CAPCA ADVISER

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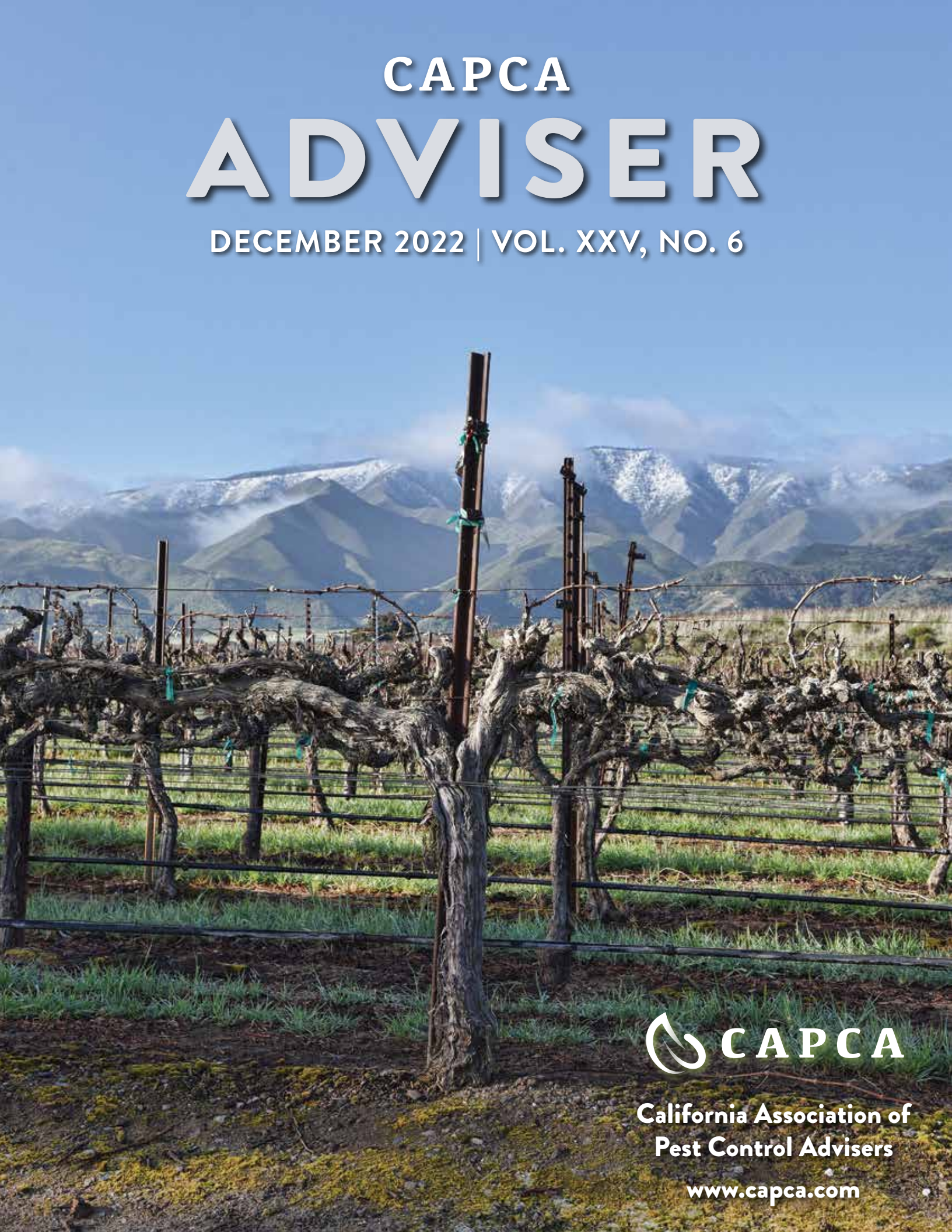

CAPCA

California Association of Pest Control Advisers

www.capca.com

The technology that's a wake-up call for dormant oil users.

With market conditions putting stress on the availability of dormant oil, now is the time for growers to be proactive in protecting their trees and their livelihood.

VINTRE adjuvant is specifically designed to improve spreading and wetting on trees and vines. When combined with dormant oil, it delivers superior coverage and effectively reaches nooks and crannies for better protection using less oil. It can also be applied with other pesticides for maximum protection from damaging pests.

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- ✔ One label for multiple uses
- ✔ Ease of use via stable formula, short contact time & no additional rinse
- ✔ Tank-mix friendly: boosts fungicide performance

TANK MIX WITH

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CAPCA
AT THE CENTER OF PLANT HEALTH

Welcome Back Magic!

We absolutely felt the "Welcome Back Magic" at the 48th Annual CAPCA Conference & Agri-Expo, and we hope you did too! There was a spirit in the air of returning to in-person meetings and catching up with colleagues and old friends while making new connections.

The Annual Conference & Agri-Expo returned in full force this October, with nearly 1,500 attendees. During our member luncheon in Anaheim, we took a few moments to acknowledge the 50th Anniversary of the PCA license and those original licensees still working among us. It was a pivotal moment, the relaunch of our Student Networking Event (on hold since 2020) brought students back to Conference, alongside PCAs in all stages of the career, and recent retirees. CAPCA has the capacity to not only meet PCAs across these milestones, but to grow with them as the license continues to evolve.

While CAPCA celebrated the 50-year milestone for the license this year, we look forward to another milestone for CAPCA in 2024: the 50th Anniversary of the CAPCA Annual Conference, to be held in Anaheim, October 13-15, 2024. We'd love to hear your Conference stories and favorite memories – from the early days of attending Conference, decorating your booth to match the theme, or serving on the Conference planning committee. Please email them to us at conference@capca.com. We know a lot has changed over the years, but one thing remains the same: the CAPCA Annual Conference is the premier Agri-Expo Trade Show for PCAs!

Thank you to those who attended and put the magic in the air. We can't wait to see you again soon!

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MISSION & PURPOSE
California Association of Pest Control Advisers (CAPCA) is a non-profit voluntary mutual benefit association that represents 75% of the 4,000 California EPA licensed pest control advisers. *CAPCA's purpose is to serve as the leader in the evolution of the pest management industry through the communication of reliable information.*
CAPCA is dedicated to the professional development and enhancement of our members' education and stewardship which includes legislative, regulatory, continuing education and public outreach activities.

PUBLISHING INFORMATION
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CAPCA
AT THE CENTER OF PLANT HEALTH




PCA 2072

By Patrick Dosier

While CAPCA celebrates the important milestones of the past 50 years of the PCA license, I'll ask you to join me in one of my favorite pastimes: imagining the future. Please, step inside my pickup time machine and we'll visit farms in California in the year 2072.

As you recover from the disorienting effects of time travel, you recognize we are in a small valley surrounded by dry, golden hills. This certainly looks like California, but it's not somewhere you recognize. The valley bottom is still quilted by a patchwork of productivity. There are row crops, permanent crops, large poly tanks filled with what looks like algae, and there are varying types of greenhouses & hoophouses. It appears that controlled environment agriculture (CEA) continued even after it was over-hyped by Silicon Valley back in the '20s.

Some of the farmland, er... infrastructure, is unrecognizable. A form of photovoltaics occupy about 10-15% of the land. There are also massive, yet empty, reservoirs scattered across the landscape. We approach a worker to learn more. The worker patiently explains that these are groundwater recharge basins. The basin captures the annual flood waters flowing from the mountains and recharges the aquifer. Some are placed where there is a permeable route to groundwater, but most have reverse-flowing recharge wells which actively recharge the deep aquifers. You comment that the massive scale seems like more water than these local farms can use, and he informs us that, "These basins generate aquifer recharge credits, or ARCs. The irrigation district sells some of the water, and most of the credits to Los Angeles."

We decide to move on and get a closer look at the dizzying variety of autonomous equipment in operation. Together, we observe small electric rovers outfitted with an array of sensors. We marvel at medium-sized laser weeders, as they appear to roam the landscape zapping everything that is not the primary crop or a cover crop. Finally, we spot the familiar green tractor working some marginal ground on the foothills and we decide to investigate. We find a Deere 10000 series, but there is no operator to flag down! It is fully autonomous, so we are forced to guess at the rest of the details; it is not diesel-powered but has large fuel-tanks. We assume it must be hydrogen-powered. The implement it is dragging is exceedingly complicated as it appears to lift and loosen the soil profile without disturbing the topsoil. We note that the machine is planting a crop into the thatch. Neither of us recognize the type of seed, but the tractor provides a clue: "Property of Aviation Fuels, Inc. A subsidiary of United American Airlines" is emblazoned on its side.

Hunger strikes, so we stop by the local café for a bite. It looks like your typical greasy-spoon diner, but inside we find a dusty self-serve kiosk in place of a waiter. Besides us, the place is empty. We notice some magazines on the counter! As we wait for the robot to wrap our breakfast burritos, we dive into the media. You find a recent print issue of the CAPCA Adviser and read about the latest pest control platform to be approved by California's Department of Sustainable Pest Management (DSPM). We surmise that the technology is related to the gene drives that were just being discovered back in our time. Apparently, now manufacturers develop their fundamental approach and then apply for "broad technical approval" status from the US EPA and DSPM. This pre-approved fundamental technology becomes the platform on which hyper-specific end uses are built. PCAs determine which biotypes of which pests are present and then the manufacturer creates a hyper-specific mode of action, or a combination of modes, for the pest spectrum present. This mass customization requires only a simple notification to regulators as the state-of-the-art production facilities churn out these hyper-specific prescriptions on a small-batch basis. Most manufacturers promise delivery, by drone of course, less than 24 hours after a PCA submits a recommendation!

Next, you notice a tablet device inscribed with, "Property of The Los Angeles Bee." Hesitantly, we decide to read the headlines. Our collective minds are blown by all that we read, but we decide to stay focused on what the media reports about agriculture. We are surprised by the sheer number of ag-focused articles, maybe a third or more of the content

relates to our industry. More surprisingly – it is all positive! From the International Section: "Alliance of California Ag industry and charitable organizations ship 25 gigacalories to save Europeans from ravages of winter." From the Business Section: "As Ag markets close near all-time high, industry execs promise to reinvest in food-system resilience and healthy soils." From the Travel Section: "Why a weekend on a Central Valley farm is just the luxury your family needs." We fist-bump as we realize that the Ag industry has flipped the narrative!

Just as our burritos slide down the "Order Up" slot, another customer walks in. She appears to be on a phone call, without a visible device, and we can't avoid the opportunity to eavesdrop. After just a few moments, the pattern of this conversation becomes clear. This is a PCA on the phone with her grower! They're discussing pest issues, fertility plans, and market conditions. She ends the call with a promise to flick over the required documents later that afternoon. After she orders, we strike up a conversation by telling her that we are PCAs from the past and asking her what her work looks like in 2072. We share some of what we have witnessed today, and she remarks that she is involved in all of it. She manages irrigation sustainability plans, she crafts the precision fertigation algorithms, she identifies the biotypes of pests and orders the pest control solutions, and she documents all the environmental benefits that her growers' farms create. As we go on talking shop and sharing a meal, she remarks that, "Today, PCAs are still at the center of it all. We remain the grower's most trusted technical resource. I just can't understand how you old-school PCAs managed it all without automation! The sheer volume of data coming at you, the complexities of the environment and the markets, the personalities of growers… I feel stressed out, and I have 4th generation artificial intelligence to help me. PCAs from the '20s must have been incredibly smart, tough, and hard-working!"

