to cultivate a thriving community by nurturing the emotional, spiritual, intellectual, and physical development of our youth and inspiring them to grow to their full potential.

Love Turlock

A team of volunteers from our Turlock site led the recycling effort for the Love Turlock event on April 30. They received all manner of donated recyclables and delivered them to the recycling facility. The team even took the time to step in to help the neighboring project collect clothing for refugees. The team helped fold and sort into sizes then packed bags for thirty refugee families who are living in local hotels. During their break, team members took a moment for some fun and did a little line dancing to lively music. They enjoyed lunch with the community and were swiftly invited back for next year's event. A few team members are already on the books to volunteer for Love Turlock next April!

Love Modesto

On April 30, about 23 of our *Blue Diamond* Salida volunteers teamed up with scores of external friends of Modesto to clean up the streets and show a little love to the city. Our team ran the Sustainability portion of the Love Modesto event, coordinating various recycling projects throughout the region. Team members also helped with community cleanup efforts as part of the citywide beautification project. *Blue Diamond* also hosted a booth at the event and provided some much-needed snacks to the volunteers.



“I am so grateful for the continued partnership with organizations like Blue Diamond who demonstrate their care and commitment to serving our communities. Thank you to the Sustainability teams for leading the Love Modesto and Love Turlock recycling projects and for truly loving our cities!”

—Jeff Pishney, CEO & Founder, Love Stanislaus County/Love Our Cities

Love Our Cities' Mission:

Our mission is to help cities lead city-wide volunteer days, facilitate city-wide initiatives, and become city-wide conveners while networking and collaborating with fellow city leaders.

We are proud of our teams for their hearts to serve. They let their actions speak of our cooperative's deep commitment to sustainability of our lands and our cities by stewarding the land well and by preserving our cities for the next generation. ♦



**Jillian Luna,
Managing Editor,
Almond Facts Magazine,
Blue Diamond Growers**

THE BEE BOX

Extreme Weather Demonstrates the Need for More Cover Crop: Introducing Rory Crowley

Greetings from Project Apis m. (PAm)! My name is Rory Crowley and I am the new Director of Habitat Programs, managing Seeds for Bees. I live and work in Chico in the Northern Sacramento Valley. For the last seven years, I have helped operate our family's ranch of almonds and walnuts.

Although my first year as an almond grower was mostly about learning in the school of hard knocks in the orchards, I quickly jumped into the science of "soil health." I learned about the vast potential of cover crops, and that fall we planted our first batch of seed. Like many of you, Billy Synk coached me on my very first cover crop planting of PAm's Brassica Mix. We had soil problems which we were trying to correct, and I also saw how important it was to give back to the bees that worked so hard for us in the almonds.

These areas—soil and bee health and productivity—marked my next seven years on the farm. Cover cropping became a foundation to our family's commitment to agricultural stewardship. Ever since that first year of planting cover crop, I just can't seem to shake how vital this practice is to our system and to the bees. If we put life into the soil, we will get life out. This is true for both the trees and the bees.

Over the years we have had huge successes and abysmal failures with cover cropping. As I have observed this year, for those who planted cover crops, there were more failures than successes, through almost no fault of those who planted.

When planting cover crops in California, each year is different. One year, mustards might have a phenomenal germination and explode to six feet with thick stock and great floral resources, but the daikon looks no bigger than the baby carrots we get at the grocery store. Other years, you may have daikon the size of your forearm, and the mustards look like toothpicks. These annual changes in



A "bee pasture," as this grower put it, in Colusa County. No irrigation was required in certain parts of the Northern Sacramento Valley to produce a successful stand. (Photo courtesy of Done-Again Farms)



A very successful stand of PAm's Brassica Mix in a young almond orchard in Merced County. (Photo courtesy of G & M Tree Farms, LLC)



A cover crop was planted in this orchard and yielded very little viable pollen in Merced County. (Photo courtesy of George Hansen)

germination and stand are common, but in my experience, they seem to be exacerbated in flood and drought cycles.

Regardless of these typical kinds of annual changes in seed, germination, and stand, this year seemed to be one for the books. Farmers who planted cover crops were yet again at the mercy of varying and extreme weather systems. For many of us, this caused havoc in our plans. Even in my short time farming in the Central Valley, I've seen a wide array of drought and flood. After taking our almond cover cropping program to yearly plantings, I started planting cover crop in our walnut orchards just to keep the soil in place after extreme flooding eroded many metric tons of topsoil the year before.

This year, California experienced two sizable atmospheric rivers, one of which was coupled with a bomb

cyclone. Then, the spigot was shut off. In just one year, we got flooded and had extreme drought. This kind of weather variability can be intensely frustrating for farmers planting cover crop. Growers up and down the Central Valley, regardless of water allocation, irrigation system type, and soil type faced huge upsets after setting seed in the ground. Some planted right before an atmospheric river, only to watch their seed be taken away in a gully washer. Others planted after the second atmospheric river, only to have not one more drop of rain until the end of February. Furthermore, some growers who got their seed in the ground in the month of October still didn't have viable pollen until after the almond bloom. Frustrations abounded.

Despite the headaches, I continue to be impressed with the strong resolve of our California producer

communities. There were successes. Challenging years like last year should never discourage us from planting more cover crops nor should they discourage new adopters from starting. Indeed, it should garner even more of a resolve to plant because of the positive benefits we see in just a few years of implementation.

Our Seed for Bees (SFB) free seed program was designed to give growers two years of free seed in a tiered manner. The first year, growers get \$2500 off their seed purchase and the second year, growers get \$1500 dollars off their seed purchase. After that, though there is no free seed, we encourage growers to take advantage of our wholesale, nonprofit discounts and free shipping.

The main reason we designed the program this way is because the majority of growers planting cover crops see positive changes in the soil, bees, and/or crop after just two years. Although the changes may be slight at first, we still see them. This is exactly how it worked for me when I started my own cover crop program years ago. I saw huge increases in bee activity, and my soil was clearly improving.

Every year, we send out a participant survey that asks a vital question: "Will you continue to plant cover crops after your two years of free seed in the Seeds for Bees program?" In the five years we have conducted the survey, 90–95% of respondents claimed they would continue to plant cover crop

IN YOUR ORCHARD

after SFB participation! In fact, even after this hard year, 98% of respondents said they are going to plant next year!

There is no stronger metric for us at PAm. This demonstrates that after two years of planting cover crop, growers see so much value that they take on this practice themselves with their own dime and on their own time. This was exactly my own experience my first two years of planting, and with SFB mixes, no less!

