Power in Partnership

BLUE DIAMOND GROWERS

almond facts

NEWS, VIEWS, AND INDUSTRY INSIGHT

SEPTEMBER–OCTOBER 2021

"*Blue Diamond* Blooms at Farm to Fork Festival" — Our Success at the Largest Event of its Kind

Meet BDG's Newest Regional Managers: Kenny Miyamoto & Trent Voss

Cover Crop & Water Info from Project Apis m.

Port of Oakland Shipping Challenge Update

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ON THE COVER:
Blue Diamond served as a sponsor for the wildly successful Farm to Fork Festival in Sacramento.

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

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Almonds

Best Clonal Rootstocks

- Brights Hybrid BH® 5
  (cv. Arthur V) US PP18,782 P3
- Krymsk® 86
  (cv. AP 1) US PP16,272 P3
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1116 15th St., Sacramento, CA 95814 | For more info marketing@duartenursery.com

Bring conference badge for admission

Mark Jansen
President & CEO

2020 Final Crop Return

This summer's drought and continued COVID-19-related challenges have certainly tested the resilience of your Blue Diamond co-op and proven our collective tenacity to overcome.

Despite supply chain and global shipping challenges over the last year, California almond industry shipments remained strong with an increase of 526 million pounds from the 2019 crop. Contributing to that success, our Global Ingredients sales increased by 36% to profitably move our record handle. I'm incredibly proud of the co-op's hard work, including SVP Global Ingredients, Bill Morecraft, who has announced he will retire in December after 35 years with Blue Diamond. We are grateful for Bill's leadership and legacy.

I know most of you are currently deep in harvest and while the 2021 crop is not expected to be as large as last year's, it will, nevertheless, be a significant one. I'm confident we've proven as a co-op that we can effectively receive, process, and market whatever size crop our growers entrust us to handle.

As almonds are coming in, we're starting to see that this year's challenge may not be the size of the crop, but the size of the kernel impacted by trees stressed by higher temperatures and insufficient water during the growing season. Whatever the challenge, I assure you that our mission remains to maximize returns to you, our growers.

One of the strengths of our *Blue Diamond* cooperative is the breadth of our product portfolio. Because of *Blue Diamond*'s line of value-added products during this year of lower prices, we were able to substantially increase our competitive return, estimated at more than a $.20 per pound advantage, to help reduce the financial impacts to our grower families.

The table on the right summarizes the final payments for all varieties - the actual rates earned by your deliveries are shown in the box on the last page of your grower's statement. The Revolving Reserve for the 2020 crop has been set at 3.0 percent of the base payment rate.

Variety	Overall Average	Average of High Quality	Maximum Possible
Nonpareil & Sonora Inshell	$1.99	$2.00	$2.02
Nonpareil /Supareil Meats	$1.87	$1.89	$1.93
Sonora Meats	$1.86	$1.88	$1.90
Independence Inshell	$1.79	$1.83	$1.84
Independence Meats	$1.71	$1.74	$1.76
Carmel & Winters	$1.83	$1.84	$1.86
Monterey /Neplus	$1.81	$1.82	$1.85
California /Price /Fritz /Wood Colony	$1.82	$1.83	$1.85
Butte & Padre	$1.81	$1.83	$1.85
Mission	$1.71	$1.74	$1.76

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

Your Board of Directors and *Blue Diamond* Leadership Team have made the decision to switch the 2021 Annual Meeting on November 17 to an online format, similar to last year's event. With significant current restrictions for large events, such as vaccination verification, masking, potential limitation on meals, outside security and reduced attendance, the quality of an in-person event would be substantially impacted. Additionally, most growers who responded to our poll in early September were not interested in attending an event with significant COVID-19 restrictions and requirements.

As was done last year, we'll make every effort to create a virtual Annual Meeting experience that combines the year's highlights with the relevant business reflection you've come to enjoy at our annual gatherings. I wish you all the best with the rest of your harvest activities. ◆

Mark Jansen
President & CEO

FIELD TEAM

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Director, Southern Region
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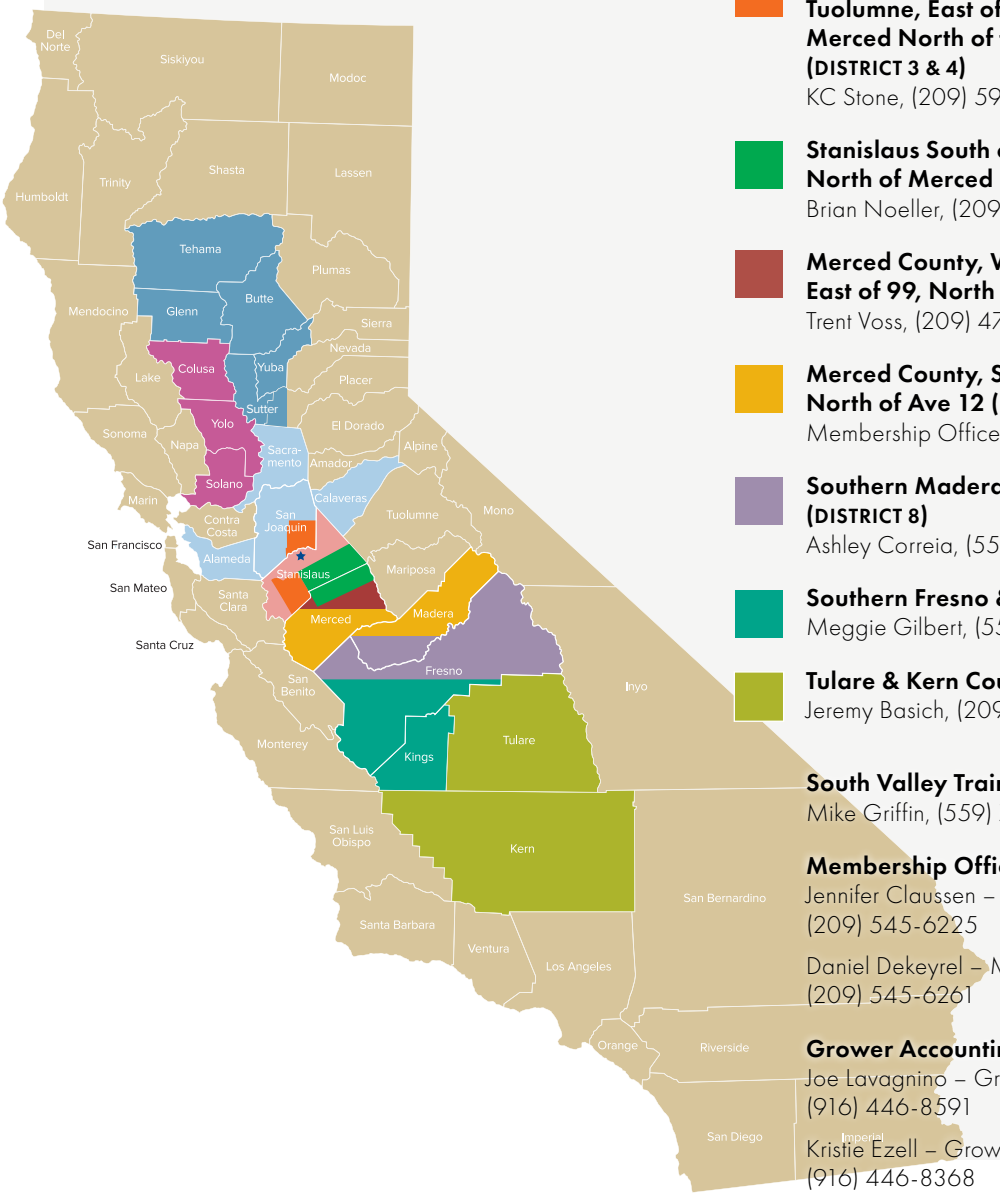

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John Aja, (530) 338-6440

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Stanislaus South of Tuolumne River, East of 99 & Merced North of Merced River, East of 99 (DISTRICT 6 & 7)
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Kevin Davies C
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Darren Rice
P. Samantha Lewis
Chris Alves VC
Luke Konyn
Robert Thill
Dan Cummings **
W. Howard Isom *
Steve Carlos !

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Ryan Finnen
Brian Cahill
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Jim Peart
Brook Bachmann
Cathy Marsh
Sid La Grande
Joe Martinez
Sarah Pippitt
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Elaine Rominger *
Gerald Rominger *
Maryann Warmerdam !

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Rick Phillips
Louie Tallerico
Michael M. Petz
Lloyd Van Dyken
Bruce Oosterkamp
Craig Miller
Ian Koetsier VC
Nick Alta
Chris Rishwain C
Jack Dalton
Dale Van Groningen **
John Thoming * ABA
Mike Bogetti !

DISTRICT 4

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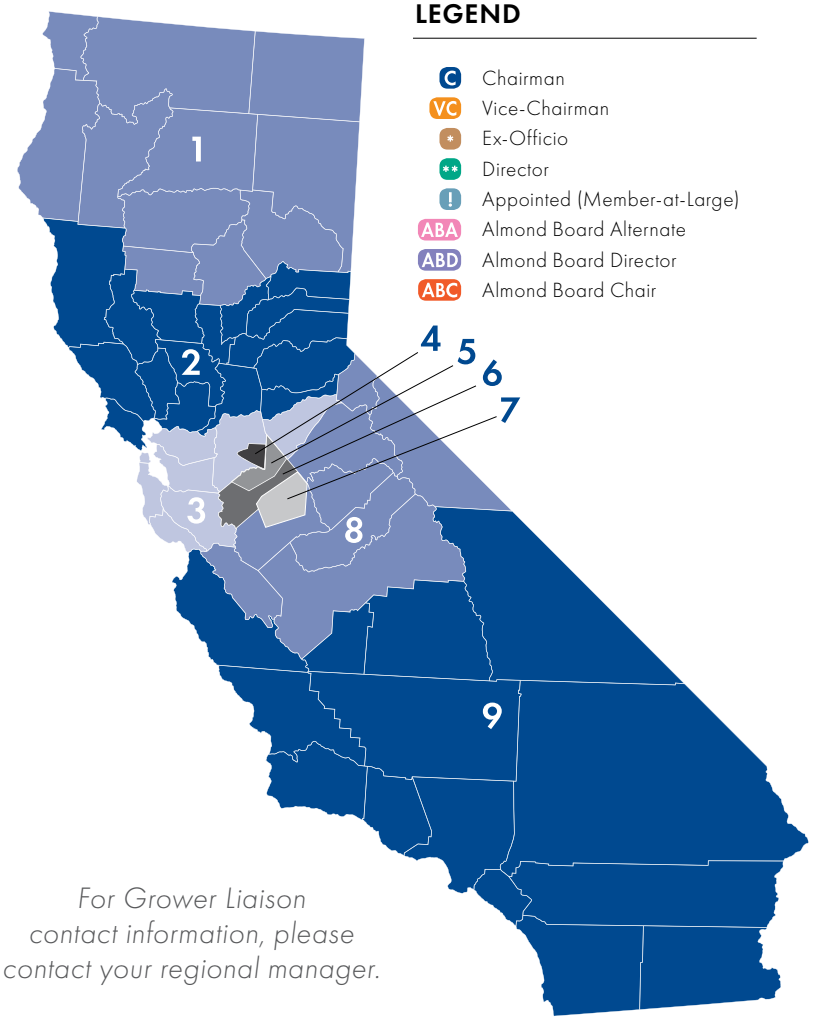
Rick Morris
Paul Adrian
Will Drost
Wes Eisenga C
Robin Giuntoli
Joe Gasper
John Almeida VC
Phil Mohler
Jake Sonke
Bryan Van Groningen
Kevin Fondse **
Kenneth Roos *
Wayne Bruns !