We couldn't agree more. ■

CAPCA
AT THE CENTER OF PLANT HEALTH

Mission & Purpose

CAPCA's mission is to facilitate the success of the PCA and to represent our 3000 members who provide pest management consultation for the production of food, fiber and ornamental industries of California.

CAPCA's purpose is to serve as the leader in the evolution of the pest management industry through the communication of reliable information.

CAPCA is dedicated to the professional development and enhancement of our members' education and stewardship which includes legislative, regulatory, continuing education and public outreach.

Photo: © Fred Rehrman, Elysian Fields

2022 CAPCA CONFERENCE RECAP

48 Annual CAPCA Conference & Agri-Expo

The **48th Annual CAPCA Conference & Agri-Expo** was a wonderful opportunity for more than 1,400 PCAs and guests to learn, network and have fun. The theme of the conference this year was *"Welcome Back Magic."* We had a great time welcoming everyone back, meeting new people, reconnecting with old friends, and learning new things. Thank you to all who welcomed back magic with us through their attendance, sponsorships, exhibits, and educational presentations!

Our focus continues to address the professionalism and ongoing efforts of our membership to provide protection and stewardship of the largest, most varied agricultural industry.

Mark your calendars! CAPCA looks forward to seeing you next year at the 49th Annual CAPCA Conference & Agri-Expo, October 15-17, 2023 at the Grand Sierra Resort in Reno, Nevada.

Welcome Back Magic!

48th ANNUAL CAPCA CONFERENCE & AGRI-EXPO

SCANNING IN / SCANNING OUT

2022 CAPCA CONFERENCE RECAP

2021-2022 CAPCA Executive Board
(L-R) Matt Bristow (Treasurer), Paul Crout (Vice Chair), Patrick Dosier (Chair), Rick Harrision (Ex-Officio), Jennifer De Jong (Secretary).

A Very Special Thank You to

Corteva Agriscience

for the donation of t-shirt sales of $1,920 to the Stanley W. Strew Educational Fund for scholarships!

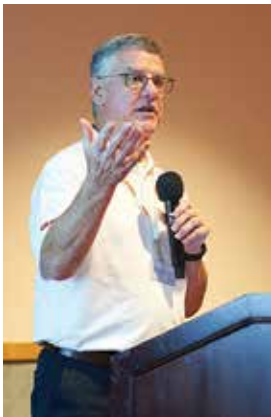
2022 STUDENT NETWORKING EVENT

October 9, 2022

This year's Student Networking Event at CAPCA's Annual Conference & Agri-Expo was well attended by students, industry professionals, and CAPCA Chapter representatives.

An important and ongoing part of CAPCA's mission is to share with students the opportunities, importance, and value of the PCA profession. The Student Networking Event serves to connect students with Industry companies and their PCAs, so that the next generation is aware of the many benefits the PCA pathway provides.

CAPCA would like to acknowledge our 2022 Student Networking Event Title Sponsor, FMC, along with program partners BASF, UPL, WARP, and Wilbur-Ellis.



THANK YOU 2022 CONFERENCE SPONSORS

Stoller Solutions

ABOUT STOLLER

Stoller has a 50+ year history of helping growers increase productivity and return on investment (ROI). Based in Houston, Texas, we are a U.S. company known internationally as the global leader in plant science and plant physiology, with 17 subsidiaries and sales in over 70 countries.

We are proud to help growers feed more people, and we do it by helping them increase their farm productivity and by maximizing the genetic expression of their crops. We understand the factors that limit yield and how to provide solutions to overcome those challenges. Stoller's products and technology are proven to ensure optimum plant growth so our growers get the most out of every acre - no matter what challenges or conditions they face during the season.

TRIAL OBJECTIVES

Evaluate the effect of different registered nutritional materials on strawberry growth, health, quality and yield.

TRIAL INFORMATION

Location: Shafter Research Station, Shafter CA (2019-2020)
Cultivar: San Andreas
Treatments:

- Grower standard practice (GSP)

a. 20-10-10 (1.88 qt/ac weekly)
b. Potassium Thiosulfate (1.32 qt weekly)

- GSP + Stoller program

a. Stoller Root Feed® Dry (10 lbs /ac every 10 days)
b. Stoller® Grow (8 fl oz/ac through drip)

Parameters Measured:
Canopy growth, leaf chlorophyll and nitrogen, fruit sugar, fruit firmness, heat stress, and fruit yield.
Statistical Analysis:
Data analyzed using analysis of variance in Statistix software and significant means were separated using the Least Significant Difference (LSD) test (alpha = 0.05).

RESULTS

Stoller programs had significantly higher marketable yields per plant compared to the GSP (Figure 1). This was attributed to an integrated nutritional approach. Furthermore, unmarketable yields were not significantly different compared to the GSP.

Figure 1. Strawberry Marketable Yield (lbs of berries/ plant). Means with different lowercase letters are significantly different

There were no significant differences between the Stoller program and the GSP in canopy growth, leaf chlorophyll, leaf nitrogen content, response to heat stress, fruit firmness and sugar content. Therefore, results of this study indicate the significant value of using a sound nutritional program to maximize yield potential without negatively affecting fruit quality.

Stoller program increased marketable yield by 24.9% while maintaining overall plant and fruit quality. Stoller program showed return on investment of 45:1

Products may not be registered in all states. Please contact your Stoller Representative, visit our website, or contact your state's agricultural regulatory agency for registration status. Always read and follow label directions. Conduct a "jar test" using all products in proper proportion in order to establish physical compatibility. Many factors contribute to crop performance and return on investment. Results not guaranteed.

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Yara North America

48 Annual CAPCA Conference & Agri-Expo

Nu-Film® P

IT'S TIME TO CELEBRATE SUCCESS

The buzz and energy throughout the restaurant, the classic sound of the cork popping and the smooth steady pour of your favorite selection and vintage. It's truly the total experience of the moment, all of those seemingly small details and decisions that build to the peak, that moment of enjoyment when you take the first sip of your favorite wine. Just as the taste of the 'vino' depends upon the quality of the ingredients and the process, so too does the production of wine grapes for that special said wine. To produce a remarkable vintage, it all begins with using high quality inputs and management practices.

The process to produce a crop of wine grapes is a journey that never actually ends. As one season ends, the preparation for the next season has already begun. This management of nutritional inputs, the timing of agrochemicals and a host of other responsibilities is critical. Each of these key agronomic points can at times benefit from some additional help to further improve quality or efficacy. **Enter Nu-Film® P Spreader Sticker.**

Nu-Film P is a superior deposition, spreader and sticker adjuvant with non-ionic properties made possible by the proprietary Miller technology known as Pinolene®. Our high-quality adjuvant provides not just an OMRI approved organic option for your adjuvant needs, but a number of additional and equally valuable benefits.

APPLICATION PROTECTION

Each agrochemical application made with the addition of Nu-Film P benefits from the Pinolene technology in that not only is the consistency of deposition improved, but also the retention. Within the first hour after application, a thin protective film is formed over the applied agrochemical. This protective layer reduces the loss of product through rain, wind, ultraviolet degradation, volatilization, or other potential methods. By minimizing this unwanted loss of product, Nu-Film P helps you get the most efficacy out of your applications and the most value out of your total investment.

ENVIRONMENTAL STEWARDSHIP

Along with being OMRI certified, Nu-Film P is proud to be non-toxic to honeybees*. While grape vines are able to self-pollinate, the preservation of honeybees is of the utmost importance to agriculture as a whole. Bees serve as the pollination source to a large majority of other key agricultural products. By selecting a product that isn't damaging to honeybee populations and following the labeled guidelines of all tank mix partners, these critical members of modern agriculture will continue to not only survive but thrive.

APPLICATION FLEXIBILITY

The final key benefit of adding Nu-Film P to your wine grape crop production program is the flexibility with which it can be used. Able to be combined with both water and oil-based tank mix partners, you're able to take the guesswork out of which is the most effective adjuvant to use in your applications. There is never a shortage of questions throughout the season, but which adjuvant to use shouldn't be the one that keeps you up at night.

Given the tremendous number of adjuvant options available, consider adding Nu-Film P to your next wine grape management season to simplify and improve your operation.

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CAPCA ANNUAL AWARDS

ADAM TAVARES
2022 MEMBER OF THE YEAR

2022 AWARD

CAPCA's Member of the Year is an annual award bestowed upon a member and licensed PCA who excels in their contribution to the profession through CAPCA activities and leadership, above and beyond the norm. The 2022 recipient of the CAPCA Member of the Year Award is Adam Tavares.

The nomination by Fresno-Madera Chapter said, in part: *"Adam has been incredibly involved with CAPCA over the last six years and has proven his desire to elevate the PCA profession as an educated, zealous representative of Agriculture."*

Adam has been a PCA since 2009, after graduating from Fresno State with a BS in Plant Science. Adam began his career at S&J Ranch (until recently, Wonderful Ag Management) where he was a PCA and then Manager of Technical Services and Spray Operations. After eight years there, he moved to Monsanto for 2-1/2 years, covering Northern and Coastal CA. Currently, Adam is a sales rep for Amvac, covering their product line through retail locations in Kings, Tulare, Kern and parts of Fresno counties.

After sharing his frustration over regulations impacting PCAs' ability to thrive, Adam found his passion to make change with the Government Relations Committee over the last four years.

In 2021, he stepped up as the Co-director of the Government Relations Committee and, over the last two years, has been fighting to keep tools in the PCA toolkit with integrity and well-thought-out tactics. His leadership has pushed us all to commit more time to connecting with legislators, telling our story, and fighting for our license.

Adam has also supported the next generation of PCAs, first starting at the chapter level mentoring Fresno State students at Conference, then presenting at the Student Networking Event every year since its inception, and most recently as an adjunct professor at College of the Sequoias, teaching students about citrus production and connecting them with the industry.

Adam is committed, from chapter responsibilities to state governmental change, to paving the way for the next generation. Adam has given his all to bringing a fresh perspective to CAPCA and is most deserving of recognition through his volunteerism and leadership as the 2022 CAPCA Member of the year.

D WINNERS

DR. JOHN PALUMBO

OUTSTANDING CONTRIBUTION TO AGRICULTURE AWARD

CAPCA's Outstanding Contribution to Agriculture Award is given to those individuals, companies or organizations that have made a meaningful difference in support of California agriculture. The 2022 recipient of the Outstanding Contribution to Agriculture Award is Dr. John Palumbo.

Nominated by the Desert Valleys Chapter, Dr. Palumbo has worked over the past 32 years, as a professor and extension specialist in the Department of Entomology at the University of Arizona. Dr. Palumbo has worked collaboratively with scientists from the University of Arizona, University of California, USDA-ARS and Industry to develop pest management alternatives and educational programs for several invasive species in the western U.S. These efforts have resulted in hundreds of scientific publications, book chapters, and extension bulletins. He has delivered over 700 presentations to growers, PCAs and agri-business interests during his tenure on a wide range of topics on vegetable IPM and reduced-risk insecticides.