All this to say, we farmers don't give up because of a bad year; we dig in. As we all know, we cannot change the weather, we must adapt to it. We must adapt to changing markets. We must adapt to changing regulations. For millennia, farmers have been adapting and thereby surviving and providing for others. We, in California, are no different. We have proven time and time again that no matter what is thrown at us, we will overcome. This is the essence of the California farmer and Seeds for Bees runs on the same spirit. Let's dig in and get more seed in the ground this year.

As the new Director of Habitat Programs, I am here to help growers adapt and overcome. I am a California farmer, and we are resilient. Resiliency comes from learning from each other, and supporting each other in our communities, just like honey bees. Each hardship brings learning and new solutions and I am excited to be in this with you.

If you are asking whether you should continue planting cover crops, or if you should plant for the first time, the answer is an overwhelming YES. Droughts and floods are



Newly-planted almond trees with cover crop that finally bloomed after the almond bloom; in the background, mature almond trees after petal fall and leaf out. (Photo courtesy of George Hansen)

two of the primary reasons we should plant cover crops, to keep soil in place when atmospheric rivers hit. We need deep taproots to get water into the ground so we can keep it in the ground where it belongs until we need it again. We are here to help you continue or start having a strong cover crop program. Let's get to work. ♦



Rory Crowley,
Director of Habitat
Programs, Project Apis m.
Rory@ProjectApism.org

Seeds for Bees encourages the use of cover crops to increase the density, diversity, and duration of bee forage in California orchards, farms, and vineyards, while improving soil health. First year Seeds for Bees enrollees are eligible for a \$2,500 discount off their total seed purchase. Second year enrollees are eligible for a \$1,500 discount off their total seed purchase. If you want to learn more about Seeds for Bees and planting cover crops in your orchards, check out our **NEW Quick-Guide where you can access resources, enrollment information, and technical guidance, at: bit.ly/sfb-quick-guide, or visit ProjectApism.org/Seeds-For-Bees.**

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THE ALMOND BOARD

With Fertilizer Costs Up, Accurate Crop Estimates More Important Than Ever

The last thing any almond grower wants to do is spend money on something that's not needed to produce an optimal crop. Especially in tight years, growers try to maximize the investment of their inputs.

In particular, fertilizer prices have spiked this year, thanks to continued snags in the global supply chain and related transportation issues as well as the Russia/Ukraine war — Russia is one of the world's largest producers of nitrogen and potassium.

One proven way growers can avoid applying too much fertilizer is by accurately estimating the yield expected from their trees. Even in established orchards, yields can vary from year to year based on a variety of factors — the age of the trees, weather, and soil conditions can all affect yields.

For instance, several almond producing areas in California experienced frost during bloom this year, which can be expected to reduce yields in some orchards. Applying the same amount of fertilizer in those orchards as the previous year — when the same trees produced a larger crop — isn't likely to change that and could be a waste of money.

"Fertilizer prices are really, really expensive these days, which is why it's really important to apply the right amount at the right time," said Sebastian Saa, Associate Director of Agricultural Research for the Almond Board of California.

In addition to his duties with the Almond Board, Saa also is part of the California Department of Food and Agriculture's Fertilizer Research and Education Program. He is responsible for reviewing proposals related to the precision application of fertilizer. Accurate yield estimates are a critical part of any grower's data set when deciding when and how much to fertilize.

"It's really important to have a good estimation — hopefully as early as possible in the season — of how many kernels you are going to have on those trees and how many pounds you expect to produce because that is the driver to define how many pounds of nitrogen you need to apply," Saa said.

Historical reference

Keeping good records of an orchard's yield year over year under varying weather conditions and with fluctuations in water availability can pay off when it's time to formulate annual estimates each spring.

"You don't have to do it perfectly," Saa said. "You could be off for 500 pounds in your first assessment early in the season and that's fine because as the season progresses, you can do it again and again and adjust your fertilization plan accordingly. So, the earlier you try and the more you do it, the better you get at it and the better you get at applying the right amount of nitrogen."

There is no "one-size-fits-all" approach to nitrogen needs. Each orchard should have a specific nitrogen management plan that considers the 4 Rs of Nutrient Management:

- Right rate
- Right time
- Right place
- Right source

Growers cannot enhance orchard productivity by providing more nitrogen than is needed by the crop. However, they can harm productivity by applying too much nitrogen. With proper management, optimal productivity and minimized nitrogen loss can be achieved simultaneously.

Saa said that in years like this one — with fertilizer prices higher than in the past and potential yield reductions from frost events — it's more important than ever that growers' yield estimates are accurate. He recommends doing leaf analyses "to see if your trees are actually responding to what you're applying."

"I think the worst thing you can do is to do blind applications," he said. "There are multiple reasons to not do that this year."

Growers who need more assistance with their fertility program can refer to the Nitrogen Best Management Practices and Quick Guide. ♦



Farming in Tough Times

Benjamin Franklin said, “An investment in knowledge pays the best interest.” Today it is hard to find anything that has not increased in cost. The cost of water, land, fuel, fertilizer, and chemicals have all increased in the last year. We are currently at an 8.5% rate of inflation! Knowledge however, as Benjamin Franklin said, gives us the best value. The other remarkable thing about knowledge is that it does not cost much; maybe unless you are paying for your child’s college or still paying your own, but that is a different topic for a different day. Today I want to provide knowledge from local growers and industry professionals on ideas about how to farm during these tough economic times. Are there things growers can cut back on? What should stay the same? How can I make or maintain a budget? With the help from our growers, hopefully some of that will be answered.

Justin Elam, Blue Diamond Regional Manager for Districts 5 & 6, had a discussion with Bill Brush, the CEO of B&B Ag Consulting, and got his take on how to farm in these times. Bill made an analogy of the four foundational walls of almond farming: **water, fertility, bees, and pest management**.

The first thing that Bill said was critical is **water**. “Don’t cut water. If you don’t have enough don’t fall behind.” This has become increasingly difficult for many growers this year. We all know that the water availability is drastically different depending on where you farm in the state. In some areas, growers have received a full surface water allocation and can continue normal farming practices while others have received zero surface water and will have to rely on pumps or purchase water from other areas. What can growers do if their water has been reduced? The UC ANR publication, “Drought Tip: Drought Management for California Almonds,” can help you determine the best practices on managing your water supply through drought.