LEGEND

- 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.

DISTRICT 5

John De Visser
Manuel Furtado
Lucas Van Duyn VC
Jack Hoekstra
Sonny Johns C
Sid Miller
Gary Darpinian
Eric Heinrich
Naomi A. Layland
Alex Vanderstoel
Ryan Valk
Stephen Van Duyn **
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Grant Ardis !

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Michael Mora
Richard Gemperle
David M. Genzoli
Paul Lara
Darryl Starn C
Christine Gemperle VC
Don Clark
Jared Serpa
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Charles Crivelli III **
Steve Vilas *
Bill Brush ABA
Paul Danborn !

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Joe Sansoni
Jimmi Atwal
Jim Snyder
Victor Yamamoto
Bobby Deol
Alan Sano
Frank Fagundes VC
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Tim Lohman
Rick Scoto
Dan Mendenhall **
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Lee Erickson C
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Jerry Rai
Anthony Basila
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David Tolmosoff
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Aldo Sansoni *
Steve Bains !

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Keith Gilbert
David Snell
John Allen
Don Davis VC
Chris Vanborg
Mark Fanucchi
Doug Kindig
Ray Van Beek C
Kent Stenderup ** ABC
Clinton Shick *
Karamjit Jhandi !

Blue Diamond Provides Red Cross Western Wildfire Relief

California wildfires ripped through the state again this year. According to CAL FIRE, 2021, has brought *7,377* wildfires that have burned over 2.2 million acres in California. In response, *Blue Diamond* has, once again, partnered with the American Red Cross to raise funds to support the firefighting efforts. *Blue Diamond* matched grower and employee donations, dollar for dollar, up to $10,000, and together, we reached a total of $29,950 in contributions. *Blue Diamond* also donated product to two shelters — one in Yuba City, and one in Reno — to provide much-needed nourishments to evacuees. Finally, *Blue Diamond* accepted donations from growers and team members to help provide necessities and food to families displaced by the disasters. Some in our grower and workforce community have been directly impacted or know someone who has been directly impacted by these fires. Thank you to each of you who donated and supported the recovery of these affected California communities.

2,359,871 Acres
Acres Burned

7,618 Incidents
Number of Wildfires

3 Fatalities
Confirmed Loss of Life

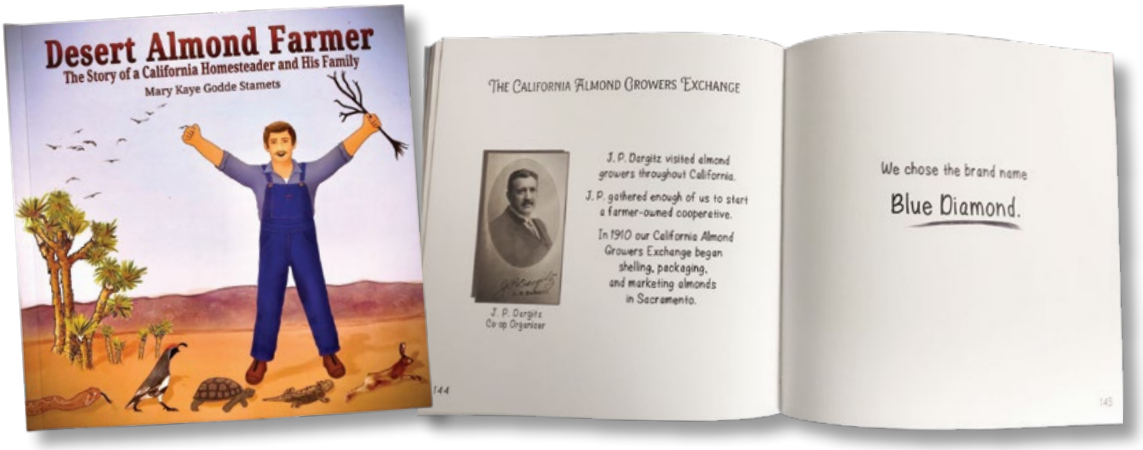
3,289 Structures
Structures Damaged or Destroyed

$19,950
Donations

67
Contributions

TV Tokyo Story on *Blue Diamond*

As a market that depends on California for more than 90% of its almond imports, Japan was exceptionally interested in visiting California to see how *Blue Diamond* was managing throughout the hot summer. The crew from TV Tokyo spent some time with Mark Jansen at the Sacramento campus and learned that despite the climate challenges that have impacted California growers, *Blue Diamond* is still doing great work to provide for the large almond demand in Japan. ◆



Desert Almond Farmer

California native, Mary Kaye Godde Stamets has a unique story to tell. Her grandfather, Frederick Godde, was a California homesteader who — with his family — transformed a portion of the Mojave Desert into a thriving almond orchard. Godde became one of the original members of The California Almond Growers Exchange, which is known to us now as *Blue Diamond Growers*. This informative, entertaining window into a vital time of agricultural history unveils the incredible challenges that this almond farmer and his family faced and the innovative spirit with which they relied on to overcome. It is amazing to see the relatability because, to this day, many of those challenges remain. To top it off, there are quite a few fun facts within this read and colorful illustrations that will be enjoyed by children and adults alike. What a lovely tribute to Frederick Godde's footprint on ag history in this California almond origin story.

To purchase or learn more about the book, visit the website: desertalmondfarmer.com ◆

Blue Diamond Leadership Program — Apply Now!

In 1994, *Blue Diamond* developed the *Blue Diamond* Leadership Program, intended to educate potential young almond growers between 21–40 years of age. The program still encourages leaders within that age bracket but is open to growers of all ages who are interested in participating. Designed to prepare participants for leadership roles, the program will:

- Develop communication and leadership skills.
- Familiarize participants with the structure and operations of *Blue Diamond*.
- Educate participants on the advantages of *Blue Diamond* membership.
- Acquaint participants with other almond growers.
- Encourage participation in *Blue Diamond* activities.
- Assist participants in the development and operation of a successful farming business.
- Familiarize participants with external factors that affect their business.

Participant selections for the **2022 Leadership Program** will be made by a committee consisting of the local Board member, Advisory/Liaison Committee members, and the field supervisor representing your district.

If you are interested, please submit your application by **October 15, 2021**!

Please download the application here:
bluediamondgrowers.com/wp-content/uploads/2021/09/2022-Blue-Diamond-Leadership-Application.pdf

Or scan this QR code with your smartphone.

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EQUAL HOUSING LENDER

Blue Diamond Blooms at Farm to Fork Festival

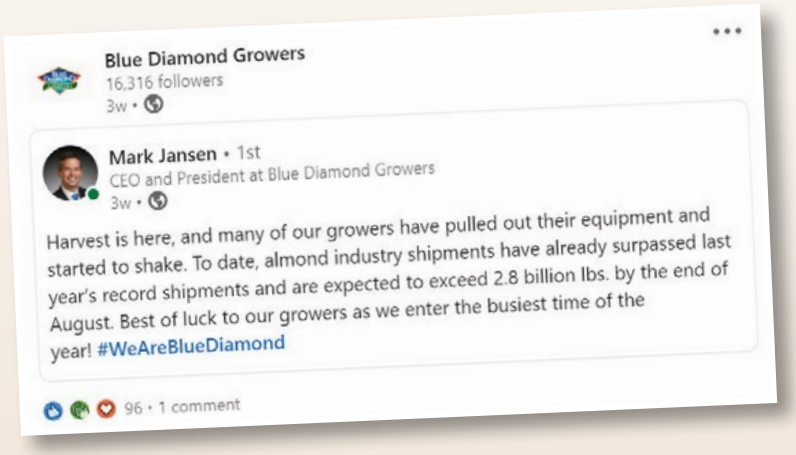
On a breezy Saturday morning in September, *Blue Diamond* team members volunteered at a beautiful booth at the 2021 Farm-to-Fork Festival in downtown Sacramento. The booth featured images of our growers to help guests get to know who is producing their favorite almond products. The booth also showcased *Blue Diamond*'s newest products including XTREMES, Tasty Little Cup™, and Baking Mixes to provide attendees with a look at *Blue Diamond*'s commitment to innovation so they understand that there is always something new coming.

The festival welcomed thousands of attendees who enjoyed sampling *Blue Diamond*'s iconic Smokehouse almonds, learning more about the co-op from our team members, and spinning a prize wheel to win a variety of fun *Blue Diamond* treats and swag. Visit Sacramento facilitated a Facebook Live interview with *Blue Diamond*'s Director of Corporate Communications Lynn Machon, where she discussed *Blue Diamond*'s role as a co-op, connection to its growers, and

presence at the festival. This was a fantastic opportunity to raise awareness of the brand and its locally sourced almonds to members of the Sacramento community and to allow them to personally engage with *Blue Diamond* as a Sacramento staple. Many guests even expressed their plans to visit the Nut and Gift Shop to purchase more new products following the festival. The phrase, "I love almonds!" was on the lips of nearly every guest who visited the *Blue Diamond* booth.

#WeAreBlueDiamond Social Media Activity

In September, we remembered the 20th anniversary of the tragedy of 9/11, never forgetting those who were lost that day. We also took a look at several of our growers' shakers hard at work throughout the season while celebrating the excellent almond harvest.



BLUE DIAMOND INVESTMENT PROGRAMS

Current Investment Rates available as of August 8, 2021

Blue Diamond Growers offers members short-term and long-term investment programs.