John is an Arizona native and received his BS in Agricultural Science (1982), and MS in Entomology (1985) from the University of Arizona, and a PhD in Entomology from Oklahoma State University (1989). He joined the department in 1990 as a faculty member at the Yuma Agricultural Center where he has developed an internationally recognized extension and research program in IPM for desert vegetable and melon crops.

His primary interest is in examining the chemical management of insects and investigating techniques to better use new insecticides for crop protection. His program goals are to optimize insecticide performance in IPM programs by understanding novel insecticide chemistries and their interactions with the target pest and cropping system.

It is with much honor and respect that CAPCA recognizes Dr. John Palumbo as our 2022 Outstanding Contribution to Agriculture Award recipient.

2023 CAPCA Spring Summit

April 25-26, 2023
PECHANGA RESORT CASINO | TEMECULA CA

CAPCA's Annual Spring Summit returns to Temecula in 2023
as a one and a half day event!

REGISTRATION INFORMATION

Pre-Registration is Online Only
(runs from 1/16/23 to 4/18/23)

	MEMBER	NON-MEMBER
Early Rate *(By 3/7/23)*	$200	$250
Standard Rate *(After 3/7/23)*	$250	$300
Onsite* Rate	$275	$350

**Onsite Registration is first come, first served*

Sponsorships Available

In-person Label Updates, Product Profile, & Exhibitor Opportunities Available

For more information:
https://capca.com/spring-summit/

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NEW IRAC GROUP 32

emPOWERed by Purpose

In the evolution of agricultural environmental science, Vestaron is leading an innovative, sustainable peptide-based revolution in crop protection. We are committed to providing powerful novel solutions for growers to overcome resistance without sacrificing performance or safety — emPOWERed by peptides for sustainability of farms, farmers and the planet.

Peptides are an example of natural product chemistries that can possess pesticidal properties. A peptide consists of several amino acids linked together by a peptide bond between amino and carboxyl groups of two adjacent amino acids. Amino acid composition and sequence in a polypeptide chain determine its two and three-dimensional folding and thereby, its biological function and stability. An important class of natural toxins is disulfide-rich peptides known as knottins. The knot-like three-dimensional fold of these mini-proteins provides them with exceptional chemical and thermal stability and resistance to degradation.

Peptide neurotoxins possess high affinity and specificity for target receptors and ion channels in the insect nervous system. In contrast with other bioinsecticides, which are often slow-acting, knottin-peptides are fast-acting neurotoxins. In addition to being insecticidal, some knottins have exceptional selectivity, being lethal to key agricultural pests but harmless to vertebrates and beneficial insects such as bees. The intrinsic oral activity of these peptides, combined with the ability to penetrate insect spiracles, has enabled them to be developed commercially as eco-friendly bioinsecticides. However, while the large size of these 30-50 amino acid peptides improves their specificity to the target receptor, it decreases their bioavailability and uptake through insect gut membranes. To improve bioavailability of peptide actives via ingestion, tank mixing with Bt or another facilitator is required.

Utilization of insecticidal peptides in modern agriculture requires a manufacturing system that allows production of a desired peptide in large quantities. Development of an expression system with yeast cells has facilitated production of complex knottin-peptides in large scale fermentation. Even though the commercial end product contains the pure peptide alone without any GMO yeast, peptide insecticides produced in yeast expression systems are not allowed for use in organic production.

Spear®-Lep is Vestaron's revolutionary insecticide for tree nuts, fruits, vegetables, and other high-value field and orchard crops. Targeting lepidopteran pests, local field trials with Spear-Lep show performance that is **equal to conventional insecticides in efficacy and residual control**. With no known resistance or cross-resistance, Spear-Lep works as a standalone treatment or as part of a traditional IPM program against Navel orangeworm (NOW) in almonds and other tree nuts.

2023 Stanley W. Strew Educational Fund, Inc.

SCHOLARSHIP

A scholarship opportunity will be available beginning in December 2022 for students interested in careers in the pest management industry. The scholarship is sponsored by the California Association of Pest Control Advisers (CAPCA) and is administered by the Stanley W. Strew Educational Fund, Inc.

The CAPCA Scholarship will provide $3,000 to a selected college student actively engaged in a PCA career pathway. The scholarship recipient will be selected by the SWS Board of Directors.

Applications are available for students who are currently attending college in an agricultural/horticultural related field or who are entering or returning to college in an agricultural/horticultural related field in the fall and will have a junior level status.

Nominees should submit a completed application form and copies of their transcripts. ***Applications must be postmarked no later than May 5, 2023*** and submitted with required letters of recommendation so that the committee can make final selections. The student selected will be notified in July.

For application information please contact CAPCA at (916) 928-1625 or email scholarship@capca.com

https://capca.com/scholarships-awards/

Photo: Fred Rehrman, Elysian Fields

ADVERTORIAL

Where California grows best.

We are a highly trained, locally experienced team who delivers diverse, comprehensive solutions that maximize our customers' ROI, reduce complexity and foster environmental stewardship.

Local Experts

At Grow West®, our people are our company. Every one of our employees gives their all each and every day to ensure our growers — their neighbors — receive the best service and get the most out of every opportunity. Our team of more than 300 professionals operate as partners to our growers, putting our customer's success first and bringing the latest knowledge and confidence to help our customers make strategic decisions in real-time.

Comprehensive Solutions

We offer an extensive portfolio of products and services for more than 50 crops to support California growers across their operations, all season long. Our combination of local presence and understanding, independent ownership and partnerships allow our teams to provide individualized service to our customers. All while supplying industry-leading crop nutrition and protection products and solutions to help build, operate and sustain profitable agriculture enterprises.

Family-Focused Culture

As Grow West continues to grow, staying true to our family values is a top priority. Respect, integrity and teamwork are central to the way we operate, and we believe family should always come first. We are driven to grow with and for our people, our customers and the communities we serve while never sacrificing our values to ensure the next generation continues this proud legacy.

Grow West at a Glance

- A local, independently-owned operation.
- Entrepreneurs run our locations and store fronts with the support of our management and administration.
- 300+ employees, 5,000+ customers.
- 18 retail, farm supply, trucking and wholesale manufacturing locations throughout California.
- Owners in Aligned Ag Distributors, along with Winfield United, the largest purchasing entity of agricultural chemicals in the United States.
- Less than 3% turnover and many multi-decade employees.

LOCATIONS:

UKIAH (2)
GEYSERVILLE
LAKEPORT
WOODLAND (5)
DIXON (2)
SONOMA
MAXWELL
YUBA CITY
PLEASANT GROVE
WEST SACRAMENTO
WALNUT GROVE (2)

To learn more about how we can go further together, visit **www.GrowWest.com**.

INDUSTRY RECOGNITION

In recent years, the Grow West team has been recognized for innovation, service and professionalism throughout the industry.

★★★★★ **CropLife's Top 100 US Retailer Award**

★★★★★ **Environmental Respect Awards**

★★★★★ **Ag Retailer of the Year Award**




Golden Anniversary

George Soares - Kahn, Soares & Conway

On the front end of a fresh, new idea, thoughts of eventually celebrating a 50-year anniversary of accomplishments is full of downside and certainly premature. Those who, during their careers, have been on the cutting edge of a big idea by chance or through careful planning know all too well the challenges of achieving success and the level of commitment needed to sustain the effort.

However, ideas can be powerful things if there is both an identifiable need and an unrelenting focus which brings us to formation of CAPCA. After the PCA license was created in 1972, several groups in the industry worked to form a 'council' to represent PCAs while rules and regulations were being promulgated in 1973, which lead to the formulation of CAPCA in 1975 under the leadership of Stan Strew, its first executive director.

History has shown that the idea of forming CAPCA was timely—bringing PCAs together to highlight their individual and collective professionalism akin to "lawyers, architects and doctors who consult with clients and who have their own organizations for purposes of upgrading and strengthening their standards" (Strew)—and clearly more essential over the decades as demonstrated by the evolving perceptions of an urbanized public and the erratic actions of California government.

The following list of noteworthy milestones during the last 50 years emphasizes the timeliness of creating CAPCA and is meant to encourage the industry to dream of what more can be done for the collective benefit of all as CAPCA marches toward its 75th Anniversary.

- Formation of the Stanley W. Strew Educational Fund (1993) to implement educational and scholarship programs to ensure the future prosperity of our nation's food, fiber and ornamental enterprises.

- Adoption of a Standard of Conduct (1989) was part of the maturing of CAPCA which later led to adherence to a Code of Ethics (1992). The highlights include (1) the obligation of PCAs to the public and environment; (2) the obligation of PCAs to their clients; and (3) the obligation of PCAs to their profession.

- Creation of the Plant Doctor Program (1990's) to instill in young students an appreciation for agriculture and its environmental sensitivity, and to provide facts about how food and other agriculture commodities are produced. The Program was also helpful in framing the work of PCAs in a more relatable human context. Today, CAPCA has hundreds of PCA "Doctors" doing this important work.

- BeeWhere (2019) is a cutting-edge law which CAPCA and the county agricultural commissioners jointly drafted and moved through the legislative process. To their credit, the two groups saw the importance of pollinators to much of production agriculture, and knew that their protection must be at the forefront of thinking especially when pesticides are applied, so they created a law and the bees and we are all beneficiaries. Now the location of these beehives will no longer be a mystery. With the passage of Assembly Bill 2468, the hundreds of thousands of hives imported into California each Spring must be registered as to location and relocation with county agriculture commissioners. Further, the hives must show the owner's name, address and phone number.

- The Alliance of Farmers and Ranchers (2021) is comprised of production agriculture groups and CAPCA. Their agenda is simple. Find and embrace candidates of various political parties who are balanced in their approach to governance and solution oriented. Too many in the political process have strayed from these fundamentals and its the Alliances' job to help bring order in the midst of chaos.

Notice the progression? One important step after another over 50 years and CAPCA is far from done. So, what's next? How about Integrated Pest Management (IPM) education for PCAs? Historically, growers have relied on IPM related advice from PCAs so it logically follows that the

Department of Pesticide Regulation (DPR) would include this opportunity in their educational training program.

As it turns out, CAPCA anticipated the question. So, earlier this year it advanced the idea which turned into legislation (AB 1959) which made its way to Governor Newsom who signed it into law. Beginning in 2023, DPR will start the process to implement IPM as part of the Continuing Education of the PCAs and other licensees.

It could be fairly argued that the IPM training authorized in AB 1959 should not have stopped with licensees but somehow extended to the uninformed who often decry the use of pesticides for any reason. They would learn about the actual integration of practices and pesticides to prevent or suppress pest problems.

In reality, IPM utilizes a combination of techniques such as monitoring pest presence and establishing treatment threshold levels; using non-chemical practices to slow pest development such as sanitation and various control measures. At times pesticide usage is also needed but even then only those that are the most effective and least harmful to the public, environment and property.