Fertility is the second of the four walls. We all know the cost of fertilizer has increased drastically, but as farmers you also understand the need for it. Do you know how much nitrogen you should apply? According to the “Nitrogen Best Management Practices” from the California Almond Board, 68 pounds of nitrogen is removed for every 1,000 pounds of kernels. That means if you have a 2,000 pound per acre crop you are removing 136 pounds of nitrogen per acre in just crop. This calculation does not include the nitrogen needed for tree growth or nitrogen source efficiency. Bill said, “There are three sources of N (nitrogen)

applied, stored, and water”. Everyone knows what applied nitrogen is, but as a grower do you know what the levels are in your soil, trees, or water? Tissue, soil, and water samples can help you determine the amount of applied nitrogen needed. If your irrigation water is high in nitrates, you may not need to apply as much fertilizer, thus saving on your fertilizer costs. Knowing current water source nitrate levels is actually a cost savings strategy. After determining how much nitrogen you need to apply, always remember the Four R’s: **Right rate, right time, right place, and the right source**. Potassium is also vital in the production of almonds. Bill told Justin “Potash is necessary even though it’s expensive. Since the cost of potassium can be excessive, it may seem like an easy expense to cut but can lead to production loss in future years. According to UC Davis, with each 1,000 pounds of harvested kernels, 70 to 80 pounds of potassium are removed from the orchard with kernels, shells, and hulls. How do you know where you stand as far as nutrition? If you took soil samples last fall, go back to your soil and tissue samples and discuss them with your Pest Control Advisor (PCA) or Certified Crop Advisor (CCA). April tissue samples will let you know if you are ahead or behind on Nitrogen and Potassium. If you don’t have recent samples, having new samples pulled would be one simple way to determine how to manage costs.

The third wall is **pollination**. Pollination is critical for a good almond crop, and the quality of bees can have an influence. Having a good relationship with your beekeeper is key. Before bees are placed onsite, make sure to have a discussion with your beekeeper on how many hives you

need, and the strength of the hives you are receiving. According to Bill Brush, “four frames are just maintaining the hive”. To elaborate, if you have an eight-frame hive, four frames are staying at the hive, while the other four are gathering resources for the hive. We have all heard the saying “If it sounds too good to be true, it probably is” and that has never been truer than here. If you receive a low or reduced price for bees, ask about the quality, and make sure you are receiving the number of frames requested.

The last segment of Bill’s four walls is **pest management**. As growers, you know pest management encompasses several factors including diseases, weeds, and insects. Are there areas where savings can be made? According to Bill “monitoring is key” when it comes to deciding if a pesticide application is needed. This year for example we experienced a fairly dry bloom, which led growers to defer a fungicide at bloom. Many growers opted to skip a “Pink Bud” spray since the conditions were not favorable for disease at that point in time. This saved on costs and let growers focus on spraying material at “Petal Fall or Post-Petal Fall” timings. Therefore, monitoring is critical and needs to be done by you, the grower, alongside your PCA. In order to maximize and obtain top premiums you should continue to maintain focus on keeping rejects to a minimum. This includes a solid Navel Orangeworm program, as well as monitoring for plant bugs and ensuring orchard floors are free of ants. According to Mel Machado, VP of Member Relations, “growers should seek to keep rejects at two percent or less in order to take advantage of *Blue Diamond’s* Quality Premium Program. It can cost the grower over \$240 an acre when rejects rise from just two to three percent, and can cost an additional \$125 per point, per acre thereafter.” (Please see Mel’s accompanying article on page 40).

Another area that may be able to be scaled back is weed sprays. Steve Moeller, a *Blue Diamond* Grower in Livingston, said “With the increase in drip irrigation, and middles not receiving water through the summer, it has reduced the need for tree to tree weed sprays.” Weeds typically do not grow where water does not flow. Growers who have flood or full coverage sprinklers do not have this advantage, so what are they to do? Having a strategic plan with your PCA is a good start. This allows you to plan for pre- and post-emergent applications and will help you keep a timely schedule. All growers know once you realize you need to spray for weeds, they seem to grow a few inches overnight.



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After the discussion with Bill Brush and learning about his four walls, I wanted to talk to growers about any cultural practices they have reduced. The most frequent practice mentioned was pruning. In my discussion with Steve Moeller, he said “Pruning doesn’t need to be done every year. It’s a labor cost that can be removed.” UC Farm Advisor Roger Duncan supports this as well. In an article he wrote titled “Pruning Almond Trees Does Not Pay” Roger states “...orchards older than 10 or 15 years should not be pruned for the purpose of sustaining yields, period.” By choosing not to prune you are saving on cost of labor for pruning, but also the cost to get rid of those prunings. Pruning is still needed however, especially when establishing new orchards and removing dead wood. If neither of those applies to your operation, it may be worth considering opting out of pruning moving forward.

After all the discussions with growers about what could be reduced, and what should stay the same, I kept going back to the same idea...a budget! It sounds simple just make a budget, but it can be incredibly daunting once you sit down to do it. There are people who can help though, and the first one to start with is your PCA. When I worked as a PCA I created budgets with various growers, and it led to better communication between us and no surprises. Tom Evans, a PCA for Wilbur-Ellis said, “I like creating season-long budgets with growers because it lays out a plan and keeps everyone on the same page. Having a budget makes it easier to handle pricing changes and product shortages.” A budget with your PCA will also give you a game plan throughout the year of when certain pesticide or fertilizer applications are needed. It also takes away any surprises because you will know what an application is going to cost and the reason for the application. It also allows your PCA to be able to forecast the material needed in advance, which is vital in today’s changing markets. After establishing a budget with your PCA, you can start adding in other costs such as water, electricity, bees, and labor. Most growers have a record of all these items from previous years, so they can have an idea of what they will spend in the current year. Budgets are never exact though they serve as close estimates. You never know when you will have a mite flare

up or an equipment breakdown, but a budget gives you the best guide of where your money is going.

No one truly knows when or if the cost of goods and services are going to level off. The only thing you can do as a grower is adapt. Luckily, that is what you are best at doing: adapting to new regulations; adapting to new pests; adapting to the weather. You will just add this to the extensive list of things a farmer has to go through. The best thing that comes from adaptation is knowledge, and that knowledge will stay with you. It will help you take advantage when times are good, and how to maintain when times are tough. From the “Four Walls” of what is needed, to where you can reduce cost, or how you can plan where your money is going by building a budget, we will all learn along the way. The more growers communicate and share ideas the better we all are. An African proverb says “If you want to go fast, go alone. If you want to go far, go together.”

Please feel free to reach out to me with other ways in which you manage your operation through these tough times. I would like to share it with other growers who may need help or are just trying to learn something new. ♦



Trent Voss
Regional Manager
Blue Diamond Growers



Justin Elam
Regional Manager
Blue Diamond Growers

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This article serves as an update to a previous article featured in the Jan/Feb 2021 issue of *Almond Facts*

Maximizing Almond Quality...And Profitability

The Obvious and Not So Obvious Factors That Affect Your Bottom Line

The quest for top yields and the highest quality drives an almond grower's thoughts and labors throughout the year. Fertility and water management are high on the list of priorities required to produce top yields and maximize revenue. Careful monitoring of insect populations, both pest and beneficial species is necessary to reduce damage by insect pests and scrutiny of disease pressure and environmental conditions are required to reduce losses caused by fungal and bacterial infections.