The objective of these programs is to serve as a competitive investment alternative for our members and provide *Blue Diamond Growers* with a steady source of funds. The interest rates effective August 8, 2021, for the program are listed here:

	Short-Term Investment Certificate (STIC)	Long-Term Investment Certificate (LTIC) (Maturity Date of 6/30/2024)
Initial Investment Required	$1,000	$50,000
Interest Rate	1.00%	1.875%
	(Variable, subject to change)	(Fixed rate)

For more information, contact your local Regional Manager, or Member Services at (209) 545-6225.

This summary does not constitute an offer to sell or a solicitation to purchase investment certificates. We will provide a package of documents for the programs to those members who are California residents and who express an interest in participating in the program.

Pumpkin-Sage Ravioli Bake

Prep Time: 45 minutes Cook Time: 45 minutes Difficulty: Easy Serves Up To: 6

Cheese ravioli studded with spicy sausage and bathed in an earthy-sweet cream sauce — this bake is easy enough for a weeknight but special enough for company.

Ingredients

- 8 oz. ground Italian sausage
- 2 cups *Almond Breeze* Original almondmilk or *Almond Breeze* Unsweetened Original almondmilk
- 3 tbsps. all-purpose flour
- ½ cup canned pumpkin
- ½ tsp. ground sage
- ½ tsp. salt
- ¼ tsp. ground black pepper
- Cooking spray
- 1 package (25 oz.) frozen cheese ravioli; regular size or mini
- 1 cup part-skim mozzarella cheese; shredded
- Coarsely ground black pepper; optional
- Chopped fresh sage; optional

Directions

1. Preheat oven to 400°F.
2. In a large skillet over medium-high heat, cook sausage until done; drain and set aside.
3. Combine almondmilk and flour in a large saucepan. Bring to a boil over medium-high heat and cook 2 minutes or until thickened, stirring constantly. Remove from heat. Stir in pumpkin, sage, salt and pepper.
4. Cook ravioli according to package directions to just al dente. Drain and return to pot. Add reserved sausage and cream sauce; fold gently to combine.
5. Transfer mixture to an 11”x7” glass baking dish lightly coated with cooking spray. Top with mozzarella.
6. Bake, uncovered, at 400°F for 20 minutes or until cheese is beginning to brown and sauce is bubbling. Top with pepper and sage, if desired.

Coconut Cupcakes or Sheet Cake with Chai Frosting

Dairy-Free Cooking Time: 34 minutes Difficulty: Easy Serves Up To: 12

The spices in the Chai Frosting pack a punch; start small and add to taste. To prepare this recipe as a sheet cake use a 13"x9" pan coated with cooking spray and reduce the bake time to 20 minutes. If you'd like to keep things dairy free, substitute a vegan butter for regular in the buttercream part of the recipe. For a more pronounced coconut flavor, add coconut extract.

Ingredients

- 2¼ cups all-purpose flour
- 1 cup sugar
- 1½ tsp. baking powder
- ½ tsp. baking soda
- ¾ tsp. salt
- 1 cup *Almond Breeze* Almond Coconut Blend almondmilk
- ½ cup canola or vegetable oil
- 1 tsp. coconut extract; optional
- 2 cups powdered sugar
- ¼ tsp. cinnamon
- ¼ tsp. nutmeg
- ⅛ tsp. ground cloves
- ⅛ tsp. ground cardamom
- ½ cup unsalted butter; softened
- 1 tbsp. *Almond Breeze* Almond Coconut Blend almondmilk
- Toasted coconut; optional

Directions

1. Preheat oven to 350°F.
2. Combine flour, sugar, baking soda, baking powder, and salt in a large bowl with a whisk.
3. In a separate bowl combine the almondmilk, oil and extract, if using.
4. Add wet ingredients to dry; stir just until combined. Divide evenly among 12 muffin cups lined with muffin liners, lightly sprayed with cooking spray.
5. Bake 22 minutes at 350°F or until a toothpick inserted in the center of a cupcake comes out clean. Cool in pan for 5 minutes. Remove to a wire rack to cool completely.
6. To prepare frosting: combine powdered sugar and spices. Add butter; beat until combined. Beat in almondmilk until smooth. Frost tops of cupcakes. Sprinkle with toasted coconut, if desired.
7. Refrigerate leftovers.

Meet Trent Voss, New *Blue Diamond* Regional Manager

Almond Facts (AF): Could you tell us a bit about yourself? Where were you educated and how did you get involved in the ag industry?

Trent Voss (T): I grew up in the Hughson area in the valley where my family has been farming almonds and peaches. I'm fourth generation in the area. I went to Hughson High School, then MJC, then transferred to Stanislaus State and got my Bachelor's in Ag Studies. While I was going to school, I got my PCA license and my CCA license. I was a PCA for Wilbur Ellis for the past 10 years in Hughson. As a PCA I wrote recommendations to farmers on what to use for their crops: chemicals, fertilizers, nutrition and helped with any questions they had. This (regional manager) position opened and I was happy to have a better conversation with growers. It's a better fit for my personality.

AF: Could you share a specific highlight or something you love about working in ag?

T: The best thing is that I still help on the family farm with my dad and brother. Being able to farm all together is the best thing for me. It's great! My kids (ages 4 and 1) go out there me and so do my brother's kids. It's nice that we all do it together. That's my favorite!

AF: What brought you to *Blue Diamond*?

The Voss Family: Spencer, Cash, Arlo, and Trent.

T: I get to represent growers and the almond industry. As a PCA you're always thought of as a salesman, but with *Blue Diamond*, you're thought of as a partner. You're not there to push anything, you're there the help them get the best return for their product. My family is *Blue Diamond Growers*. I remember growing up, my parents had relationships with their field reps for years and that was important to me. It's a lifelong relationship rather than just a business deal.

AF: What led you to transition from a PCA to a regional manager?

T: I'm able to farm with my parents but I needed to do something else too. This way I can still be a part of farming and not have the same risks that go with it.

AF: Can you expand more on some of your passions for the ag industry and what drives you to go deeper?

T: My heritage drives me. My grandfather was California State Secretary of Ag and President of the Farm Bureau in the late '80's, early '90's, so he was part of ag politics. Being involved in ag has always felt like something I wanted to do, since it's "in my blood." My dad is a bit of the opposite of my grandfather; he just wants to go out and work on the farm, and that's it. He pushed me to

do this saying that we always need representatives, they need people to show up for them and put themselves in front of those who don't understand the ag industry. I want to be sure their voices are heard.

AF: As you begin your career with *Blue Diamond Growers*, tell us something you're looking forward to or what you're most excited about?

T: I am most excited about getting out in front of the growers in my area face to face so they can get to know me and so I can learn about them and their operations. I'm also excited for harvest. I came in at the busiest time of year and I'm looking forward to seeing how intense it can get.

AF: What is your favorite *Blue Diamond* product?

T: The product I use the most is Unsweetened, Original *Almond Breeze*. The one I like the most to snack on is the Honey Roasted snack nuts.

AF: What do you use the Unsweetened, Original *Almond Breeze* for?

T: Coffee and cereal! And anything that requires milk!

AF: What are some of your hobbies?

T: I like to workout at my home gym in the garage. My boys love it, too; they go out there and jump around. My family and I also love to ride quads at Pismo Beach.

AF: Is there a final thought you'd like to leave with our growers?

T: I always have their best interest in mind. Growing up as a farmer's kid you understand that everybody's farming off a budget, and you understand the hardships farmers go through. I want you all to know I've been there; I've seen it and I'm here now to help in any way I can. ◆

New Regional Manager, Kenneth Miyamoto, Shares His Family History and Passion for the Almond Industry

Almond Facts (AF): We love that you come from a family of *Blue Diamond* growers. Could you tell us a little bit about your family history in the almond industry?

Kenneth (K): My family have been *Blue Diamond* almond growers for four generations. My great grandfather emigrated here from Japan and raised my grandfather's family on a farm. My grandfather followed in his footsteps and started farming following his service in World War II. He raised my uncle, father, and aunt on a forty-acre almond farm. My dad and his older brother formed a partnership and have continued farming almonds for *Blue Diamond* to this day. Growing up I remember seeing the big billboards with the slogan "A can a week, that's all we ask."

AF: Could you share an exciting highlight about your life in the almond orchard?

K: I'm happy with the progress and technological advancements that have been made in the industry, primarily when it comes to harvesting equipment and implements. We would walk the windrows and pull sticks out by hand. During harvest the tractors would back the trailers onto the elevator, and our primary focus was to grab as many sticks as possible out of the trailer before they made their way into the double with the almonds. Now everything is so much more streamlined and mechanized. The process is less laborious, safer, and more efficient. I don't think I'll ever be as excited as the first time I was able to operate an enclosed sweeper.

AF: What was the greatest appeal that brought you to *Blue Diamond*?

K: *Blue Diamond* is an industry leader with worldwide brand recognition, but beyond that the role of Regional Manager allows me the best of both worlds. I get to be out in the field working with our growers and not only be a resource, but a conduit of information.

AF: What helped you decide to become a *Blue Diamond* regional manager?

K: Having worked at the Agricultural Commissioner's office for over seven years as an Agricultural Biologist, I knew I enjoyed working with growers. The *Blue Diamond* employees I've met over the years and growers ultimately made my decision easy. I knew I couldn't pass up this once in a lifetime opportunity.

AF: What is one of your greatest passions in this industry?

Kenny's family, L to R: Giuseppe (brother-in-Law), Luca (nephew), Minda (twin sister), Kenny, Melba Miyamoto (mother), Allegra (niece), Galen Miyamoto (father)

K: Farming is constantly evolving and changing. It's never stagnant or boring. Farmers are some of the greatest stewards of the land and the industry is constantly pushing the envelope through the ever-changing demands and constraints. This excites me and I'm passionate about making a difference.

AF: What are you looking forward to the most as you begin your career with *Blue Diamond*?

K: I'm looking forward to working with a solid team, my growers, industry professionals and developing lasting relationships.

AF: What is your favorite *Blue Diamond* product?

K: My favorite *Blue Diamond* products would be chocolate covered almonds or some of the bold flavors like Habanero BBQ.

AF: What are some of your hobbies?

K: I enjoy spending time with family and friends or anything outdoors. I like to get outdoors for recreational activities ranging from camping, hiking, fishing, and snowboarding.

AF: Is there anything else you would like our growers to know about you?