So again the question: What's next? One answer (among many) may be an enhanced inward look at politically mobilizing CAPCA chapters with aggregate membership consisting of thousands of PCAs operating throughout all 58 California counties. The current political extremes in California with no signs of moderation dictate a higher profile with public officials at all levels, and these chapters are well positioned to ensure that the "rest of the story" is brought to the forefront.

The unrelenting focus of CAPCA has brought us to this Golden Anniversary with its many accomplishments in the record books, so let's honor the moment and then get on with tackling what's next. ■

STAY INFORMED

Increase your knowledge of the news, actions and proposed regulatory changes from the Department of Pesticide Regulation (DPR) that may affect your PCA license and the pest management industry.

Subscribe at:

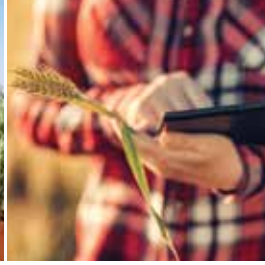
http://www.cdpr.ca.gov/docs/dept/listserv/listdesc.htm

California Department of Pesticide Regulation

DPR Electronic Subscription Lists

DPR's web site includes a subscription page for their electronic mailing lists. You can sign up to receive free, automatic delivery of:

- DPR News Releases.
- Licensing, Certification and Continuing Education Information.
- Notices on Regulatory Actions or Proposed Regulatory Changes that may affect your license and/or business operations.
- Updates on over 20 regulatory issues and programs.



CAPCA 2022 Membership Recap

Crystelle Turlo, Chief Operations Director

https://capca.com/membership/

Wow, 2022 flew by! It seems that the CAPCA State Office was just beginning to plan the 48th Annual CAPCA Conference & Agri-Expo in Anaheim, and now as I write this, we are collecting your survey data and beginning to plan the 49th Annual CAPCA Conference & Agri-Expo in Reno.

CAPCA staff started 2022 at full-speed to bring you the Spring Summit in Napa. Though this year's Summit was in a new location and had a slightly different program, we were excited to have a great turn out and see some new faces.

At Spring Summit, we piloted the CE Scan In/Scan Out program and received great feedback and support from attendees and sponsors. After the Summit, staff got right back to work, rolling out new online CE, while also developing the 2022 Conference in Anaheim.

By the beginning of summer, we had opened Conference registration. This year's registration was a little different and staff took to the phones and email to assist members in retrieving their CAPCA.com passwords and in registering for the big event. We also ensured that official CE certs were available online and that we provided more on-demand CE courses at CAPCA.com.

By the end of summer, we were putting the final pieces together for Anaheim. Label Update was rolled out online and was free as part of early registration. In October, CAPCA staff set off to provide our members, exhibitors and sponsors the very best Conference we could by *"Bringing back the Magic."*

Thank you to our members for your patience in 2022. We know it was a busy year for you – just like it was for us. CAPCA appreciates your continued support and wishes you a very happy New Year. ■

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Grape Wise™
Knowledge to Yield

ADVERTORIAL

THE CRITICAL IMPORTANCE OF SAMPLING

Understanding the physical and chemical properties of the soil and water in which vines grow is critical for effective management of inputs and the diagnosis of potential issues in your vineyard. Following a regular sampling schedule provides valuable data in season and an opportunity to observe trends year over year. With a Grape Wise™ plan tailored to your vineyard, Helena consultants will provide educational tools, agronomic information and expert recommendations throughout the growing season. Utilizing our AGRIntelligence® program, you will receive industry-leading precision offerings with our HyGround®, AquaLenz® and Extractor® sampling reports.

Soil sampling is a key first step in grape production, whether you are developing a new vineyard, replanting a block or developing a yearly fertility budget/program. Helena typically recommends sampling the soil every two to three years to establish new baselines for soil nutrient and salinity values. Choosing the correct sampling location will also help give the most accurate picture possible. With Helena's HyGround soil mapping system, we can identify changes in the soil profile and create soil management zones for smart sampling, rather than taking random samples in the field. Once samples are pulled and georeferenced, results are uploaded into our agronomy platform, AI360®, and stored for easy access throughout the season. Our agronomists take the soil sample results and use them to build prescriptive programs throughout the season for your vineyard.

Water is the largest input in most grape operations. It ties all aspects of crop production together by playing a key role in nutrient management, irrigation efficiency, salinity management and pesticide efficacy. Helena's AquaLenz water sample reports address all these issues in a simple, easy-to-understand report. Water reports can be very complex, and interpretation is often difficult. AquaLenz simplifies this process by highlighting the problem areas (salinity, nitrogen, bicarbonates, pH, etc.) and recommending solutions. Helena recommends growers take a water sample every season, especially if they are using ground water sources, because water chemistry can change from year to year.

Tissue sampling is the final key component in grape production. Soil and water samples tell us what's in "the bank". Tissue samples tell us what the plant is actually able to withdraw.

> "SOIL & WATER SAMPLES TELL US WHAT'S IN `THE BANK'. TISSUE SAMPLES TELL US WHAT THE PLANT IS ACTUALLY ABLE TO WITHDRAW.

Measuring the nutrient values in grape tissue allows us to evaluate the effectiveness of your fertility programs and identify areas for improvement. Helena recommends a minimum of two tissue samples be taken over the course of the season. The first should be taken pre-bloom from the leaf, opposite the basal cluster. The second should be taken when the berries are BB size, from the first mature leaf on the shoot. Taking whole leaves (petiole + blade) is encouraged, but there are also petiole-only tests and blade-only tests. Helena's Extractor tissue reporting system is similar to our AquaLenz reports. Extractor takes tissue sample data and presents it in an easy-to-understand report to highlight deficiencies and recommend solutions. These reports are stored in our AI360 system for future use and comparison.

To learn more about the importance of sampling in grape production and develop a Grape Wise program, contact your local Helena Representative.

HELENA®
AGRI-ENTERPRISES, LLC

Learn more at HelenaAgri.com.

Let's get social.

CAPCA on

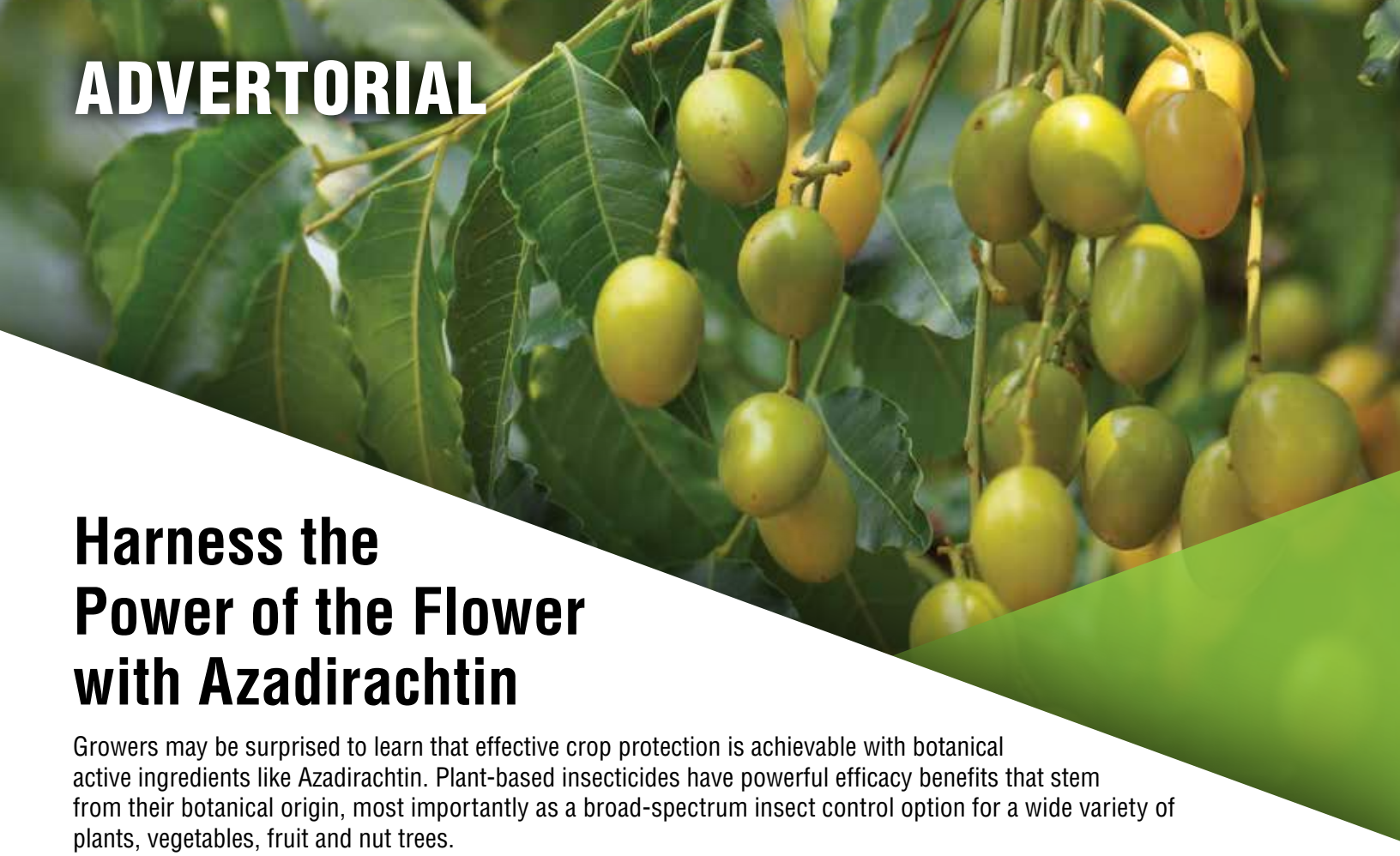
CAPCA is working hard to build out a robust social media platform to connect with members, and to bring them additional industry-focused content.

FOLLOW CAPCA ON THESE SOCIAL MEDIA SITES:

- Facebook - *@California Association of Pest Control Advisers (CAPCA)*
- Instagram - *@capca_plant_health*
- Twitter - *@CAPCA3*
- LinkedIn - *@California Association of Pest Control Advisers (CAPCA)*

CAPCA

ADVERTORIAL



Harness the Power of the Flower with Azadirachtin

Growers may be surprised to learn that effective crop protection is achievable with botanical active ingredients like Azadirachtin. Plant-based insecticides have powerful efficacy benefits that stem from their botanical origin, most importantly as a broad-spectrum insect control option for a wide variety of plants, vegetables, fruit and nut trees.

The vast majority of Azadirachtin-based products are OMRI listed and/or compliant with national organic technical programs like NOP, Eco-Cert, among others.

Broad-Spectrum Kill

Azadirachtin is an increasingly prominent insecticide used by farmers worldwide to control aphids, beetles, flies, thrips and other damaging insects on specialty crops produced for consumption. This pesticide also acts as an insect growth disruptor.

Azadirachtin is a broad-spectrum pesticide product with activity on many insect types and a chemical complexity that minimizes risk of pest resistance. In action, the pesticide stunts insect development, impairing the growth of pests hungry for crops.

Application Flexibility

Azadirachtin is the most active component of neem oil, a plant-based pesticide found in seeds from the neem tree. Neem oil and some of its purified components are harnessed in dozens of pesticide products. The oil – known for its centuries of use in pest control – can be formulated into granules, wettable powders, or blended concentrates.