Growers tend to be well aware of the quality levels earned by their almond deliveries during the harvest. Premium values earned by the highest quality deliveries are intended to reward growers producing high value almond deliveries and offset the costs of production. Furthermore, high value deliveries are easier to process, taking less time and lowering costs to produce finished products ready for delivery to *Blue Diamond's* customers. The premiums you earn are directly related to the cooperative's costs.

Moreover, optimizing quality premium levels increase in importance as market prices moderate. Simply stated, the premiums become a greater percentage of the total return.

Growers tend to focus on three things when considering crop quality...

- Foreign Material
- Rejects
- Chipped and Broken

Foreign Material



In the case of meat deliveries, foreign material consists of anything other than the kernels themselves. For inshell deliveries, anything other than the kernels and almond shells are considered foreign material. Pieces of hull are the most common foreign material found. However, soil, rocks, and wood are also found in deliveries received by *Blue Diamond*. In areas where peaches are grown, peach pits and fragments of peach pits remaining in the soil are also a common problem. Some growers have planted olive trees around their property and olive pits have been known to find their way into almonds during the

harvest. Clearly, planting olive trees near almond orchards is never a good idea.

Some of the more problematic items found in almond deliveries include plastic, usually from sprinkler or drip irrigation systems, glass, and metal. These items are particularly troublesome due to the dangers they induce if found in finished goods and are accidentally consumed. While it is true that *Blue Diamond* has invested in a variety of technologies designed to find and eliminate foreign material from the flow of almonds during processing, each piece introduced during the harvest is a piece that must be removed. This jeopardizes the consumer experience as each piece introduced increases the possibility of something getting through and winding up in the finished product.

Allergens are especially troubling in today's highly sensitive food safety environment. Many orchards have oaks in proximity, and many more have plantings of other tree nuts, including walnuts and pistachios on adjacent lands. Each of these presents a possible source of contamination with serious food safety consequences if consumed by someone with a dangerous food allergy. Growers should sweep and remove any other tree nuts adjacent to almond orchards prior to the shaking

to ensure that almonds delivered from their orchards do not present a possible allergen hazard.

While on the subject of allergens, special attention must be given to peanuts. Peanuts are grown in California on small scale plots in the Central Valley and care must be given if your orchard is adjacent to any planting of the legume. With that said, the greatest hazard for contamination comes from incidental introduction into the orchards carried in by employees, typically in their meals. Simply stated, peanuts must never be allowed to enter an almond orchard at any time.

Rejects



When considering crop quality, growers tend to focus most on reject levels, either from insects in the form of Navel Orangeworm

(NOW), Peach Twig Borer (PTB), or ants. Many years of Integrated Pest Management (IPM) research serves as the foundation to assist growers in making pest management decisions for insect control and the counsel of a good Pest Control Advisor (PCA) is virtually priceless when making pest management decisions.

While the cost of controlling insect infestations can be substantial, the rewards for producing low reject deliveries are equally substantial when compared to the potential losses. Much work has been done since the 2017 crop, when NOW caused significant losses for growers throughout the Central Valley.

- Orchard sanitation continues to be the cornerstone of a strong NOW management program. Growers should target a maximum of no more than one mummy per tree remaining through the winter

NOW Hull Split Strategies by Joel Siegel

1. Spraying when the nuts become vulnerable is the key for successful control. Nuts tend to split from the orchard edge moving inwards
2. Read the insecticide label and use the maximum rate that you can afford. The maximum rate will give you extended coverage
3. It should take no longer than 5 days to spray your orchard at the proper speed of 2 MPH. If it will take more than 5 days, consider air application or a combination of ground and air.
4. You can use air application for the first hull split spray when nuts split from the top of the tree downwards. Follow the air application by a second ground application 10-14 days later, depending on the insecticide label
5. In tall trees (>25 ft) consider an air application to cover the upper canopy. If you go by ground, increase water volume
6. To maximize an insecticide with adult activity, spray by night when the adults are active
7. Do not spray successive generations of NOW with the same insecticide family.

- After shaking or poling, mummies must be destroyed using a flail mower at a slow enough speed to guarantee their destruction before NOW moths emerge.
- New methods of mitigating NOW involving mating disruption have shown promise and have been adopted by many growers.
- Hull split treatments in the final effort to control NOW prior to the harvest must be conducted in a timely manner. (See sidebar)

Growers with orchards planted with Butte and Padre tend to focus less on damage caused by NOW, given the typically better shell seal these varieties provide. Many have discovered that while the Padre is virtually impervious to NOW, the shell of the Butte can allow NOW to penetrate and cause damage. More importantly, both

the Butte and Padre can and will harbor NOW between the hull and shell. Butte and Padre growers believe that winter sanitation is not required. However, Butte and Padre plantings can be a source of NOW for neighboring orchards and failing to sanitize these plantings can support infestations in adjacent orchards.

Pistachio orchards can also be a troublesome source of NOW. Orchard sanitation is more difficult to accomplish in pistachios and the nut is an excellent food source for NOW. Controlling NOW in almond orchards can be much more problematic when there are pistachio plantings nearby. Growers in this situation should be much more diligent in their NOW management efforts.

Mating Disruption – A Proven Technology

Mating disruption incorporates the use of devices that release pheromones within the orchard designed to interrupt the mating of the adult NOW moths. Whether using “puffers” or “strips”, the intent is the same. Each device releases a synthetic pheromone mimicking the pheromone that female moths use to “call” the males for mating. With enough of the synthetic pheromone wafting through the orchard canopy, the males are unable to find the females and mating is reduced or disrupted. The technology has been proven to work in larger orchards, greater than 40 acres. Results in smaller planting have been more variable. That said, growers with smaller orchards may be able to achieve successful results by cooperating with neighboring growers, in effect increasing the size of the orchard under mating disruption.

Mating disruption is not a replacement for hull split treatments. However, growers who have employed mating disruption have been able to reduce the number of hull split treatments in some locations.

Losses from ants tend to be less of a problem for most growers. Unfortunately, more than a few have been unpleasantly surprised by unobserved ant infestations within or even adjacent to their orchards. There are several bait formulations that can effectively reduce ant populations

when properly employed. Contact your Pest Control Advisor for the best applications for your situation... and remember to also look down when walking through your orchards. Many ant problems are simply unobserved.

For growers who rely on others to complete their harvests, consider that the increasing acreage, particularly of the Independence variety, which harvests at the same time as Nonpareil, has created a degree of strain on equipment availability. Growers who rely on custom harvesters to shake, sweep and pickup their crops may have their harvests delayed either in the trees, leaving them susceptible to NOW, or on the ground and susceptible to ants. This fact highlights the importance of proper insect pest management.