K: I'm excited to be a part of the BDG family; and I can't wait to meet all of you. ◆

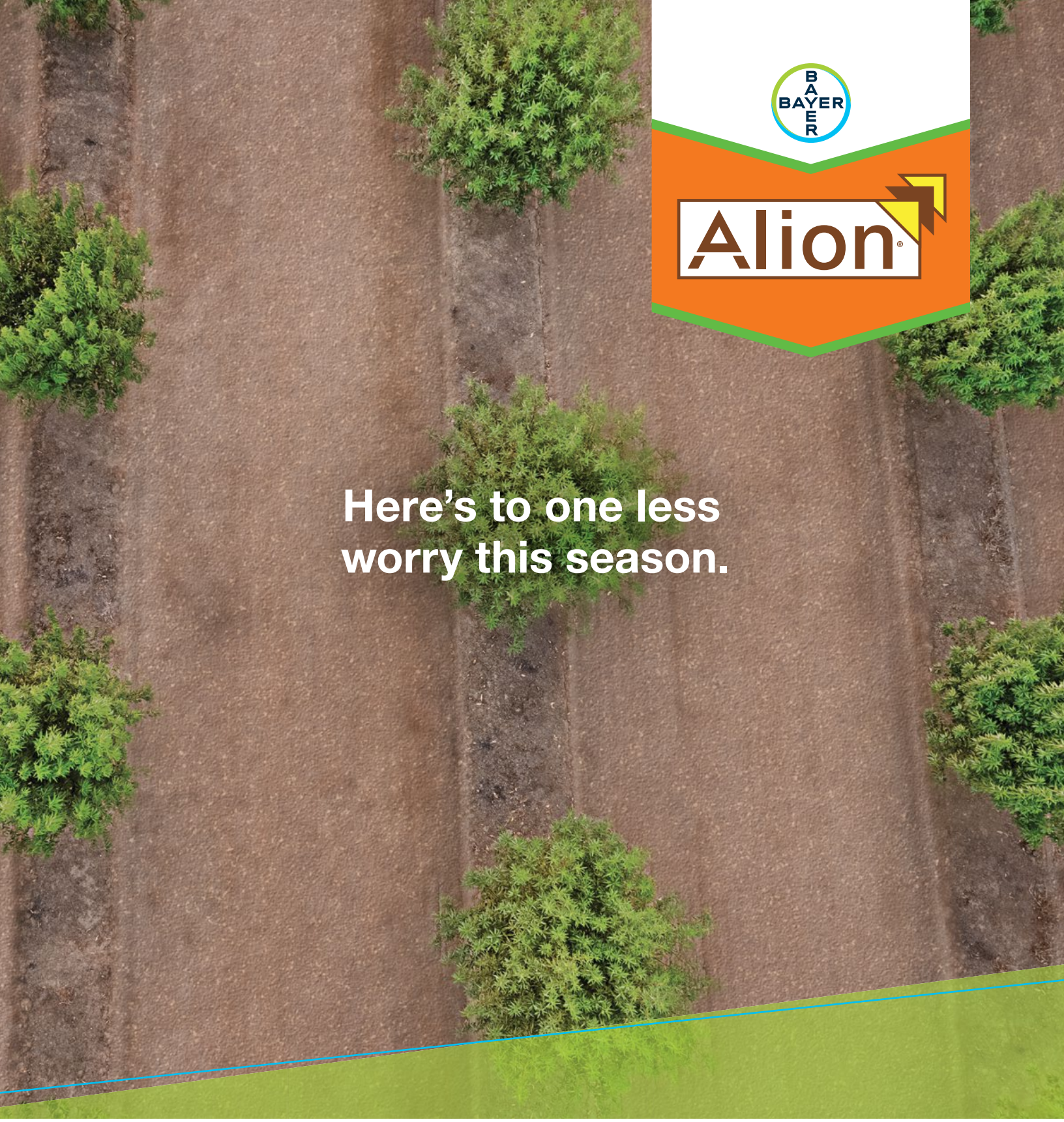
Almond Alliance of California's Elaine Trevino Nominated as U.S. Chief Agricultural Negotiator

Photo: California Almond Alliance

In mid-September, the Almond Alliance's very own Elaine Trevino was nominated by President Biden as Chief Agricultural Negotiator for the United States Trade Representative. This position is responsible for conducting and overseeing international negotiations for trade of American agricultural products, and is a crucial role for exported crops, like almonds.

During Elaine's tenure, the Almond Alliance leveraged its industry's economic value, commitment to stewardship and its 7,600 family growers to promote and protect almond farming in California. Her efforts brought needed attention to almonds and in turn all specialty crops garnering these farmers direct payment assistance from USDA for the first time when retaliatory tariffs were crippling their operations.

Although Elaine will be missed here in California, she will be an excellent voice for American agriculture, and we look forward to the great work she will do in Washington. *Blue Diamond* will continue our work with the Almond Alliance during Elaine's transition and will welcome her successor when named.



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For more information, contact your retailer or Bayer representative or visit **www.AlionHerbicide.com**.

Industry Alert: An Update on Ongoing Shipping Challenges at the Port of Oakland

The Congestion Issue Summary:

The transportation crisis continues for agriculture exporters and seems to be worsening as the holiday season nears. Increased costs, rescheduling, cancellations, detention, and demurrage charges up 300% and lost markets are some of the realities the industry is facing. Based on numerous sources, over 20% of sales cannot be completed due to ocean carrier rates, declining to carry export cargo, unreasonable demurrage and detention charges, and other practices. As an industry that is international holiday focused, this issue continues to be a top priority for almonds.

The Almond Alliance continues to focus on this issue and work closely with AgTC, several stakeholder organizations, logistic companies and of course the Port of Oakland. Here is a summary of recent efforts related to port congestion and related Almond Alliance action items.

Federal Maritime Update (FMC):

The FMC launched an expedited inquiry into the timing and legal sufficiency of ocean carrier practices with respect to certain surcharges. There are eight ocean carriers being asked to provide the Commission's Bureau of Enforcement (BOE) with details about congestion or related surcharges they have implemented or announced. This action was taken in response to communications received by the Commission from multiple parties reporting that ocean carriers are improperly implementing surcharges. The companies contacted are CMA CGM, Hapag-Lloyd, HMM, Matson, MSC, OOCL, SM Line; and Zim. Each ocean carrier was identified as having recently implemented or announced congestion or related surcharges. Ocean carriers are subject to specific requirements related to tariff changes or rate increases, including providing a 30-day notice to shippers and ensuring that published tariffs are clear and definite.

The FMC has indicated that they are committed to transparency and Chairman Maffei has said, "As Chairman, I want to know the carriers' justifications for additional fees, and I strongly support close scrutiny by the FMC's Bureau of Enforcement aimed at stopping any instance where these add-on fees may not fully comply with the law or regulation."

In summary, the FMC is working on the below items:

- The Fact Finding 29, led by Commissioner Rebecca Dye, to identify operational solutions to cargo delivery system challenges.

- FMC Ocean Carriers Audit Program which will analyze the top nine carriers by market share for compliance with the Commission rule interpreting 46 USC 41102(c) as it applies to detention and demurrage practices in the United States. Other focus areas of the audit process may include practices of companies related to billing, appeals procedures, penalties assessed by the lines, and any other restrictive practices. Lucille Marvin, the Commission's Managing Director, is leading the audit.
- FMC is committed to transparency facilitating ongoing stakeholder discussions and roundtables.

The Commission can initiate enforcement actions for improperly established tariffs based on their findings. We will let you know when the inquiry on Shipping Act violation findings is released. If you want to file a formal complaint, please contact the Almond Alliance and we will walk you through the process.

The Federal Maritime Commission recently announced their National Shipper Advisory Committee. The Committee is comprised of 24 members, evenly divided between those who export cargo from and those who import cargo to the United States, that will advise the Commission on policies relating to the competitiveness, reliability, integrity, and fairness of the international ocean freight delivery system. Joshua Woods from *Blue Diamond Growers* will serve on the advisory committee. The Almond Alliance will continue to communicate industry challenges to the Commission and newly formed advisory committee.

☑ **ACTION ITEM:** ***The Almond Alliance continues to engage with the FMC staff and will be transmitting a letter to the commission regarding the impacts to the California almond industry and our requests for action. In addition, we alerted the FMC that due to the delays at the Port of Los Angeles and Port of Long Beach the number of vessels that have bypassed the Port of Oakland, we believe due to time constraints, has soared. The number of vessels that have bypassed the Port of Oakland in comparison to last year is approximately 40 (from July 2020 to July 2021) which furthers the challenges that almond exporters are facing.***

Recent Roundtables Facilitated by FMC:

Port of Oakland on August 30, 2021: Oakland Port executives, with Federal Maritime Commissioner Carl W. Bentzel, California State Transportation Agency Secretary David S. Kim, importers, exporters, and stakeholders discussed the port congestion challenges and how to strengthen Oakland's place in the global supply chain and strengthen the state and federal economies. Attendees asked for support from maritime leaders to streamline seaport operations and communications and collaborate on making the supply chain transparent for customers and operators. FMC and CalSTA asked for recommendations on how to alleviate the port congestion and improve communication between importers, exporters, the Port of Oakland, logistics and carriers. The Almond Alliance requested longer night gate hours, requirements on the percentage of empty containers returning on a vessel, improved notifications from carriers on early calls and blank sailings, explanation of increased fee methodology and compensation for third party fees on storage and chassis. While our requests are ambitious, our goal is to push for transparency on the issues important to our exporters.

Port of Long Beach on September 1, 2021: The Long Beach roundtable focused on supply chain transparency and how equipment and operations move cargo in and out of the largest port complex in the United States. Commissioner Bentzel was joined by Congressman Alan Lowenthal, who has represented the LA/LB port complex at the local, state and now federal level for decades. Long Beach and Los Angeles Port Directors Mario Cordero and Gene Seroka also joined as well as representatives of rail lines, trucking, chassis, container lines, and terminals.

☑ **ACTION ITEM:** ***The Almond Alliance was asked to summarize and update the impacts that the port congestions have had on almonds. We are in the process of drafting and will submit soon. We need to hear from our handlers if expanding night gate hours for truckers at the Port of Oakland will be helpful and utilized. Please email us and express your support. This will help our effort to expand gate hours at the Port of Oakland.***

Port Update:

Port of Oakland: A year-long cargo surge slowed and volume dipped at the Port of Oakland in July. The Port recently reported it expected containerized cargo volume growth to resume as peak shipping season arrives. Though business dipped in July, the Port said year-to-date import volume has increased 16 percent. Total volume in the same period is up 9 percent.

According to the Port, cargo volume declined 3.5 percent in July compared to the same month a year ago. Here's the breakdown:

- July containerized imports down 1.7 percent year-over-year;
- July containerized exports down 4.7 percent Y-O-Y; and
- July total volume, which includes imports, exports, and empty container repositioning, down 3.5 percent Y-O-Y.