Azadirachtin insecticide can be utilized with other conventional and botanical compounds against plant-feeding such as Lygus, aphids, worms and mites. These insects are serious pests for crops such as berries and leafy greens as well as fruiting vegetables and tree fruit, including apple. Laboratory and in-field evaluations show that other botanical active ingredients can work in combination with Azadirachtin to protect plants against these dangerous pests.

Plant Friendly. Pest Deadly.

An exclusive combination of Azadirachtin and Neem Oil make MGK's recently acquired Debug® family of products a unique find in the organic market. This easy-to-use and versatile product line includes four different formulations to meet crop producer's specific needs: Debug ON, Debug Optimo, Debug Tres and Debug Turbo. Get the killing power and application flexibility you need with these all-in-one insecticide, miticide, nematicide and fungicide products.

Visit MGK.com/Crop to learn more and find your preferred Debug product.

MGK®

SPRAY SAFE

A FARMER TO FARMER COMMITMENT TO YOU

SPRAY SAFE 2023

17th Annual

Kern County Spray Safe

Jan. 23, 2023

Kern Co. Fairgrounds
1142 South P Street
Bakersfield, CA

Kern Co. Farm Bureau:
(661) 397-9635

12th Annual

Yolo County Spray Safe

Feb. 1, 2023

Yolo Co. Fairgrounds
Waite Hall
1250 Gum Ave
Woodland, CA 95776

Yolo Co. Farm Bureau:
(530) 662-6316

CAPCA MEMBERS-ONLY BENEFITS

Membership with CAPCA is the best way to take your involvement, education, and skill set to the next level.

CAPCA provides three levels of membership for individuals:

MEMBERSHIP LEVELS

ACTIVE MEMBER

Only California State licensed Pest Control Advisers are eligible for Active Membership in the Association.

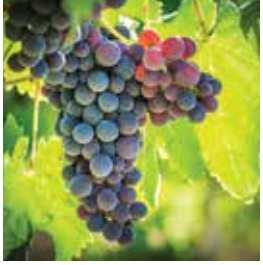
ASSOCIATE MEMBER

An Associate Member is any person not licensed as an agricultural Pest Control Adviser, but may hold other licenses issued by the State of California, and wants to promote the purpose of the Association.

STUDENT MEMBER

A student member is a student regularly enrolled in a college or university, majoring in biological or agricultural sciences and preparing for a career in pest management. A student member may not hold a DPR license.

To join, visit https://capca.com/membership/

Central Coast sees drop in pesticide runoff, ahead of new ag order

Brad Hooker, Agri-Pulse

The Central Coast Regional Water Quality Control Board approved the latest version of its agricultural order last year. Known as Ag Order 4.0, the aggressive regulation aims in part to protect surface waters from pesticide contamination.

The order raised alarms in the agriculture community for setting mandates for vegetation buffers around farmland to act as filters for pesticide and nitrogen runoff. A review by a consulting firm found the requirements were unlikely to achieve water quality objectives and "lack a sound scientific basis."

Growers worried that such mandates under Ag Order 4.0 would lead to unintended consequences, such as having to apply much more pesticide to fields to control insects, pathogens and other pests that would proliferate in the buffer zones.

More than a year after approving the order, the board held a hearing recently to assess the implementation. While it is too early to see results on phased-in requirements like buffer zones, researchers have noticed a continuing trend of reduced pesticide contamination in the soil and water.

Owing to the complexity of the regulatory requirements, growers hired third-party consultants to ease the workload for monitoring, tracking and routinely reporting on water quality. The lead organization, Central Coast Water Quality Preservation, Inc., has been analyzing pesticide contaminants for decades in the region and has stepped up their efforts with the new order.

"There's clearly a decline in pesticide concentrations over time," said Sarah Lopez, executive director of Preservation, Inc., on pesticides measured in soil. "We're not seeing any reversal in trends."

The Newsom administration banned use of the insecticide chlorpyrifos in 2019. With decreasing usage in the region, less of it is being found in the water—the same for Diazinon, another organophosphate. Mary Hamilton, the section manager overseeing the board's Irrigated Lands Program, confirmed the observations, noting the researchers have gathered enough data to show the two pesticides are no longer contributing to toxicity. This meant the agency could remove the pesticides as contaminants on the federal Clean Water Act list of impaired waters.

In all, the board has delisted nine pesticides from the list. Yet the increased monitoring has led to adding 161 new pesticide waterbody combinations to the list recently, though many will eventually fall off the list when more data is collected.

"We have a lot of different pesticides coming into use more frequently just as we're seeing some of these [organophosphate] pesticides phase out in use," said Hamilton. "I do want to point out that the ag order and the implementation efforts to date are already proactively implementing actions that will address some of these pollutants along the way."

Tim Tringali, monitoring project manager for the consulting firm Tetra-Tech, has been leading the cooperative monitoring program for surface water since 2012 and is now assisting with groundwater monitoring as well. Tringali noted that malathion, an organophosphate, and imidacloprid, a neonicotinoid, continue to be found in samples collected across the region, "but at the moment, there's no clear trend, upwards or downwards."

Tringali also observed more significant toxicity to riparian species in some surface waterbodies than in others.

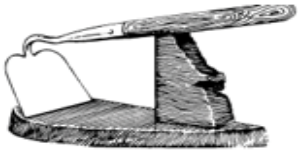
"Certain pesticides pose greater risk to certain organisms than others," explained Tringali. "That certainly is the first thing that jumps to my mind."

The board will continue to follow the progress on Ag Order 4.0 and hear updates every year on its implementation, including with pesticide monitoring.

For more ag news, go to www.Agri-Pulse.com. ■

CWSS

California Weed Science Society



The California Weed Science Society
75th Annual Conference

"Metal, Mixing and Microchips: 75 Years of Weed Science"

Portola Hotel & Spa
Monterey, California
January 18 – 20, 2023
Register at www.cwss.org

Featured Sessions Include:

- Weed School – Drought & Weed Interaction
- Updates and the latest in weed biology and management in CA agricultural crops & orchards, turf & ornamentals, roadside & industrial sites, forestry, range & natural areas, and aquatic sites
- The latest research updates on robotics and A.I., specific weed species, resistance management, and new herbicides in rice
- What's New featuring new products and industry updates
- Laws and Regulations Sessions

DPR & other agency CEU hours have been requested

For more information and to register online please visit www.cwss.org.

1972-2022 50 YEARS

The PCA License turns 50

CAPCA Staff

The PCA license was first introduced under the California Department of Food and Agriculture (CDFA) in 1972. As the license has evolved over the years, with the Department of Pesticide Regulation (DPR) assuming the administration of the PCA program since the 1990's, there have been advancements and changes to the approaches and implementations of pest management in the industry, yet the focus has always remained on the professional recommendations and skillful application practices of Integrated Pest Management (IPM) in the field.

The priority of CAPCA remains to be our representation and support of the California PCA. We continue to strive to advance the PCA professionalism and expert adviser reputation for growers across the state.

The professionalism of your license and renewal is a substantial building block and first line of defense to the safe use of pest control materials in California. We envision that the role of the PCA will continue to be key in promoting and implementing sound and proven, science-based pest control methods.

RETROSPECTIVE

John Perry:
"It was 1972 that the law went into effect and the fall of 1972 that the testing began for the those in the ag chemical sales business. I (still) have some memorabilia from those initial tests – my actual results on cards mailed out by the California Dept. of Food and Agriculture. I also have the original study books for each category and some old licenses (PCA #01776).

"I took all my tests in the Fresno area. The tests were conducted at the Fresno County Fairgrounds. The building is gone now (it sat where the Paul Paul Theater outdoor pavilion now resides). I can remember the building though, and all the old chemical guys who were scared to death to take the tests. The room was full of cigarette smoke – this was before smoking/non-smoking sections existed. I had just graduated from Fresno State in June 1972, and was wet behind the ears. A lot of changes have happened since those days. I am one of the few still working in the business who was there at that moment in history. Little did I know then that the industry would evolve to what we have today."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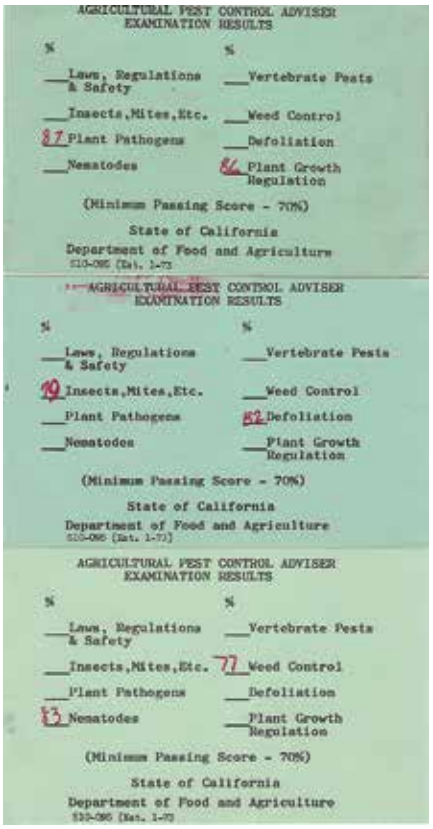
AGRICULTURAL PEST CONTROL ADVISER EXAMINATION RESULTS

% %
Laws, Regulations & Safety — Vertebrate Pests
Insects, Mites, Etc. — Weed Control
87 Plant Pathogens — Defoliation
Nematodes — 86 Plant Growth Regulation

(Minimum Passing Score - 70%)

State of California
Department of Food and Agriculture

AGRICULTURAL PEST CONTROL ADVISER EXAMINATION RESULTS

% %
Laws, Regulations & Safety — Vertebrate Pests
90 Insects, Mites, Etc. — Weed Control
Plant Pathogens — 82 Defoliation
Nematodes — Plant Growth Regulation

(Minimum Passing Score - 70%)

State of California
Department of Food and Agriculture

AGRICULTURAL PEST CONTROL ADVISER EXAMINATION RESULTS

% %
Laws, Regulations & Safety — Vertebrate Pests
Insects, Mites, Etc. — 77 Weed Control
Plant Pathogens — Defoliation
83 Nematodes — Plant Growth Regulation

(Minimum Passing Score - 70%)

State of California
Department of Food and Agriculture


STATE OF CALIFORNIA
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Photos of study guides, test results, and Adviser licenses courtesy of longtime CAPCA member, John Perry.

After receiving the Legacy Membership in 2019, Neale McNutt provided some recollections as one of the founding members of CAPCA. He related that he still found it inspiring to see how far CAPCA had come over the years, and the importance of the CAPCA organization to PCA license holders.