Other Considerations

Plant Bugs, such as Leaf-Footed Plant Bug, Boxelder Bugs, Stink Bugs or most recently, Brown Marmorated Stink Bugs (BMSB) can cause significant losses through their feeding on the nuts, relatively early in the season before shell hardening. Brown Marmorated Stink Bug is a particularly serious plant bug that has recently moved into California and established populations have been verified from Butte County in the north, to as far south as Fresno County. BMSB has a wide host range, including nut, fruit, and vegetable crops and has caused significant losses in infested almond orchards. When infestation occurs, onset of damage is rapid and often devastating.

Plant bugs cause crop losses in two ways. When infestations occur early in the season, prior to shell hardening, nuts are literally killed and drop from the trees. After shell hardening, the nuts may remain on the tree and included in the harvested crop. Damage at harvest is observed as a “brown spot” on the kernel. A recent USDA ruling now defines damage from insects with piercing-sucking mouthparts, plant bugs, as a sunken area or depression on the kernel of at least $\frac{1}{8}$ inch in diameter, with or without discoloration, OR a discolored area of the kernel of at least $\frac{1}{8}$ inch in diameter, with or without a sunken area.

Consult your PCA immediately if you see gumming on nuts in the spring, which is a sign of feeding by plant bugs. Information on BMSB can be found at www.stopbmsb.org.

An Important Point About Reject Damage...

One must also consider that the reject level determined during grading reflects the weight of kernels with reject damage that remained in the delivery lot at the time of receipt. However, reject kernels are also “lost” throughout the harvesting, hulling, and shelling processes, reducing the overall level of damage reflected on your grower statement. For those producing meat deliveries, it has been well documented that the harvesting, shelling, and cleaning processes can remove approximately half of the reject kernels from the flow of product. In other words, the actual crop losses coming out of the orchard can be much higher than the level indicated on a delivery’s grade sheet, typically twice as high.

Growers producing inshell do not enjoy the same “benefit.” Inshell almonds with insect damage are not typically light enough to be separated from the product flow during hulling and even the most modern technology cannot detect insect damaged kernels within inshell almonds. Thus, the damaged kernels remain in the crop at delivery, producing higher reject levels than if the crop had been shelled. For this reason, growers producing inshell should sample their crop during the harvest prior to pick-up to determine the best option for further processing when deciding to deliver

as inshell or meats, maximizing the value of the crop. Your Regional Manager is a valuable resource who can help with this decision.

The table below presents the financial impact of varying reject levels on a 2,500 per acre yield, produced as meats at \$2.00 per pound and includes the almond loss during the harvest and shelling process. When calculated, a 1% reject level can produce a reduction in value of more than \$130 per acre; at 5%, the loss is more than \$800 per acre and at 10%, the loss is nearly \$1,500 per acre!

An additional threat imposed by excessive reject levels comes in the form of potential increases in aflatoxin levels resulting from extreme worm damage. Aflatoxin is a carcinogen by-product of the fungus *Aspergillus flavus*, which can be introduced into the kernel by the Navel Orangeworm. Controlling reject levels can have a definite effect in reducing aflatoxin levels within the crop.

All growers should employ the services of a professional Pest Control Advisor to provide the best opportunities for a successful Integrated Pest Management program. When dealing with NOW, proper treatment timing and complete coverage are critical components of proper insect management. There is no substitute for orchard sanitation during the dormant season. Clearly, poor mummy shaking conditions can contribute to the rising reject levels. Orchard sanitation, mating disruption, population monitoring, and proper application are the keys to maximizing quality and value.

Comparative Values at Varying Reject Levels												
		Yield	2,500									
		Price	\$ 2.00									
Total Meat Pounds	Reject %	Reject Wt	Field Loss Wt	Total Good Meat Wt	Base	Total Premium		Total Value	Loss	Incremental Loss	Value/Total Good Meat Lb	Opportunity Loss
						Rate	Amount					
2,500	0.00%	-	-	2,500	\$ 5,000.00	\$0.185	\$462.50	\$5,462.50			\$ 2.185	\$0.000
2,500	1.00%	25	25	2,450	\$ 4,900.00	\$0.175	\$428.75	\$5,328.75	(\$133.75)		\$ 2.175	(\$0.054)
2,500	2.00%	50	50	2,400	\$ 4,800.00	\$0.115	\$276.00	\$5,076.00	(\$386.50)	(\$252.75)	\$ 2.115	(\$0.155)
2,500	3.00%	75	75	2,350	\$ 4,700.00	\$0.050	\$117.50	\$4,817.50	(\$645.00)	(\$258.50)	\$ 2.050	(\$0.258)
2,500	4.00%	100	100	2,300	\$ 4,600.00	\$0.045	\$103.50	\$4,703.50	(\$759.00)	(\$114.00)	\$ 2.045	(\$0.304)
2,500	5.00%	125	125	2,250	\$ 4,500.00	\$0.035	\$78.75	\$4,578.75	(\$883.75)	(\$124.75)	\$ 2.035	(\$0.354)
2,500	6.00%	150	150	2,200	\$ 4,400.00	\$0.025	\$55.00	\$4,455.00	(\$1,007.50)	(\$123.75)	\$ 2.025	(\$0.403)
2,500	7.00%	175	175	2,150	\$ 4,300.00	\$0.015	\$32.25	\$4,332.25	(\$1,130.25)	(\$122.75)	\$ 2.015	(\$0.452)
2,500	8.00%	200	200	2,100	\$ 4,200.00	\$0.005	\$10.50	\$4,210.50	(\$1,252.00)	(\$121.75)	\$ 2.005	(\$0.501)
2,500	9.00%	225	225	2,050	\$ 4,100.00	(\$0.005)	(\$10.25)	\$4,089.75	(\$1,372.75)	(\$120.75)	\$ 1.995	(\$0.549)
2,500	10.00%	250	250	2,000	\$ 4,000.00	(\$0.015)	(\$30.00)	\$3,970.00	(\$1,492.50)	(\$119.75)	\$ 1.985	(\$0.597)
Assumes Nonpareil Meat Deliveries												
Assumes full premium for Chipped & Broken and Foreign Material =												

Chipped and Broken



Chipped and broken levels in meat deliveries probably earn the lowest degree of a grower's attention. Most growers believe that they have the greatest

direct effect on foreign material and reject levels and the least on the chipped and broken percentage. However, chipped and broken levels are earning an increasing degree of scrutiny by *Blue Diamond's* buyers' and growers' practices in the orchards. This can play a role in the amount of damage their almonds sustain.