The Port attributed the declines to record cargo volume in the first half of the year. It explained that surging shipments stacked up on docks causing delivery delays. The Port said that as a result, shipping lines omitted several voyages to Oakland, leading to lower volumes.

The Port said that cargo volume should increase again from August through October. Those are peak shipping months for retailers building holiday inventories. Oakland has introduced two new vessel services to Asia in the last month which should also boost volume. The Port said new services demonstrate continued reliance on Oakland as a key global trade gateway.

☑ **ACTION ITEM:** ***The Almond Alliance is working with the Port of Oakland to encourage longer hours of service at the night gate, with an early opening time. If you have an opinion on this issue, please contact the Almond Alliance.***

Union Negotiations:

All our almond exporters are concerned with the upcoming labor negotiations which are set to begin in January 2022. Given the existing conditions at the Port of Oakland, an impasse would be devastating. While labor negotiations impact the Port of Oakland, the two parties negotiating are the International Longshore and Warehouse Union (ILWU) and the Pacific Maritime Association (PMA). The Almond Alliance is meeting with ILWU and PMA and will continue to monitor contract negotiations and update on the progress.

Legislation of Interest:

Congressmen John Garamendi and Dusty Johnson are authors of the Ocean Shipping Reform Act of 2021 "OSRA21." The Act's provisions address the unreasonable detention and demurrage charges, export cargo bookings, and other carrier practices that are essential to allow US agriculture to remain competitive in global markets. The Almond Alliance strongly supports provisions in the bill to gain reasonable and fair ocean carrier practices consistent with the Federal Maritime Commission's Interpretive Rule on Demurrage and it imposes upon carriers the obligation to self-police compliance with that Rule. In addition, the bill obligates ocean carriers to carry export cargo, to the extent they can do so safely. It addresses carrier practices limiting efficient use of containers, chassis, and other equipment. The Almond Alliance will continue to work on advancing and strengthening this bill as it proceeds through the legislative process.

The Ocean Shipping Reform Act of 2021:
www.congress.gov/bill/117th-congress/house-bill/4996

The Ocean Shipping Reform Act of 2021 Factsheet:
almondalliance.org/wp-content/uploads/2021/09/OSRA21-Section-by-Section-Summary.pdf

☑ **ACTION ITEM:** ***Below are the California representatives already listed as co-sponsors. If your congressional representative (or one that you know) is not on the list of co-sponsors of OSRA21, please contact them directly to request they co-sponsor the bill.***

A current list of co-sponsors of OSRA21:

- Rep. Costa, Jim [D-CA-16] 08/13/2021
- Rep. Valadao, David G. [R-CA-21] 08/13/2021
- Rep. Brownley, Julia [D-CA-26] 08/27/2021
- Rep. Panetta, Jimmy [D-CA-20] 08/31/2021 ◆

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Cover Crops: Worth the Water?

This year the entire West and Northern Midwest is experiencing drought, leaving some growers with barely enough water to keep their crops healthy. Beekeepers are also struggling in places like North Dakota, where honey bees are preparing for almond pollination in February and some beekeepers are reporting record low honey crops. When nectar dries up, bees struggle to produce the honey they need to survive winter.

Blooming cover crops benefit both beekeepers and growers by providing better nutrition for bees, increasing the soil's water-holding capacity by adding organic matter, increasing water infiltration, reducing erosion, and providing natural weed control. Having forage available when bees arrive for pollination can help colonies build up strength after a tough year and ensure good pollination. On an exceptionally dry year, some cover crop plantings may not flourish as well as a year that sees average or above average rainfall. Even if your cover crops are not as robust as you might like them to be this year, the benefits are still valuable and are worth the effort.

What to Expect

Water is precious and promoting cover crops raises some important questions about water use. Seed blends intended to be planted in California's Central Valley should contain species that have low moisture requirements. Sowing seeds in the fall is a great way to take advantage of fall and early winter rains. If planted early, to utilize the seasonal rains, robust, well-growing cover crop stands are possible without the use of irrigation. Early planting also encourages an early bloom which provides nutrition for honey bee colonies pollinating almonds. Planting September 10 through November 10, while soil is still warm (above 55) is an appropriate time to plant any cover crop in California. However, to ensure species like canola, mustard, and radish will bloom before almonds, it must be sown and germinated before November 1. While not necessary for an adequate stand, irrigation can be used to ensure a more robust cover crop for some mixes.

Enrollees of Project Apis m.'s (PAm) Seeds for Bees® program receive seed mixes designed to be successful in harsh conditions like the non-irrigated middles of orchards. If water availability is a concern, select seed mixes that are the most efficient at growing successfully in droughts. The PAm Clover Mix, for example, requires more moisture than the PAm Brassica Mix which can perform well with average seasonal rain, no irrigation needed.

Recent trials conducted by University of California Cooperative Extension researchers Shulamit Shroder and Jessie Kanter give some insight as to what growers can expect from a cover crop that is grown in drought conditions. During the 2020/2021 season, a variety of cover crop mixes were evaluated at the Shafter (Kern County) research station. Most of the irrigated seed mixes were more successful than the non-irrigated ones by providing about twice as much biomass, with the brassica mix being the exception as seen in Table 1 (Shroder, Shulamit and Kanter, Jessie 2021). However, they conclude "all of the non-irrigated plots contributed some amount of biomass. This means that even if you cannot irrigate your cover crops, you can still reap some soil health benefits."

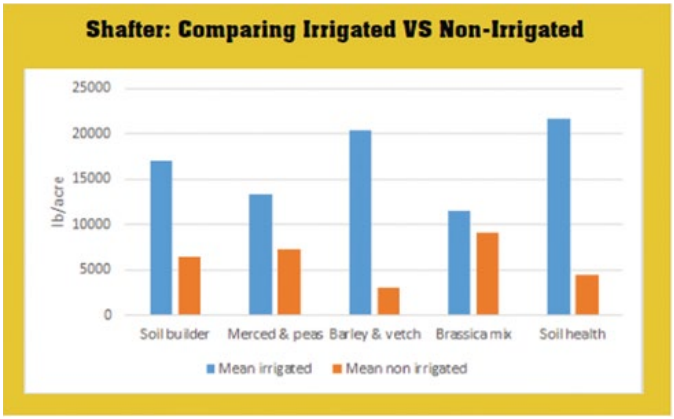

Table 1. Comparing Irrigated vs Non-Irrigated biomass collected in Shafter on March 17, 2021. (Shroder and Kanter 2021)

How Cover Crops can Increase Water Use Efficiency

Growers who participate in Seeds for Bees receive technical advice specific to them, and our team will help

you determine what mixes are most appropriate for your operation and water use goals. There is evidence to suggest that planting cover crops increases water use efficiency and water availability. Cover crops add organic matter to the soil. Organic matter is excellent at holding water; it works like a sponge that traps and retains water.

- Organic matter holds 18–20 times its weight in water (USDA NRCS 2013). One can expect the PAm Seed Mixes to provide about 3.5 tons of organic matter per acre.
- There are 1,000,000 tons of soil in a 6-inch-deep acre plot, so growing a cover crop to about waist high will provide 0.03%–0.05% of organic matter every year. Just 1% organic matter in the top six inches holds up to 27,000 gallons of water! (USDA NRCS 2013).

Organic matter helps water stay where it's needed most, around the root systems of crops. But cover crops also use water, so let's take a closer look at how much water cover crops use in an orchard system.

How Much Water do Cover Crops Use?

Cover crops grown in the fall and winter months will need less water due to shorter days and cooler temperatures. More research needs to be done to determine how much water cover crops use from October to March. Typically, this is the time of the year when Seeds for Bees cover crops are growing. However, there is still something to be learned from a 1989 cover crop study that took place in an almond orchard from April to August. The results were published in California Agriculture in an article titled, "Orchard water use and soil characteristics," by Prichard, et al. The results are shown in Table 2 (below). Resident vegetation (weeds), clover, bromegrass, and herbicide (bare ground) were the four treatments that were compared in two orchards: a newly planted one (Orchard A) and a mature one with 70% soil shading (Orchard B). The herbicide (bare ground) treatment used the least amount of water. Bromegrass used from 4% less to 18% more water than bare ground. Clover used more than bromegrass, 14% to 29% more than bare ground, and the most water was used by weedy resident vegetation, from 17% to 36% more than bare ground. A clover cover crop used less water than resident weeds! If something is growing on the orchard floor, it might as well be a cover crop. It will use less water than the weeds while increasing the soil's water-holding capacity.

Treatment	Seasonal water use*			
	Seasonal (inches)	Percent	Seasonal (inches)	Percent
	1984 4/7 - 8/18		1985 4/29 - 7/29	
ORCHARD A				
Resident vegetation	18.6 a	135	24.9 b	124
Clover	17.6 ab	129	25.9 a	129
Bromegrass	16.1 b	118	21.7 c	108
Residual herbicide	13.7 c	100	20.1 d	100
	1985 4/10 - 10/3		1986 4/22 - 8/22	
ORCHARD B				
Resident vegetation	40.8 a	123	31.9 a	117
Clover	41.0 a	123	30.8 a	114
Bromegrass	32.1 b	96	26.8 b	99
Residual herbicide	33.2 b	100	27.1 b	100
Chemical mow	33.9 b	102	27.0 b	99

NOTE: Percentage comparisons are relative to residual herbicide.
* Values within a column followed by the same letter are not significantly different at P<0.05 level using Duncan's multiple range mean separation technique.

Table 2. Seasonal water use in treatments at orchards A and B (Prichard 1989)

The 2021–2022 Seeds for Bees open enrollment period is happening now. Interested growers are encouraged to apply at ProjectApism.org/Seeds-For-Bees. We are currently accepting applications through November 15th, or until we run out of seed. Growers of all types can apply and first year applicants are awarded up to $2,000 of free seed. Don't forget – early planting is key to getting the most benefit as possible from your cover crop stand. Sign up today!

Feel free to contact me, Billy Synk, at Billy@ProjectApism.org for any questions regarding the Seeds for Bees program, cover crops, habitat, or bees/pollination. ◆

References:

Shroder, Shulamit and Kanter, Jessie (2021) Cover Cropping to Achieve Management Goals. Lessons Learned from Cover Crop Trials in the San Joaquin Valley. July 15, 2021. Progressive Crop Consultant.