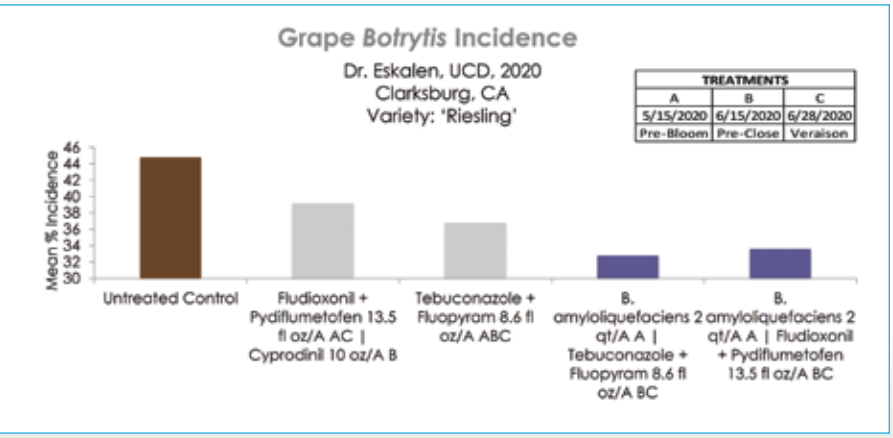
The road to where the PCA stands today has taken many turns and has seen many changes: often challenging, yet positive. The core of the PCA professionalism has been one of the key elements to strengthening the industry, which has always had its roots with the boots-on-the-ground PCA. We'd also like to acknowledge that many of the original PCAs are no longer with us, but the effects of their unwavering dedication, energetic contributions, and enthusiastic support to the PCA profession are still being felt today. Their contributions, along with your continued endeavors, will reverberate into the future and continue to enhance the PCA license. ■

Improve Early Season Pest Management: Combine Biologicals and Chemistry

Dr. Melissa Jean O'Neal, Ph.D., Senior Product Development Manager, ProFarm Group, Inc.

Now is the time to start preparing and planning for common early season pests in California crops. If not carefully monitored and effectively treated, diseases such as anthracnose, brown rot blossom blight, powdery mildew, and *Botrytis*, as well as insects such as peach twig borer will quickly reduce peak yield potential.

Rotating modes of action is one of the most powerful approaches in an effective integrated pest management (IPM) program. Utilizing different chemistries can be beneficial; however, research indicates that combining biologicals with chemistry – in tank mixes or rotations – can improve management of problematic pests. For example, the following study which was conducted in collaboration with Dr. Eskalen of the University of California Davis, showed a rotation of the popular chemistries Tebuconazole + Fluopyram along with a biological active ingredient, *Bacillus amyloliquefaciens* strain F727, where the rotational program reduced *Botrytis* incidence compared to using chemistry alone.



A lack of clarity is common regarding what biologicals are and how they can be utilized in IPM. The facts are:

- Biologicals provide novel modes of action that improve pest management.
- Many biologicals can be combined with chemistry to improve efficacy.
- Most biological products are available in improved formulations that make them cost effective.
- Biologicals are low impact on farm workers and pollinators.

Ben Wallace, PCA/QAL for P-R Farms, Inc., a fourth-generation farm near Clovis, California, comprised of 5,000 acres of both registered organic and conventional almonds can relate to the learning curve with biologicals. "I didn't know much about biologicals until I saw how they worked in a previous role; growers would use them when other solutions for dampening off or nematode control weren't working," says Wallace. "When I came to P-R Farms, I immediately introduced *Burkholderia rinojensis* on our organic acreage. The organic almond trees looked so good that I decided to use the product on our conventional acres as well."

Biologicals for Modern-Day Tank Mixes

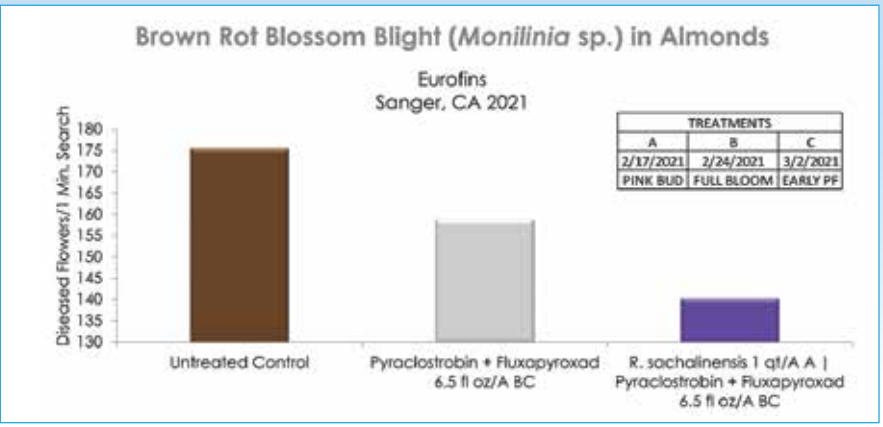
Reynoutria sachalinensis is a biological that is particularly effective against anthracnose, brown rot blossom blight, powdery mildew, and has a broad spectrum of activity against many other fungal and bacterial diseases. This biofungicide also supports plant health and, when applied to roots or foliage, has been shown to improve yield and crop quality on grapes, strawberries, almonds, and other crops.

R. sachalinensis increases crop performance through induced systemic resistance (ISR) and systemic acquired resistance (SAR), thus stimulating a plant's innate ability to fight disease in the following ways:

- Through triggering the creation of several antimicrobial compounds, phenolics, phytoalexins and pathogenesis-related proteins that enable treated plants to inhibit and restrain pathogen growth.
- By signaling plants to accumulate more lignin, which thickens and strengthens cell walls. This added strength helps protect against penetration by pathogens and lends structural integrity to the plant.

Reynoutria sachalinensis is highly compatible with other crop protection products. For example, field studies have shown that when combined with popular chemistry such as Pyraclostrobin + Fluxapyroxad, *R. sachalinensis* reduced the incidence of brown rot blossom blight by 12 percent when compared to using traditional chemistry alone.

Another active ingredient to consider is *Bacillus amyloliquefaciens* strain F727, a unique strain that is broad spectrum and provides multiple modes of action, for which efficacy data appear in the grape *Botrytis* dataset in this



article. This *Bacillus* differs from other species and strains in that it generates living spores to form a protective barrier; therefore, pathogens have a more difficult time establishing within the plant.

ISR and SAR activity for *B. amyloliquefaciens* strain F727 boosts the plants innate ability to defend itself, preventing pathogens from taking a foothold on the crop.

These two biofungicides show their greatest efficacy when applied early – when conditions become conducive to disease development or at the very onset of disease. In a variety of uses by growers, there is evidence showing that adding biologicals to conventional sprays may maximize effectiveness.

Adding peroxyacetic acid (PAA) to tank mixes or in rotation is another IPM approach to improving control by utilizing a contact curative. PAA kills pathogens on contact and has an extremely broad spectrum of activity. PAA also tends to be widely available and is quite economical to purchase, making it a great choice when costs for other agriculture inputs fluctuate. It is important to note that PAA should not be used while bees are foraging.

Biologicals for Early Season Insect Management

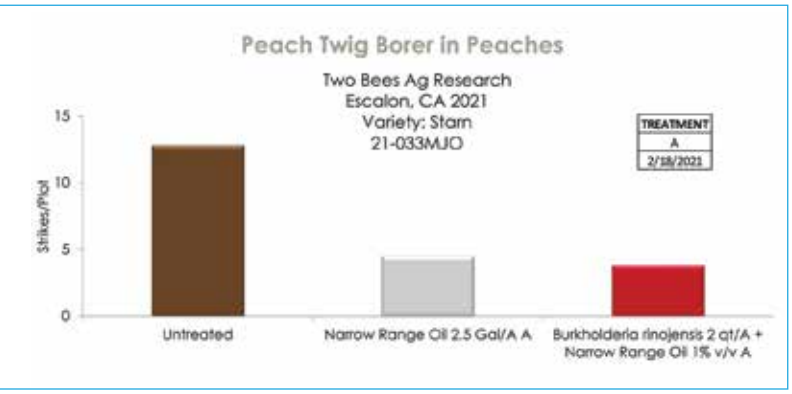
Insecticides are required for select pests in early season management programs. One example is peach twig borer, which has become increasingly problematic throughout California. The best way to manage this pest is through delayed dormant or bloomtime sprays.

Burkholderia rinojensis is a bioinsecticide that features multiple modes of action and is effective against a wide variety of chewing and sucking insects, as well as mites. Thorough scouting programs are imperative to the efficacy of biologicals, since applications should occur when newly hatched arthropods appear, or when the insect population is first noticed.

One of the common misunderstandings surrounding bioinsecticides is that they don't immediately kill the pest;

therefore, they must not be working. While the onset of mortality is delayed somewhat with bioinsecticides including *B. rinojensis*, this product causes immediate cessation of feeding. Thus, the damage to the crop is stopped immediately.

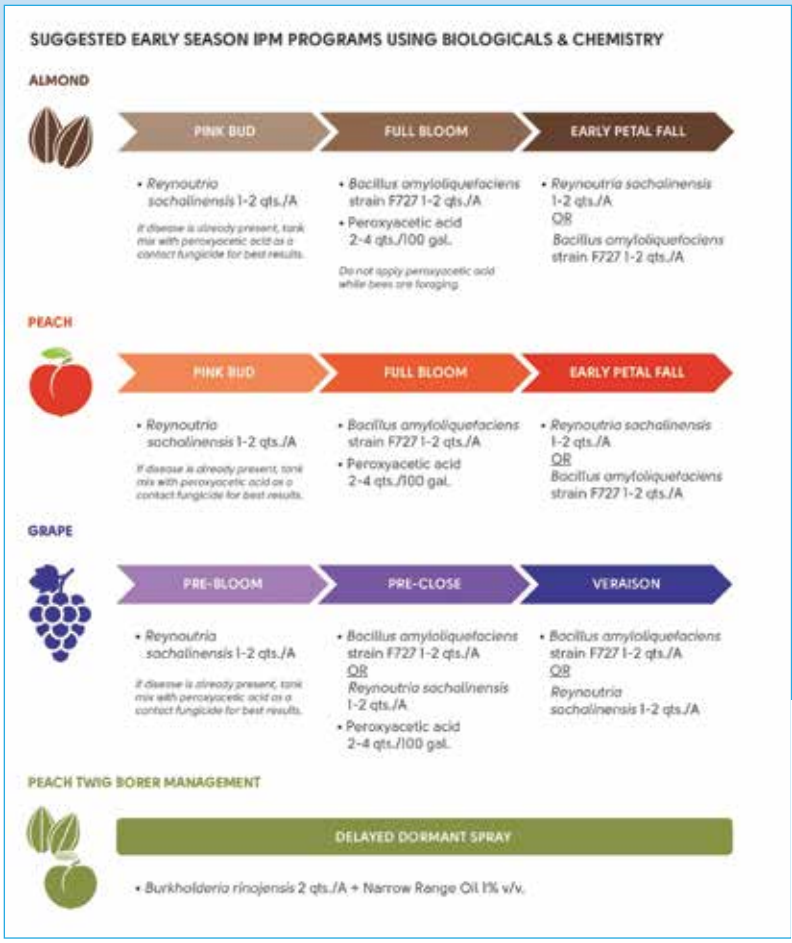
This biological, like the others noted above, works very well with conventional chemistry and often improves the efficacy of popular synthetic partners. An example is highlighted in the chart below where the efficacy of *B. rinojensis* added to a 1% v/v rate of narrow-range oil reduced damage as good as narrow-range oil at 2.5 gallons per acre applied alone. While the level of control is about the same as the standard, the biological brings in a different mode of action which, in turn, will help reduce pest resistance.