Grower deliveries are scored based on a ¼ inch chip, where a total of ¼ square inch of the kernel beneath the peel has been exposed. However, the buying community is increasingly shifting their standards to a ⅛ inch chipped level. At *Blue Diamond*, we continue to use the USDA Standard of the ¼ chip as the basis for grading grower deliveries. Our research has shown that there is a 7 to 1 relationship between ⅛ inch and ¼ inch chipped and broken levels. That means that for every percentage point of ¼ inch chipped and broken, there will be approximately seven percentage points of ⅛ inch. The buying community is interested in ⅛ chipped levels at and below the middle teens, which translates into ¼ inch chipped levels at or below 2.0%. This was the driving force behind the Q+ Grade category for Nonpareil meats implemented several years ago, which set a maximum chipped and broken level of 2.0%.

While it may seem that the bar continues to be set higher and higher, many growers have met the challenge and have been able to deliver a significant proportion of their Nonpareil meats with a chipped and broken level at or below 2.0%.

Driving Quality Higher... and Chipped Damage Lower

What can a grower do to improve chipped and broken levels?

- Proper harvest timing is the best place to start. Harvesting too early while the nuts are still "green" can create significant difficulties for the sheller operator as they hull and shell the crop. Shear roll technology used to shell almonds must have enough space between the inside of the shell and the kernel to crack the shell cleanly without damaging the kernel. Green or wet kernels do not provide sufficient space, resulting in increased damage. Embedded shell is also a serious problem that increases dramatically when almonds are shelled at excessive moisture levels.
- Foreign matter in the crop can increase damage. Rocks from the orchard floor and wood that falls from the trees during the harvest can increase damage to the kernels. Obviously, more wood falls from older trees and we see increased damage levels from older orchards. Sheller operators have reported reduced damage levels where growers pull wood from the crop by conditioning windrows just after sweeping, by employing de-sticker equipment during the harvest, or both. Simply pulling wood from the windrows can also help to reduce the level of chipped and broken kernels. As the old saying goes, "garbage in, garbage out."
- Not all almonds are stockpiled at harvest, nor should they be. But stockpiling almonds, even for a few days allows moisture levels in the harvested crop to equalize, providing for easier shelling and a potential reduction in damage. To be sure, green or wet almonds will not dry in a stockpile and green or wet almonds must never be stockpiled. While moisture levels can reach equilibrium in a stockpile, green or wet almonds will not dry in a stockpile.

- Obviously, proper setup and operation of the shelling equipment itself plays a role in the quality of the almonds produced and the level of damage sustained during shelling. It can be said that shelling equipment is much like a musical instrument and that the instrument must be properly played to produce the best music, or in this case, the best product. Every machine has an optimum operating range at which it performs at its highest efficiency. Shelling equipment is no different. However, given optimum product, your sheller operator will be able to produce the highest quality almonds at the highest efficiencies. *Blue Diamond* also works with sheller operations throughout the Central Valley to help them optimize their equipment and reduce chipped and broken levels in our growers' deliveries. Sheller managers can contact their *Blue Diamond* Regional Manager for more information.

A Note on Producing Inshell

We've already noted a few special points for growers producing almonds for inshell sales. This pertains particularly to Nonpareil, Sonora, and Independence inshell. Two factors rise to the forefront when considering producing these varieties as inshell:

1. Nonpareil, Sonora, and Independence have thinner, more open shells, making them more susceptible to damage from Navel Orangeworm and ants. As previously mentioned, it's nearly impossible to remove reject nuts during the hulling process. However, rejects can be reduced during shelling. The maximum reject level that qualifies as "High Quality Inshell" is 3.0%. The maximum level that qualifies for "High Quality Meats" is 2.0%. Pre-harvest sampling of almonds that have a reject level as high as 4.0% will not return the maximum premiums if delivered as inshell. However, if the same crop is shelled and delivered as meats, the reject level may be reduced to 2.0% or less, qualifying for "High Quality Meats" and earning a greater value to the grower.
2. Foreign material levels from excess hull or hull fragments are a major problem in inshell deliveries. For the best success, almonds grown for inshell must hang in the tree longer than those grown for shelling. This allows the hulls to dry and open fully, providing for better separation and cleaning during hulling.

Unfortunately, these factors are at odds with each other. Delaying harvest to provide for better hulling when producing inshell means that the crop will be exposed to egg laying by Navel Orangeworm for a longer period, potentially increasing damage levels. These damaged kernels cannot be easily removed from inshell almonds. Clearly, growers producing inshell must also have an iron-clad pest management program to protect against insect damage. This is one example of the often repeated saying that "good inshell is grown, not hulled."

While the factors listed above can and do play a significant role in the final value of your crop, there are at least two other factors that can influence a grower's final return.

Moisture

Among the typical recommendations to mitigate NOW damage is the practice of "early harvest." Given that NOW moths lay their eggs on nuts while in the trees and not on the ground, the intent of early harvest is to get the crop out of the trees before the next "flight" of moths in the NOW life cycle emerges and lays their eggs on the splitting hulls. While early harvest can be a valid method of reducing NOW damage, care must be taken to ensure that the crop is not harvested TOO early. Under the heading of "no good deed goes unpunished," early harvest can lead to several serious consequences. Growers who shake their trees too early—before the kernels are physiologically mature—can find their chipped and broken levels increased by "peelers." Peelers are caused when the peel is not fully attached to the underlying kernel and flakes off as the nuts flow through the hulling and shelling process. Peelers add to the amount of chipped and broken kernels on your delivery's Grower Statement.

Nuts that are shaken too early also require a longer time to dry on the orchard floor. This can lead to increased damage from ants if measures have not been taken to eliminate damaging populations.

As noted above, if almonds are swept and picked up too soon and not allowed to dry fully, excessive moisture levels can wreak havoc on nuts that are stockpiled. Stockpiling is a way of life for many almond growers. Stockpiling can improve grades if the crop is stockpiled properly due to the uniformity of the product coming out of stockpiles. Every orchard can produce a variation in the level of maturity and moisture from variation in the orchard soil and irrigation system uniformity. Stockpiling allows the product to reach an equilibrium or “even out” within the pile, which enhances the shelling process and can reduce the level of chipped and broken kernels.

If the crop is stockpiled before the nuts have time to dry, the surplus of moisture within the pile can lead to mold growth and concealed damage within the kernel from heat generated by microbial activity within the pile. As a practical guideline, do not stockpile almonds when the hull moisture exceeds 12% OR the kernel moisture exceeds 6%. Experience has taught us that if you have to ask, they’re too wet!

Doubles



Doubles are a naturally occurring phenomenon that are produced during pollination. While all varieties are capable of producing doubles, in most cases the second embryo fails to

develop. Almond breeders have worked to select for little or no doubles in their development programs. But one must remember that quite a few of the more popular varieties grown in California were “discovered” and not developed as part of a breeding program.