USDA NRCS (2013) Soil Health Key Points

Prichard L., Terry (1989) Orchard water sue and soil characteristics. California Agriculture. July-August: 23-25

THE BEE BOX

A Window Into US Honey Bee Pesticide Exposure

The Bee Informed Partnership team often likes to use these "Bee Box" articles in Almond Facts to communicate insights and key findings about the country's honey bees derived from the Annual Colony Loss and Management Survey that Bee Informed Partnership (BIP) has been conducting since 2011. In this issue, I wanted to share with you results from another important survey that BIP participates in each year: The USDA APHIS-funded National Honey Bee Disease Survey. Each year, BIP Tech Team Field Specialists assist US apiary inspectors tasked with evaluating US commercial honey bee colony health, inspecting colonies and collecting samples that are evaluated for existing and novel pests, diseases, viruses, and pesticides. Conducting these studies each year makes it possible to look out for accidental introductions of pests and diseases known to be a problem in other parts of the world. It also allows researchers to track trends in honey bee health risks geographically and over time.

As part of this survey, both wax and pollen samples are collected from colonies and analyzed for 218 fungicides, herbicides, insecticides and varroacides of interest (and/or their breakdown products). Each of these samples tells a different story: because pesticide residues build up in wax, these samples provide a longer-term record of what pesticides the colony has encountered, whereas fresh pollen samples, which the bees have recently brought into the colony from foraging trips, reflect what pesticides the bees are being exposed to at that moment in their current environment.

Dr. Kirsten Traynor and her colleagues used the National Honey Bee Disease Survey pollen pesticide data to investigate trends in US honey bee pesticide exposure (Traynor et al. 2021). Specifically, the researchers wanted to examine how pesticide use has changed over time, to establish a baseline of current US honey bee pesticide exposure, and look for relationships between exposure to particular pesticides and/or pesticide combinations and the prevalence of other pests and diseases.

A multi-colored assortment of recently collected pollen. Photo credit: Anne Marie Fauvel.

To address these questions, Dr. Traynor examined pollen pesticide profiles from the 2011–2017 National Honey Bee Disease Survey, which is comprised of 1,055 apiaries representing 39 US states and Puerto Rico. In addition to the pesticide data, a subset of colonies had also been inspected for signs of disease, levels of the parasitic Varroa mite, the gut pathogen Nosema and eight viruses.

Pesticide risk was evaluated in several different ways: prevalence (occurrence), diversity (no. of pesticides present in a sample), concentration, hazard quotient score (a risk score based on pesticide toxicity and concentration) and an individual pesticide risk score. Each of these measures provide different insights into the individual and combined importance and impacts of pesticides on honey bee colony health risks. While there isn't room to discuss all their results, here are a few of their key findings.

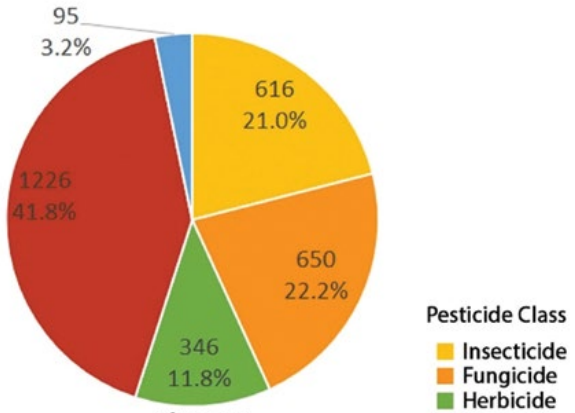

Figure 1.
Pesticide Class Diversity for all detections (n = 2,933)

How Common and How Many?

120 unique pesticides were detected from the 2011–2017 samples, with 81.9% of all samples containing at least one pesticide. The maximum number of pesticides detected in a single sample was 21, but the average was 2.78 pesticides detected per sample (Figure 1). While overall pesticide prevalence remained about the same across survey years, prevalence of the major pesticide classes — fungicides, herbicides and insecticides — did change, with insecticide prevalence decreasing, and both fungicides and herbicides increasing over time.

What, Where and How Much?

Sample pesticide concentration is measured in parts per billion (ppb) and is calculated by summing up the concentration of all the pesticides found in a sample. Average sample concentration was 600.3 ppb (± 82.0) with relatively few samples showing values above 1,000 ppb (indicating elevated risk).

Pesticide concentrations did vary across states, with some states showing averages above 1,000 ppb: California = 1,110.0 ± 228.7; Delaware = 1,228.1 ± 700.2; Indiana = 1,306.8 ± 999.7; New Jersey = 2,941.7 ± 1,475.7; New York = 1,239.3 ± 373.1; and West Virginia = 1,146.1 ± 753.8).

Varroacides: It is not surprising that the most commonly detected pesticides were the varroacides DMPF (the breakdown product of Amitraz; 45.38% prevalence) and thymol (20.63%), products currently recommended for beekeepers to use in colonies to combat Varroa. While varroacides were the most prevalent chemicals detected, with few exceptions they had little impact on pesticide risk in those samples. However, this was not in all cases, and beekeepers must continue to be mindful of the amount and frequency of varroacides they apply to their colonies.

Herbicides: Herbicides were found in about a quarter of the samples, and while they have increased in number and frequency during the study period, overall herbicide concentrations found in samples have not changed. However, a small number of samples in this study (8) had herbicide concentrations above 1,000 ppb for either atrazine, fluridone, propachlor or metolachlor.

Fungicides: The Fungicides were the second most commonly detected group of pesticides following varroacides. And the numbers are going up — the number of fungicides detected has increased over time from 4-10, and often more than one is found in a single sample. In fact, 9.4% of the samples that tested positive for fungicides contained 5 or more different fungicides — and nearly 1/3 of these were California samples.

Insecticides: Twelve insecticides were found the main contributors to the pesticide concentrations detected in the 52 "high risk" samples. These chemicals are therefore of greatest concern with regard to current colony health risks (Figure 2 lists these insecticides). Neonicotinoids were only detected in 2% of the samples. However, when they were present, they represented a large proportion of the overall pesticide risk to the colonies in which they were found. While it is encouraging that insecticide prevalence has declined over time, this study shows insecticides continue to occur in honey bee colonies, and are usually the pesticide responsible for the increased risk in "high risk" samples.

How Great is the Risk?

Agricultural producers face a multitude of harmful pests and diseases that they must manage throughout the year to keep crops healthy while also trying to maximize production. This often requires the use of one or more pesticides that, even when used appropriately, may pose some degree of risk to

honey bee health. This study has shown how US honey bee pesticide exposure has changed over the last decade.

It is encouraging that the vast majority of samples analyzed (~ 95%) fell into the "low risk" category, and of the remaining "high risk" samples (HQ score over 1,000), only 5 were classified as "extremely high risk" (HQ scores over 10,000). However, 11 insecticides stood out for having the greatest influence on sample risk scores (Figure 2). Fungicides were often frequently detected at high concentrations, and often multiple fungicides co-occurred in a single sample, particularly in California samples. Fungicide exposure has also been correlated with a number of other colony health issues, and given that the number, frequency and concentration of fungicides found in pollen is on the increase warrants greater attention be given to better understanding their effects on honey bees.

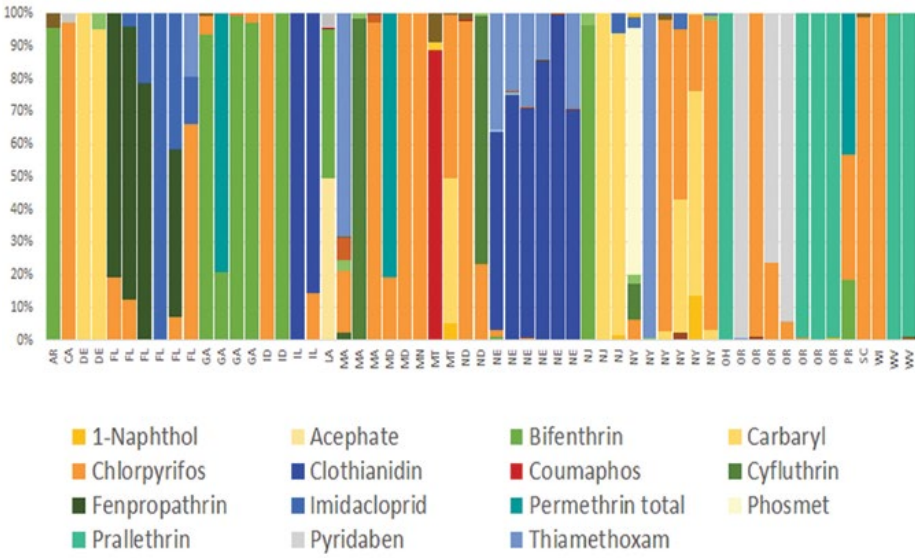

Figure 2: Pesticide Composition for high risk samples (HQ score > 1,000). Each vertical bar represents one sample pesticide profile. Bars are filled to reflect the percentage of the HQ Score contributed by each pesticide found in the sample. Reproduced from Traynor et al. (2021).

Jeri Parrent, Bee Informed Partnership Grant Coordinator

References:

Traynor, K.S., Tosi, S., Rennich, K., Steinhauer, N., Forsgren, E., Rose,

R., Kunkel, G., Madella, S., Lopez, D., Eversole, H., Fahey, R., Pettis, J., Evans, J.D., Dennis vanEngelsdorp, Pesticides in Honey Bee Colonies: establishing a baseline for real world exposure over seven years in the USA, Environmental Pollution, https://doi.org/10.1016/j.envpol.2021.116566.

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THE ALMOND BOARD

Cover Crop Resource Clarifies Confusion

In the past, many growers' experience with cover crops has started and ended with questions:

"How can I harvest my crop when there is extra vegetation on the orchard floor?"
"I heard having a cover crop in the middles increases the risk of frost damage — is that true?"
"Why would I plant cover crops to compete with blossoms and detract from bees' almond pollination?"

Formerly, these questions and lingering unknowns kept many growers from considering the use of cover crops in or around their orchards. Today, however, research is delivering answers — after ten years of investigating cover crops in almond orchards throughout the Central Valley and studying a variety of factors, answers to growers' questions have been addressed and are culminated in the Almond Board of California's (ABC) latest resource: the Cover Crop Best Management Practices (BMPs).

The Cover Crop BMPs summarize research funded by the Almond Board, the California Department of Food and Agriculture (CDFA), and others with the goal of defining and refining best practices for cover crops use in almonds. Authored by a team of University of California experts, led by Dr. Vivian Wauters, this guide outlines the production challenges cover crops address and the additional benefits they can deliver to the orchard. The BMPs then walk growers through the process of implementing cover crops, providing practical explanations of how to get started and scale up, as desired.