One of the most important benefits of combining biologicals with traditional chemistry is the ability to reduce pest resistance, which is an increasing concern among pest management professionals and growers alike.

Additional benefits of many biologicals include:

- Maximum Residue Limit Exemption (MRL) – No stress about exporting treated commodities.
- Low Impact on Wildlife – Biopesticides mentioned in this article have the benefit of being extremely low impact on pollinators and beneficial arthropods.
- Minimal Personal Protective Equipment* (PPE) and Four Hour Re-entry Interval (4 Hr. REI) – Due to the comparatively low toxicity profiles, workers can utilize minimal PPE when working with biological products, and there is less down time between applications, allowing for more efficient field worker scheduling.
- Zero Day Pre-Harvest Interval (0-Day PHI) – Biologicals provide the ability to make applications up until the date of harvest, thus protecting the produce while providing the greatest opportunity for a strong return on investment.
- OMRI Listed and Conventional Tank-Mix Approved – Biologicals are not solely for organic production. Strong efficacy has been proven in both organic and conventional farming systems.



Conclusion

Biologicals bring valuable tools to a PCA's toolbox: novel active ingredients, different modes of action, versatility, as well as providing options which are low impact on people, pollinators, and beneficial arthropods. As you prepare IPM programs for early season disease and insect management, I hope you will consider incorporating some of these valuable biologicals into your plans. Remember, rotating active ingredients and utilizing multiple modes of action will improve pest management and provide growers with the best yields possible. ■

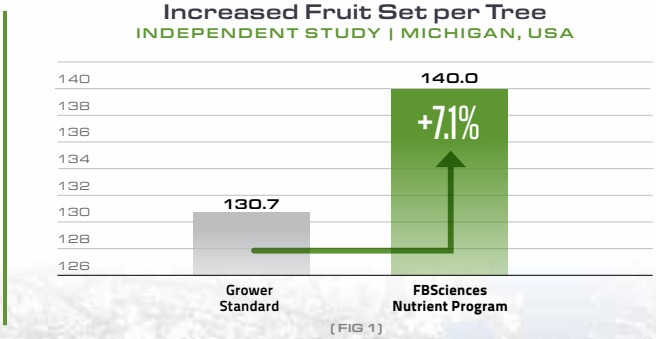
Advertorial

BLOOMING SUCCESS!

fbsciences

Bloom sprays are the first opportunity to set the stage for a successful growing season by directly affecting the yield and quality of the crop. By applying the right nutrients at this critical timing, growers can ensure a proper nut and fruit set, increased pollen viability, improved pollination, and support early-season energy processes.

Bloom and early fruit set are the most critical periods for setting and retaining fruit. Zinc, calcium, and boron are critical for pollen tube elongation and ultimately help assure the success of pollination and fertilization. Iron, manganese, and zinc are critical for chlorophyll formation and leaf and fruit expansion. Due to the timing of bloom sprays, leaf penetration is particularly important. **FBSciences' nutrient products are formulated with FBS Transit®**, FBSciences' proprietary biostimulant technology, and other formulation enhancers, **increasing nutrient penetration and uptake** into the plant tissue which allows the plant to take advantage of FBS Transit's **phloem-mobility enhancing benefits**. Applying the nutrients directly on the flowers and early leaves requires that the nutrients move only short distances from where they enter the plant. The enhanced penetration and phloem-mobility ensure the nutrients reach the key locations during this critical time.



(FIG 1)

The physiology of pollination and bloom set is driven by key nutrients including B, Ca, and Zn. Application of these nutrients helps to optimize a uniform pollination and early fruit and nut set. This early uniformity leads to a more uniform bulking and maturity. This apple trial in Michigan (Fig. 1) comparing FBSciences' nutrient program to the grower standard **improved fruit set by 7.1% and statistically improved yield per tree by 25.2%.**

Boron (B) is essential for pollen tube elongation and hydration. Boron plays a critical part in the polymerization of cellulose and lignin fibers.

Product Recommendation:
BoronBoost® Foliar.

Calcium (Ca) is essential for pollen tube development and strength and has a direct role in the fertilization process. Calcium is critical during the entire period of cell division and cell elongation.

Product Recommendation:
CellMate® Foliar Plus Mo

Zinc (Zn) is essential for bloom, as every protein needed for bloom is a zinc dependent protein. Zinc is critical for proper cell elongation and enhances chlorophyll density and full leaf expansion.

Product Recommendation:
Zicron® Foliar

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Exciting new research demonstrates that alkaline extracted *Ascophyllum nodosum* supports soil health

Dr. Holly Little, Director of Research and Development at Acadian Plant Health™

The challenge of sustainable food production

Growers are being tasked with producing more food for a rapidly expanding global population despite dealing with the extreme weather events (like drought, heat waves and flooding). Meeting society's demand for food relies on our ability to adapt to these changing environmental pressures. So, what's the solution?

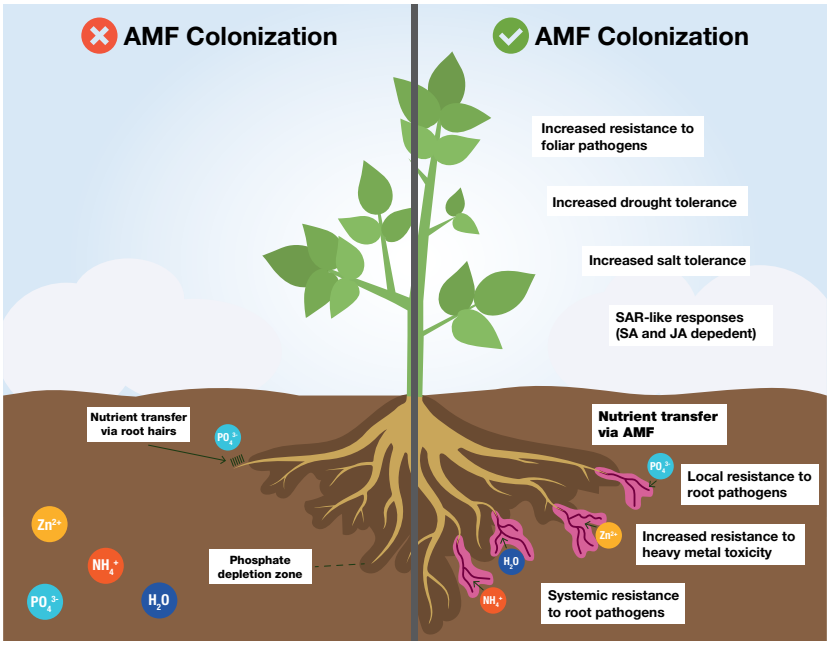
It's in the soil. Improving soil health will increase our ability to grow healthy and productive crops as well as the resiliency of our food production potential for generations. As such, soil health may just be the most important agricultural topic of our lifetimes.

Soil health is fundamentally linked to soil microbial populations.

Soil health is the capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans. Although soil health is dependent on a delicate balance of physical, chemical, and biological elements, the microbiome is perhaps the most important building block, as it has immense potential to sustainably improve plant productivity.

Extensive research has shown that soil health is nurtured by encouraging soil's complex web of microbial life. Due to their proximity to plant roots, soil microbes directly influence plant growth, health, and productivity. Plants also actively influence *their* rhizosphere microbiome by releasing molecules to stimulate beneficial microbial activity. As much as 40% of a plant's photosynthetic activity is devoted to this process.

Soil microbes aid in a plant's nutrient uptake through nitrification, phosphorus availability and organic matter decomposition. They stimulate plant growth and development of the root system through signalling molecules and plant-microbe interactions. They play a role in pathogen control. And perhaps most interestingly, soil microbes have an ability to induce stress tolerance by acting as virtual root systems for the host plant making them less susceptible to water stress.



One of the most important groups of microbes found in the rhizosphere are arbuscular mycorrhiza fungi (AMF) which colonize more than 80% of land plants including agricultural crops. AMF form mutually beneficial symbiotic relationships with plants. The spores present in soil, germinate, infect the root system and form arbuscule structures inside the cells. AMF assist plants with improved nutrient and water uptake, greater biomass, stress tolerance and pathogen resistance.

KEY TAKEAWAYS:

Alkaline extracted *Ascophyllum nodosum* biostimulants support soil health by:

- Increasing microbial abundance and activity
- Supporting the establishment of rhizosphere microbiome
- Promoting arbuscular mycorrhizal fungi growth and colonization
- Enabling continued soil microbiome function during stresses such as drought

Sap Analysis Empowers Real-Time Nutrition Decisions

Sap analysis measures only the available nutrients in the plant, helping growers to identify and correct imbalances that limit yield and quality.

THE RISE OF PRECISION AGRICULTURE has fostered a more science-based approach to farming. From variable-rate fertilizer applications to tissue and soil testing, the industry is focused on maximizing efficiency, cutting costs and increasing profits.

One of the newer innovations to come onto the scene is sap analysis testing. Like tissue and soil testing, sap analysis is another tool in a grower's precision toolkit. This test, however, stands out from the rest by offering real-time analysis for better in-season decision making.

SAP ANALYSIS VERSUS TISSUE TESTING

"The difference between sap analysis and tissue test is pretty easy," says Jeff Glass, Southern Business Development Manager at Agro-K. "A tissue test measures what's in the cells of a leaf and also what's in the plant sap. You get the big picture of everything. A sap analysis separates just what's in a plant's 'available' inventory. It only measures what's in the sap and does not disturb the plant cells."

Using boron as an example, sap analysis would indicate how much boron is in a plant in a parts per million. By analyzing separate young leaf samples and old leaf samples the grower can see what is becoming deficient through nutrient mobility and address it before damage occurs - something that cannot be achieved with a tissue test. While a tissue test is a backward look at what has occurred, sap analysis is a real-time snapshot of availability, allowing the grower to look forward.

THE SAP ANALYSIS ADVANTAGE

When Agro-K started to use what was the world's first blood test for plants, they knew immediately that sap analysis would rapidly become an integral component of their Science-Driven Nutrition™ approach to crop production.

Agro-K works with the world's leading laboratory for sap analysis, one that was instrumental in developing this ground breaking technology. Agro-K's goal is to help streamline the process, from preparing and collecting samples to delivering detailed results. When properly understood, sap analysis gives growers the insight into their crops real-time nutritional status that they need to make the most effective, in-season management decisions that can improve the quality of the developing crop.

"Sap analysis measures 23 parameters, so you get information on all the essential nutrients and a few nutritional indicators." Glass says. "You get a reading on nitrates, ammonium, aluminum, and you'll also get a chance to look at what's going on with the electrical conductivity in the leaf. These are pieces of information you have access to that you don't get with a traditional tissue test."

Growers are able to see the immediately available nutrient levels in their crop to know if they are within the ideal range for growth. Additionally, sap analysis indicates when certain nutrients are competing with one another. Using calcium and potassium as examples, sap analysis can indicate if high potassium is interfering with the calcium. If that's the case, Agro-K can provide a science driven approach to assist growers in metabolizing some of the potassium and create space for the calcium to work—before the plant becomes calcium deficient.