The most direct impact of doubles is reflected in chipped and broken percentages. High levels of doubles increase chipped and broken levels due to the sharp edges of the double kernels being worn away during shelling.

A glut of doubles can also increase *Blue Diamond's* processing costs and reduce the value of the resulting products. Doubles are difficult to separate from the flow of almonds. They tend to flow towards the larger sized kernels within the processing lines. Doubles are more difficult to blanch, and elevated levels of doubles increase processing losses when producing sliced or slivered almonds.

While doubles occur naturally, technology can also increase doubles in the crop. Plant growth regulators designed to increase yield and applied at bloom have proven to increase the percentage of doubles to excessive levels. Clearly, growers should not apply plant growth regulators that can adversely impact doubles.

Please contact your Regional Manager if you would like to review your Grower Statements and find out what you can do to produce the highest possible quality and earn the highest possible returns. ♦



Mel Machado,
VP Member Relations,
Blue Diamond Growers

When Do You Shake?

1. No separation of suture
- 2A. Less than 50% of suture line separated.
- 2B. Deep V over 50% of suture line separated, hull cannot be squeezed open.
- 2C. Deep V over entire suture line, can be squeezed open by pressing opposite ends of the hull
3. Suture opening less than 1 cm in width, exposed shell; visible brown edge along split edge of hull when observed from beneath the canopy.
4. Suture opening more than 1 cm in width, fully exposed shell.
5. Hull edges begin to dry, shell changes from white to brown
6. Completely dry hull, brown shell

Almonds can be harvest when 100% of the nuts on the tree reach hull split. The problem lies in defining that point in the stage of development. The photos above demonstrate the full range of hull split; from none to full dry. Shaking at each stage has its own benefits and repercussions. It all boils down to the goal that the grower has in mind; avoidance of NOW or producing the highest quality inshell.



Almond hull split stages (photographs by C. Reyes and L. Milliron)

TIME TO CONSIDER

It is important to manage your orchard to maximize kernel dry weight! Providing your trees with adequate irrigation and nitrogen are key inputs driving kernel growth and final weight. Hopefully you will have enough water this year to drive and build kernel weight. A free publication on 'Drought Management for California Almonds' is available at anrcatalog.ucanr.edu/Details.aspx?itemNo=8515.

Be on the lookout for premature water stress as we approach the hotter months of the season. Your orchard's water demand could vary depending on the amount of rainfall received, the soil's water holding capacity, tree canopy size, and the amount of irrigation water applied. Monitor soil moisture before irrigations to avoid over or under irrigation. Soil based options include tensiometers, gypsum blocks, or neutron probes. Pressure chambers are very accurate at directly measuring tree water status, www.pmsinstrument.com. A free publication on irrigation management with the pressure chamber is available at: ucanr.edu/datastoreFiles/391-761.pdf.

Crop evapotranspiration (ET_c) is the sum of transpiration from leaves and evaporation from soil and is referred to as the crop water requirement, or orchard water requirement. In Dr. David Goldhamer's irrigation scheduling chapter, in our UC Almond Production Manual #3364:

- ET_o from May 1–15 is 2.1 total inches (47.3 gallons/tree/day)
- ET_o from May 16–31 is 2.5 total inches (51.2 gallons/tree/day)
 - Seasonal cumulative ET_c from March 16 – May 31 is 9.4 total inches
- ET_o from June 1–15 is 3.3 total inches (70.6 gallons/tree/day)
- ET_o from June 16–30 is 3.3 total inches (72.3 gallons/tree/day)
 - Seasonal cumulative ET_c from March 16 – June 30 is 16.0 total inches.

David Doll has also published a nice article "Water use efficiency, irrigating for the highest crop per drop" on the Almond Doctor blog thealmonddoctor.com/water_use_efficiency/.

Nitrogen (N) is the most common element we can apply to our tree fruit crops. Almond growth and productivity depend on the availability and uptake of N. Most fertilizer recommendations are based on making nitrogen available to our trees so that a N shortage does not limit tree growth or productivity. Efficient N management is important as we collectively reduce groundwater contamination while keeping our orchards productive. Nitrogen usage should be based on individual orchard's cropping history (previous yields) and leaf and water analysis to determine N availability and potential sources.

Dr. Patrick Brown and co-authors, recently published "Nitrogen Best Management Practices" with the Almond Board of California at Almonds.com. A removal and replacement rate of 68 lbs. per acre of N is recommended per 1,000 lbs. of kernels harvested per acre, when estimating annual N demand from crop load. Dr. Brown's research effort, near Belridge in Kern County, determined more accurately efficient N use in productive almond orchards. In this study, applications of 275 lbs. of fertilizer N produced 3500–4500 lbs. of Nonpareil nut meats/acre in 2009–2011. A higher rate of 350 lbs. N/acre/year did not produce more nuts than the 275 lb. N rate. Lower rates of 125 and 200 lbs. N/acre/year produced good yields but significantly less than the 275 lb. N/acre/year rate. Dr. Brown carefully points out that you can't expect to increase yields by increasing N application rates; that N applications should replace the N removed in last season's crop.

Some ground water has elevated nitrogen levels, and you should take into consideration any N found in well water in developing your fertilization program. Several years ago, the well water at my family's farm tested at 50 ppm nitrate (NO_3^-). If I applied 3- acre feet of water

per season with this water, I would apply approximately 92 lbs. N per acre. This figure can be determined by multiplying mg/l or ppm of nitrate by 0.61 to get lbs. of actual N per acre-foot of water. If the lab analysis reports N levels in nitrate-nitrogen ($\text{NO}_3\text{-N}$), then multiply the nitrate-nitrogen value by 2.72 to get lbs. of actual N per acre-foot of water. For example, if your orchard produced 3,500 pounds of kernel meats last year, you would determine that 210 pounds of N was removed with the crop and needs to be replaced. But if your irrigation water has 50 ppm nitrate then you may only need to apply 118 lbs. of N per acre to your orchard (210 lbs. orchard N minus 92 lbs. found in the water).