"This guide builds on recent research and growers' experiences which have shown that cover cropping is a feasible practice in California almond systems with potential benefits to growers and the environment. It provides guidance on how cover crops can be managed to address specific objectives and limit tradeoffs in commercial fields," said co-author Dr. Amélie Gaudin.

Plan, then Plant

Before purchasing new equipment for their operation, growers ask themselves, "How will this equipment make me more efficient in my day-to-day operations?" or "What does maintenance look like?"

The same approach applies to cover crops. Growers should know what their goals are for using a cover crop and then manage said crop based on those goals. Goals can be thought of in one of two ways: added benefits that cover

crops provide — such as reducing soil compaction or enhancing pollinator forage — or problems that cover crops help growers address — like reduced nitrogen losses, nematode suppression, etc.

After growers answer the question of what they want cover crops to accomplish — the purpose and desired benefits — they should look to their operation and consider their orchard's age, water source/s, existing pest concerns and other factors (further outlined in the Cover Crop BMPs) to select the crop species and mix/es that will work best within their orchard makeup.

"Growers have many options when choosing cover crop species and mixes, which can make species selection a difficult part of the process. While having a cover crop of any kind can provide some benefit, specific species and mixes can help growers to accomplish specific goals. That is why the BMPs encourage growers to first decide what they need and want from cover crops, and then move to identifying the mix/es and species that will facilitate accomplishing those goals," said Wauters.

Once growers select their species and mixes, the Cover Crop BMPs will walk them through step-by-step instructions and recommendations on how to seed the crop, grow it, and terminate it. From information on seeding equipment and rate to mowing considerations, this resource strives to address all aspects of growing, maintaining and reaping benefits from cover crops.

> *"This guide builds on recent research and growers' experiences which have shown that cover cropping is a feasible practice in California almond systems with potential benefits to growers and the environment."*
>
> *— Dr. Amélie Gaudin, Cover Crop Best Management Practices Co-Author*

"Cover crops are not a fit for every grower or every year, and generally depend on late fall rains or irrigation. But the benefit, together with incentives that can defray some of the cost, make it something every grower should at least consider," said Almond Board Chief Scientific Officer Josette Lewis, Ph.D.

"With this guide, we hope growers and allied industry members gain a greater sense of all that's involved with planting cover crops and the ways in which it can deliver optimizations to the orchard. And, like most things in life, at the end of the day growers will get out of it what they put in — more intentional management will lead to more prosperous outcomes."

Busting Myths, Spitting Facts

Throughout this resource, information is provided to address known, existing grower apprehensions or curiosities around the usefulness of cover crops and their ability to fit well within an orchard system.

In terms of concerns that cover crops compete with almond blossoms for honey bees' attention, industry-funded, ABC-directed research shows that flowering cover crops do not compete with blossoms for bee visitation. In fact, cover crops can enhance bee health by providing pollinators with a supplementary food source during times when pollen is not as ripe for the taking (before and shortly after bloom), giving bees more energy to pollinate during the height of bloom.

Further, among all of growers' concerns, the top perceived operational constraint to cover crop use is difficulty of harvest due to crop debris. However, as detailed in this resource, cover crops can be mowed to decompose fully and disappear by harvest. While specific timing varies by operation, if growers are intentional about managing their cover crops, they may be able to terminate their cover crop as early as mid-March (depending on their orchard's needs) to reduce water competition with trees and ensure a clean orchard floor for harvest.

If growers are still on the fence, the next best step may be to give cover crops a try on a small section of the orchard and monitor them for an extended period of time. Because cover crops species and mixes are so varied and able to address a series of challenges in orchards across the growing region, the best way to determine cover crops' success is to try it out.

And for an increasing number of growers, that decision has paid off.

"I'm a huge believer in cover crops — there are so many positives," said Chris Rishwain, an almond grower near Manteca who first planted cover

crops roughly three years ago. "The cost is minimal. It's definitely helped with our soil compaction. I see improvement during pollination. And ultimately, we get a lot of bees and a lot of pollination, and at the same time our beekeeper is happy and says the hive strength is phenomenal."

Fourth-generation almond grower and owner of Pacific Gold Agriculture, Ben King, has worked with cover crops for multiple growing seasons. In addition to the benefits he's seen in his orchard and toward both honey bees and natural pollinators, he believes that, "looking long-term, growers need to really consider the benefits of cover crops to their orchards — having a lot more organic material and increased water infiltration is a good thing, both in the present and looking 10, 20 years down the road."

Stay Tuned: Bee+ Scholarship Funds

To support growers in their efforts to promote pollinator health, ABC is offering its Bee+ Scholarship for the second year in a row. Last year, this scholarship allowed 135 new almond growers to join Project Apis m.'s Seeds for Bees program and added pollinator habitat to 14,778 acres of almond orchards, a 22% increase to the footprint of almond pollinator habitat from the prior year.[1]

There are two components to the scholarship: free cover crop seed provided to almond growers through Seeds for Bees, as well as a waived Bee Friendly Farming certification fee through Pollinator Partnership, the world's largest nonprofit dedicated to pollinators and their ecosystems.

The Cover Crop BMPs and more information on the Bee+ Scholarship can be found online at almonds.com/pollination. Growers are encouraged to visit the website and explore all the tools available to support pollinators and increase soil health. ◆

[1] https://www.almonds.com/about-us/press-room/almond-board-provides-seed-grants-support-pollinator-health-and-biodiversity

TIME TO CONSIDER

Fall management practices are key to a good start to the 2022 crop. In a drought year with no irrigation and salt management are priorities coming out of harvest. Now is also a good time to gather information and block out time to plan for next year.

In a Nut Shell:

- Keep at least adequate moisture in the root zone through the fall (and the winter).
- Take soils samples to assess salinity and toxic element (chloride, boron, sodium) risks.
- Manage root zone salt this fall/winter, where needed, if good to decent quality water is available.
- Plan to maximize rain-water infiltration with cover crops or volunteer vegetation along with soil amendments.
- Consider a fall micro-nutrient spray (boron and/or zinc) if tissue samples show a need.
- Take spur or shoot sample(s) beginning in November to look for dormant pests (scale, scab, etc.)
- Prep to plan for tough calls in 2022 if rain/snow fall is light this winter.

Planning for the 2022 crop should take tough choices head on. Depending on the water situation for individual operations, it maybe necessary to select which orchard(s) should be farmed or not farmed under different water availability scenarios. The final decisions may not have to be made until the new season starts, but doing the homework ahead of time will make for less stress when crunch time comes. The actual planning is probably a winter activity but information can start to be gathered now. On September 9, 2021, The National Weather Service released a forecast of 70–80% chance of a La Niña winter (2021–22) in the Northern Hemisphere. See forecast at: www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.shtml.

Irrigation is critically important through leaf drop to produce a healthy bloom and nut set next year. Moderate to high water stress after harvest, especially in September and October, can significantly reduce flower numbers and nut set next year. Adequately irrigated orchards this fall (and winter) should have the best net return potential next year.

How much water do almond orchards need after harvest? Applying more than 100% ETc will not make more flowers than the tree would naturally produce (but adding extra water based on a leaching requirement will help with salt management). However, moderate to high water stress will cause trees to fall short of the potential crop for next year. The target postharvest moisture level is -10 to -14 bars stem water potential (SWP) in a pressure chamber readout; that's low to mild stress based on UC research. Extended periods of moderate to high water stress (SWP of -14 to -30 bars) reduces photosynthesis and sugar/starch production for next year. Some leaf drop will occur when SWP = -20 to -30 bars.

Looking ahead to the late fall and the next column, if it's a dry winter and water is available, winter irrigation can benefit production next year. Buds are never really dormant (the trees look dormant but microscopic changes are occurring in buds through the winter) and high water stress anytime in the late fall/winter can delay bloom, possibly interfering with pollinizer bloom timing. Surprisingly little water (roughly 1") was needed to return dry almond trees to close to fully irrigated status in recent winter irrigation research by Dr. Ken Shackel (UC Davis). Orchard water use is very low when leaves are off the trees so a small amount of water, compared to in-season use, is needed to keep bud development and timing on track during winter.

The trick is that fall and winter irrigation are used to manage two separate, but related issues; orchard water status and salinity (general salts and toxic elements). While only a relatively small amount of water may be all that's needed to limit water stress through the winter, a root zone at field capacity going into the winter helps reduce salinity as any rainfall will dilute rootzone salts and, if there is good rainfall, help leach salts from the root zone (see below).

Salt management: Fall is an important time to begin salt management programs, which may be especially important this year with more groundwater used for irrigation. Talk with your CCA about irrigation practices that can reduce root zone salt levels (salinity as well as sodium and chloride). The Almond Doctor (David Doll) has a great new post on postharvest irrigation in a drought year. Read it at: thealmonddoctor.com/post-harvest-leaching-fractions-to-manage-salinity. For information on leaching requirement needed to avoid yield reduction in almonds see the UC ANR publication "Managing Salts by Leaching" available, free, at: anrcatalog.ucanr.edu/pdf/8550.pdf. Almonds are sensitive to rootzone salinity with a threshold of 1.5 dSm for average rootzone salinity beyond which yield is rapidly reduced. For example, average root zone salinity of 2.5 dSm can reduce almond yield by almost 20%.

Soil analysis for salinity and toxic elements (sodium, chloride and boron) is an essential step to determining the leaching requirement and planning salt management between harvest and bloom. Samples to 24" depth help assess rootzone health (pH, EC, boron, chloride and sodium) while deeper samples provide a check on leaching programs, especially if irrigation water contains enough salts for concern with salinity and toxic elements. For information on orchard soil sampling, there is a great video series with David Doll and Blake Sanden, both former UCCE Advisors, at: fruitsandnuts.ucdavis.edu/photogallery/Soil_Sampling_Video_Series.

As part of a salt management program, consider irrigating in the rain. Having the irrigation water running while the rain is falling allows dilution of existing salts with rainwater and field capacity is reached more quickly allowing more rapid movement of salt out of the root zone than if just one water source (rain or irrigation) is available. If heavy rainfall is forecast, then irrigating is not recommended as the combination of rain and irrigation could saturate soils for extended period of time, harming root health. This is particularly a problem in poorly drained soils. Irrigating in the rain is especially important for salt management in orchards with buried drip irrigation.

Planting cover crop in organic planting. Photo: Franz Niederholzer.