Mature trees need more nitrogen in early spring during periods of active shoot growth, leaf activity, and photosynthesis when temperatures are between 70-80°F. Shoot growth is vital for canopy development and for the creation of fruiting positions (buds). Almond nuts and shoots use most of the season's N (80% of annual demand) between bloom and mid-June. Dr. Brown's group recommends delivering fertilizer N at four different timings and amounts through the season – February or March (20% of total annual N input), April (30%), May and early June (30%) and September – October (20%). Nitrogen use efficiency has increased dramatically (75-

85%) in Dr. Brown's studies where N is applied at the time of peak tree demand and uptake. I know many growers that "spoon feed" their trees with small injections of N and other liquid fertilizers into their irrigation systems. Add a little bit of N with every irrigation from March to July, rather than applying large doses periodically through the season (we humans prefer three small meals a day over one big one). Fertigation delivers fertilizer to active roots. It is important that irrigation deliver only needed water, for excess water could dilute or leach the N applied past the root zone. In orchards with flood or

solid set sprinkler irrigation systems the N should be applied down the tree rows and not broadcast down the row middles. Dormant winter applications of N should be avoided as well as applications during hull split (July), which can aggravate hull rot and delay harvest! Deciduous almond trees absorb no N between leaf drop and leaf out.

I have been working with many growers who are recycling their first-generation almond orchards, incorporating the wood chips, and planting back second-generation almond trees. We have had some orchards that incorporated as much

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as 70 tons per acre of old wood chips. In orchards where high rates of wood chips were applied, we have noticed weed suppression and reduced tree growth in the second-generation trees, even after fumigating. We realized that we were not applying enough N to counter the N that was tied up with all the carbon from the wood chips. There is so much carbon in the soil that your N to carbon ratio may be out of balance.

In a new trial, we applied a quarter ounce of nitrogen at planting time when we watered our bare root trees, and we continued to add a quarter ounce of N per irrigation for the first month. We observed tremendous growth and only ended up applying 46.6 lbs. of N per acre (five ounces of N per tree). With these results we believe that early N applications are very important, starting at planting time, after whole orchard recycling, and we are recommending approximately 50 lbs. of N per acre (roughly five ounces of N per tree, one ounce of N per month over the season). Of course, this rate will vary depending on the amount of carbon that was added to each individual orchard during recycling. Remember not to add more than one ounce of actual N per first leaf tree at any one time, but you can add multiple ounces over the course of the season. Another advantage of using granular fertilizer applications early in the season, is that some growers have applied too much water too early in the season in order to deliver the desired amount of N and have experienced *Phytophthora* Root and Crown Rot infections.

In May, young trees planted in January and February should be showing active shoot growth. Some of this growth may occur where the trunk will eventually be shaken during harvest and should be removed. Trunk dominance can be lost in the first growing season due to water-sprouts or suckers. For this reason, they should be removed during the spring. In removing unwanted growth, one wants to establish the approximate height of the first primary scaffolds and to maintain tree trunk dominance. The first scaffold should be about 30 inches from the ground level, thus, any shoots developing below this height should be rubbed or cut off as early as possible, with care taken to avoid sunburn of the bark. This initial suckering will leave about six to ten inches above the first primary where seven or more shoots will hopefully emerge that will be considered for a primary scaffold after their first growing season in your orchard. The distribution of these shoots should be around and up and down the tree trunk. All duplicate shoot or “twins” should be eliminated. It is also important to keep the trunk straight. This will prevent shaker injury at harvest and wound canker infections. One can keep the trunk straight by driving a grape stake on the prevailing wind side of the tree and by tying the upper portion of the trunk to the stakes.

May is also the time to decide on an approach to mite management. Many growers and PCAs prefer a preventative calendar program by applying a product in May (Agri-Mek or generic abamectin) and then following up with a second miticide at hull split with their NOW spray. The main disadvantage with this strategy is that two sprays are used when one spray could have been sufficient, and that a biological control program with predators never had a chance. Another approach is to base treatment decisions on pest density. The recommendation is to do presence/absence sampling and avoid spraying until about 50% of the leaves have mites present on them (in the case that beneficials are found) or until about 25% of the leaves have mites (if there are no beneficials). See the pest management guidelines for spider mites in almond at our UC IPM website www.ipm.ucdavis.edu. Following this IPM approach will often result in not needing to spray until

sometime between the middle of June and hull split when one application of products such as Envidor, Zeal or Fujimite, that kill spider mites while preserving predatory insects, will usually be sufficient for the remainder of the season.

Sixspotted thrips have become the most common insect predator of spider mites, they are highly mobile and both nymphs and adults feed on spider mites. However, movement of sixspotted thrips into orchards can be unpredictable and sometimes does not occur until mites have already exceeded treatment thresholds. If sixspotted thrips are present in an orchard, avoid using pyrethroid or spynosyn insecticides or miticides containing abamectin to preserve their presence and maximize biological control. Predatory mite releases should be made when mite infestations are relatively low, for they won't put out a 'fire,' and more than one application may be necessary. Narrow range oil sprays at 2% may also

help reduce mite infestations in combination with predatory mite release. Dust management and avoiding water stress are also important in mite management. Dust can be controlled by watering or oiling roads and by driving below 10 mph. Water stress can be avoided by following proper irrigation recommendations and promoting practices that allow for good water infiltration. If soils tend to surface seal or become compacted, the use of gypsum, light tillage, or a cover crop growing in the row middles may enhance water infiltration.

Hull rot is often observed in young vigorous almond orchards in the central and southern San Joaquin Valley. Symptoms are observed as dieback in lower limbs that can have less bloom the following spring. I believe hull rot enhances shading out as the tree abandons infected wood in the lower canopy for healthy wood receiving sunlight at the top of the tree.



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IN YOUR ORCHARD

The loss of fruiting wood, especially in the lower parts of the tree, can negatively affect yield. The disease is caused by two fungal pathogens that enter the hulls after split and release a toxin that can kill leaves and twigs. Vigorous, heavily cropped, five to ten-year-old, well-watered and fertilized orchards suffer the most damage. Irrigation management is the only practical control for hull rot, although many growers apply a fungicide to their hull split NOW sprays. Research has shown that hull rot can be reduced by inflicting mild water stress on trees during early hull split. Mild water stress does not negatively impact long term productivity and may even reduce unwanted vegetative growth in mature canopied orchards. In order to achieve mild water stress we recommend using a pressure chamber to monitor midday stem water potentials (SWP) through the season in order to keep fully irrigated trees between stem water potentials of -7 to -9 bars. Then during hull split we try to irrigate less to achieve stem water potentials between -14 to -18 bars, with the larger negative number having more stress. Without a pressure chamber growers can try putting on 50% of their normal irrigation water during the week before and the first two weeks of hull split. For flood or furrow, you can irrigate every other row if solid irrigation was used normally. Unfortunately, without a pressure chamber it is easy to over stress trees at exactly the hottest time of the season when there is a 'fine line' or 'happy medium' between yield, disease, and imposing regulated deficit irrigation at hull split for every orchard. Pushing trees too hard for maximum growth and yield may ultimately lead to increased disease severity and reduced long term productivity. Stressing trees too much in June and July can reduce nut size, spur growth, and the developing buds for next year. ♦

Good luck!!!



Brent Holtz, Ph.D.,
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