Infiltration: Growers can take steps to improve rainwater infiltration and get more, relatively clean, "free" water into orchard root zones this fall and winter. Fast growing winter cover crops or resident vegetation help soften rain drop impact on the soil, reducing soil surface sealing and moving rainwater into the soil along root channels. Orchards with micro-sprinkler irrigation are at an advantage when planting a cover crop in low water years compared to drip irrigated orchards as small amounts of irrigation can help establish the cover crop. For more information on cover crops, check out the free publication on cover crops in almonds at: www.almonds.com/sites/default/files/2021-06/ABC_CoverCropBMP_8.5x11_vmags.pdf.

To save water if it's a dry winter, when should orchard floor vegetation be removed? While green plants do use some water through the winter, improving infiltration (storing water, leaching salts) and improving orchard access (less ruts) should make orchard floor vegetation a net water plus through the winter. Removal of orchard floor vegetation to save water during the growing season should occur between mid-January and leaf out, but not before then.

Spreading gypsum should also improve rainwater infiltration and reduce runoff, and also help release sodium from the

cation exchange sites into the soil solution where it can be leached from the root zone.

With all the challenges of the 2021 season, maintaining irrigation systems may not have gotten much attention. Fall is a good time for irrigation system maintenance. See "Maintaining Microirrigation Systems" UC ANR publication no. 21637, for information on drip and micro-sprinkler system maintenance. It is available online ($20) from anrcatalog.ucanr.edu or your local UCCE office.

Spraying Boron and Zinc, November scene. Photo: Franz Niederholzer.

Nutrition is an important consideration in the fall, although the focus shifts from macro-nutrients (nitrogen, potassium and phosphorus) to micro-nutrients such as boron (B) and/or zinc (Zn) as adequate levels of these essential elements are critical to bud break timing and function.

In the fall, the effective method of B and Zn delivery is a foliar spray. Fall timing of soil B application did not increase flower B levels the next year in several years of research in almonds.

Where needed, fall foliar B can significantly increase nut set next year and so deliver the best return on investment of any fertilizer. The goal of fall B spraying is to increase flower B levels and nut set. Soil applied B in the fall will not get to the buds in time to make a different in set next February.

The general recommendation is for 0.4 lb actual boron/acre (for example 2 lb/acre of a 20% B material such as Solubor®) if hull levels are under 120 ppm boron. Dr. Patrick Brown (UC Davis) believes there may be a benefit to using lower rates of foliar boron (for example, 0.2 lb actual B/acre = 1 lb Solubor®/acre) if hull levels are between 120-200 ppm B. Hull B levels of 300 ppm B or greater indicate toxic levels of B in the orchard and no additional B is advised.

Fall or early bloom ('pink' timing) B sprays are equally effective in increasing nut set. However, under drought conditions, I prefer the fall timing. Bloom sprays are applied to protect flowers from disease infection. Research shows that 'pink' timing of foliar B improves set, while spraying later in bloom when more flowers are open can reduce set. But, in a dry bloom, the 'pink' spray can be skipped to save an application (and fungicide costs) and so the best boron application timing may be missed and possibly applied at a time that could harm set.

Fall is also a good time for foliar zinc (Zn) spray, particularly if no Zn was applied the previous season. Higher rates of zinc (for example, 20 lbs/acre zinc sulfate) in late October or early November gets zinc into the trees and can defoliate trees and so helps with foliar disease management. In my experience, a high rate of zinc sulfate doesn't accelerate defoliation in dry fall weather, but a little rain ahead of the spray helps increase relative humidity and improves defoliation. If the goal is to get zinc into trees while maintaining a healthy leaf canopy to support carbohydrate storage for next bloom, a lower rate of zinc (for example, 5 lb/acre zinc sulfate) in October is an option.

Sodium borate (Solubor®-type materials) and zinc sulfate can be tank-mixed, but keep the solution pH below 6 with an organic acid material (Trifol®, MixWell™, etc.) to avoid a low grade incompatibility (light brown haze to the spray mix) and reduced boron response.

What about nitrogen (N) fertilizer in the fall? Unless the orchard showed low to deficient N levels in the July leaf sample, fall N application may not be needed. In 3 years

of field trials in the Sacramento Valley, soil applied fall N did improve yield next year in orchards with good production and adequate leaf N levels in the summer leaf samples. If you want to apply N, use a low rate (for example, 20–30 lbs N/acre). Why such a low rate even if trees are low in N? Flower bud differentiation has already occurred, so any N applied now simply goes to storage for the next spring and even deficient trees have limited storage space.

Dry potassium fertilizer can be applied in bands or targeted broadcasting down the tree row in the fall. The conventional maintenance rate of potassium sulfate (SOP) in mature, productive orchards is 400–500 lbs fertilizer per acre. If the soil has a lower capacity to hold potassium (cation exchange capacity), then the dry, fall applied rate should be scaled back to avoid the risk of K leaching.

Dry K fertilizers are generally less expensive per acre than liquid K products that are usually injected with irrigation water during the growing season. However, fall applied dry materials require rain or irrigation to incorporate the fertilizer so K is available to the trees next spring. Dry fertilizer bands can be scattered by sweeper passes used in orchard sanitation and/or to clear away leaves before spraying preemergent herbicide(s).

Pest management practices in the fall are mostly focused on monitoring and preparing for winter practices. Big issues are mummy counts to decide if/where orchard sanitation for navel orangeworm management is needed, early dormant spur sampling for scale, and weed surveys to evaluate the weed management program last year and plan for the next one.

Now, more than ever, orchard sanitation is important. Inshell almond prices are UP. Navel orangeworm (NOW) standards for inshell almonds are high, meaning low damage is critical for gaining the inshell premium. Orchard sanitation is the foundation of NOW management. Fall is the time to plan and prep for orchard sanitation.

Once leaves are out of the trees, count the mummies in 20 trees per orchard. The target is 2 mummies or less per tree by February 1, with very low numbers (0.2 mummies per tree and less than 4 "grounder" mummies under each tree) suggested in high pressure areas. Keep final mummy counts under these thresholds for best results next harvest. If shaking doesn't get the mummy numbers down below recommended levels, consider polling with hand crews — especially in areas with a high damage history (and/or high income potential). Growers with "dirty" neighbors might consider sharing sanitation costs with those neighbors to reduce damage potential.

Weed monitoring is another important task in the late fall and into winter. A careful weed survey after the first winter rains is the first step in effective weed management. Different herbicides work differently on certain weeds. You and/or your PCA need to know what's out there to match up the proper herbicide and/or practices for best control. See details and examples of seedling weeds at: ipm.ucanr.edu/PMG/C003/m003pcweeds02.html. Once target weeds have been identified, consider timing and materials for preemergent control for the coming season. Post emergent sprays can be used with preemergents as well as applied next year once rains have passed. Preemergent sprays should be applied to clean, bare soil. Herbicide(s) can attach to the leaf litter and not end up on the soil, reducing weed control.

Talk with your PCA about preemergent materials/programs in young orchards. Water, nutrients, and sunlight make for "great" weed growing, and repeated post emergent "burndown" applications can be expensive (materials and time).

How and where herbicides are applied can make a difference in orchard health going into the new year. To make sure the labeled rate of herbicide is applied, remind operators to shut off the booms before slowing down at the end of the row and not until operating speed is reached when starting to spray. Shutting off herbicide spray at the end of the row avoids excess application that may harm trees and leaves of good infiltration veg strip at the end of each row, helping "bank" rainwater.

Once leaf drop starts (November), spur samples should be taken to look for scale and scab. If control of either of these damaging pests is needed, a pre-bloom (dormant or delayed dormant) spray can deliver excellent control. Details

on dormant sampling including economic thresholds for treatment can be found at: www2.ipm.ucanr.edu/agriculture/almond/dormant-spur-or-first-year-twig-sampling-and-treatment-guidelines.

Although it was a drought year and foliar diseases not widespread issues, monitor leaves for shot hole and rust in late October (info at: www2.ipm.ucanr.edu/agriculture/almond/postharvest).

Good pollination is critical in every year. Strong hives (8 frames of bees or better per hive) deliver significantly better pollination than weak hives for a few dollars more per acre. Late fall is a good time to sign a pollination contract (including hive strength language) to lock in that key service ahead of bloom. Waiting for a "deal" for bees might leave you without good pollination in the field next bloom.

Consider planting a bee pasture this fall to feed bees next spring. Grower resources and seed available at: www.projectapism.org/seeds-for-bees-for-the-grower.html.

Pruning/roping young trees is important to good tree structure and future production. Without careful early pruning and (where needed) roping there is a significant risk of limb breakage through wind torque and/or crop weight. Select a limited number of scaffolds (3, maybe 4) up and down the trunk and as evenly distributed around the trunk as possible. There is no cost savings in skimping on pruning scaffold selection. See a video from Dr. Katherine Jarvis-Shean (UCCE Sac/Solano/Yolo Counties) on pruning young almonds at: www.youtube.com/watch?v=LraGW0FCbi8.

Pruning potted trees planted in late summer this year can be particularly challenging. If trees were not pruned at planting and go into winter with a many scaffolds (with bad angles) near or at the top of the trunk, even with good shoot and trunk growth, consider cutting off all scaffolds and letting the tree push new ones up and down the trunk next spring. There is an excellent chance that you will be happier with the results. Wes Asai, private consultant in the Turlock area and former UCCE Farm Advisor, has a great column on early pruning (growingproduce.com/nuts/how-to-give-your-almond-trees-the-right-support). Finally, great pruning information can be found in the Young Orchard Handbook (sacvalleyorchards.com/manuals/young-orchard-handbook).

Is there a "best time" to prune almonds to avoid pruning wound infection? Recent research in Dr. Florent Trouillas' lab

November orchard scene. Photo: Franz Niederholzer.

(UC Extension Specialist) showed that pruning in December resulted in less canker disease infection than in the fall. Pruning wounds were most vulnerable to infection right after cutting. Infection susceptibility decreased by 60% at 2 weeks after pruning and 75% after 3 weeks from pruning. In field trials, Topsin-M provided the best pruning wound protection (82% infection reduction). Rain is needed to carry disease spores and allow infection, so cuts should be sprayed ahead of forecast rain.

Nematode sampling: Don't push out an old orchard that you plan to replant in the next couple of years without sampling for nematodes before the orchard goes out. Careful sampling and sample care (nematodes are living things) is important. Consult with your PCA about sampling, analysis and evaluation of the results.

Look through orchards to check general appearance of the trees and soil. Local areas of early leaf drop or limited shoot growth may indicate a need for attention. Encourage your PCA/CCA and key employees to do the same and compare notes. This information helps direct work to improve tree performance in certain areas of the orchard, which should improve the bottom line for the whole planting.

Best wishes for a productive, restful, and WET fall and winter. ◆

Franz Niederholzer, UCCE Farm Advisor, Colusa and Sutter/ Yuba Counties

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