AGRO-K®
Science-Driven Nutrition℠

To learn more about Agro-K's sap analysis and what it can do for your crop, visit www.AgroK.com

Sap Analysis 101

The world's first blood test for plants

Sap Analysis shows the real time supply of nutrients in the vascular system. It's a real-time snapshot of availability.

STEP 1A: Prepare your materials

- You will need 1-qt resealable plastic freezer storage bag and one set of pre-paid labels for each set of leaf samples (young leaves and old leaves). Agro-K provides these labels.

STEP 1B: Collect your samples

- Gather 80 grams of new-leaf samples and 80 grams of old-leaf samples. Sample the youngest fully developed leaf and the oldest vital leaf and use healthy plants representative of the field. Keep the samples separate.

STEP 2: Prepare the samples for shipping

- Remove the petioles from the leaves, and make certain the leaves are dry.

STEP 3: Package the samples

- Put each sample into a resealable plastic freezer storage bag and squeeze out the air. Apply a completed sample label to the sample bag. The lab will not process samples without it. Cool sealed samples as soon as possible to maintain freshness.

STEP 4: Ship the samples to the lab

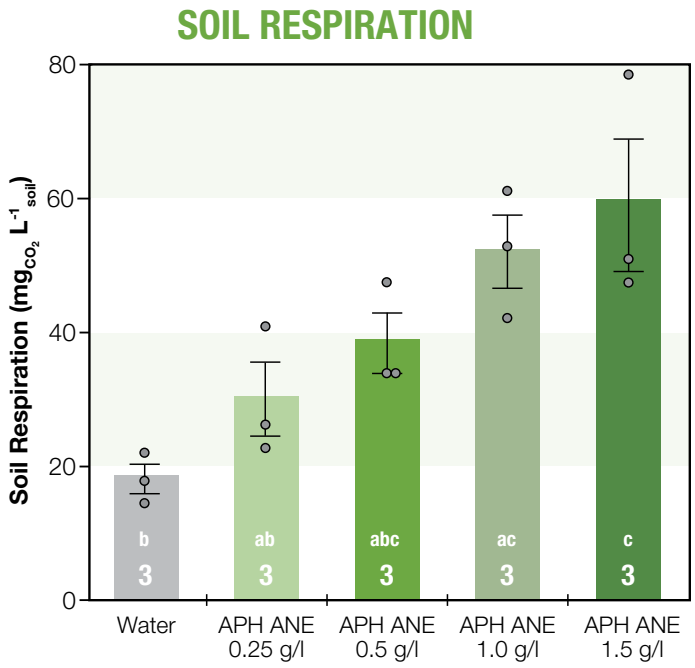
- Ship to the lab using a shipping service. The best days to ship the samples are Monday, Tuesday, or Friday.

STEP 5: Agro-K Deciphers the Results

- Lab results are usually returned within seven days of shipping. Agro-K Nutrition Experts will help you interpret the results.

A powerful tool for leveraging benefits of the microbiome

Biostimulants, such as seaweed extracts, are a class of agricultural input derived from natural resources. When applied to the plant through foliar application or as a root drench, they induce innate, natural abilities to better cope with abiotic stress and enhance water management and nutrient uptake efficiencies. A growing body of evidence indicates that applications of alkaline extracted *Ascophyllum nodosum* (ANE) biostimulants (a species of intertidal brown seaweed) broadly influence the structure and activity of microbial communities in the rhizosphere, increasing rhizosphere biodiversity, respiration, and metabolic activity.



Soil respiration (Solvita) increased with increasing doses of APH ANE

Research into the influence of seaweed extracts on specific microbes, such as AMF, and the influence on their interactions with plants, has been limited. However, a recent study published in Nature Scientific Reports titled *Alkaline extraction of the seaweed Ascophyllum nodosum stimulates arbuscular mycorrhizal fungi and their endomycorrhization of plant roots* explored this interaction.[1]

Here are some of the findings:

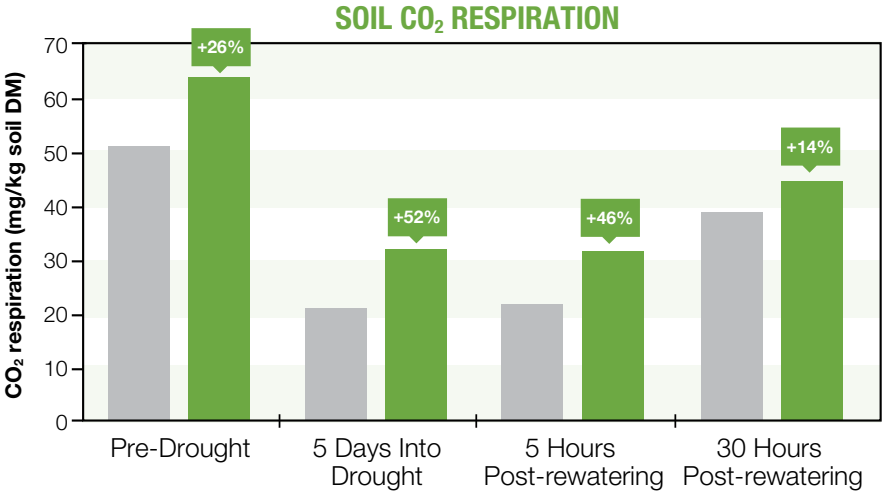
ANE stimulates fungal spore germination.

Spores of *R. irregularis* were germinated in petri dishes with or without ANE. Spore germination was 23% higher on day 4 and 19% higher on day 14 when ANE was included in the agar, compared to the agar without seaweed extract. This confirmed that treated fungi germinated earlier and had a sustained increase in germination.

Additionally, ANE treatment resulted in a two-fold increase in both germ tube length (the initial growth phase of the fungus) and fungal branching (a critical process which allows the organism to seek out a host plant). These results are intriguing in that it proves that ANE doesn't just stimulate plant growth. ANE also has a beneficial impact on spore germination and growth – which has the potential to increase early symbiosis and enhance both biotic and abiotic stress resistance in the plant.

Foliar and drench ANE applications promote AMF colonization.

Researchers wanted to understand the impact of ANE on the process of fungal root colonization. Roots from barrel clover plants treated with ANE were stained, examined microscopically and rated on the progression of colonization over the course of 8 weeks of greenhouse growth.



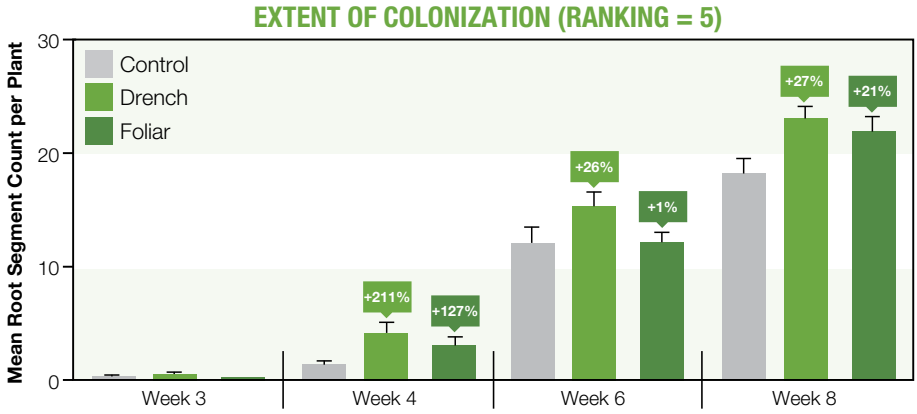
Soil respiration also increased under drought conditions, with at 52% increase during drought, and maintained the increased respiration during the recovery period.

Both foliar and drench applications of ANE increased AMF colonization 4 to 8 weeks after inoculation by up to 200%. However, drench applications of ANE stimulated colonization sooner and resulted in a greater leaf area than foliar applications. These results indicate that ANE influences the plant to encourage colonization as well as directly enhance AMF growth.

ANE changes AMF accommodation-related gene expression at early stages of colonization.

Colonization of beneficial fungi into the plant is a complex process that's tightly controlled to prevent pathogen invasion. The process of plant accommodation and intracellular development of AMF is regulated by gene activation and controlled by a network of transcription enzymes.

To understand how ANE influences this process at the molecular level, researchers



Increased arbuscular colonization following drench or foliar treatment with 1.0 g/l APH™ ANE in greenhouse-grown Medicago truncatula (barrelclover)

examined the expression of genes known to be involved in the accommodation of fungus into plant roots. This included, for example, ENOD11 which is a cell wall protein considered a marker of early colonization; DMI3 a signaling enzyme that encourages AMF accommodation in the plant; and ExpB1 which is involved in the plant's cell wall remodeling.

Surprisingly, both foliar and drench applications of ANE strongly stimulated the expression of genes involved in the intracellular accommodation of AMF, particularly during the early stages of colonization. The consistent increase in these enzymes suggests that foliar ANE application enhances plant-directed symbiosis with AMF.

A note of caution

Seaweed extracts are complex mixtures of numerous bioactive components, and extracts from different seaweed species each have their own unique profile of bioactive compounds with varying rates of efficacy. The variation between different seaweed based biostimulants, however, is due to more than just the variety of seaweed. Efficacy is also influenced by extraction method.

Research has established that the process used to make an extract is an important variable in defining its bioactivity. This study examined one type of alkaline extracted *Ascophyllum nodosum* specifically and the results may not be replicated with products derived under different methods or from other types of alkaline extractions.

Providing advancements to improve soil health – and the future of agriculture

This research offers exciting and surprising insight into how ANE biostimulants can support soil health. It is the first published evidence of foliar applications of biostimulants causing a systemic response in the rhizosphere microbial community.

It's also the first published evidence showing the effect of ANE both directly on AMF and on symbiosis enabled by the plant. This work demonstrates the effect of ANE on soil microbial populations, as well as how soil health is supported by the establishment of a strong mycorrhizal network. Improving AMF establishment presents another potential agronomic benefit to the use of ANE biostimulants, influencing not only the plant, but the fungi-plant complex as a whole.

Andres Reyes Gaige, Regional Technical Manager at Acadian Plant Health™, emphasizes that "Because plant health starts with the soil, this research helps with our understanding of plant nutrition and natural plant defenses. These results show that alkaline extracted *Ascophyllum nodosum* biostimulants are a pivotal tool for leveraging the benefits of the microbiome to support soil health, soil structure and healthy plant growth – all of which contribute to long-term sustainable agriculture." ■

Footnote:

1. Hines, S., van der Zwan, T., Shiell, K. et al. Alkaline extract of the seaweed *Ascophyllum nodosum* stimulates arbuscular mycorrhizal fungi and their endomycorrhization of plant roots. Sci Rep 11, 13491 (2021). https://doi.org/10.1038/s41598-021-93035-9

ADVERTORIAL

NEW 2023 PRODUCTS FROM ORO AGRI

Oro Agri is now part of the Rovensa Group, a global leader in bio-solutions for sustainable agriculture. This gives us the opportunity to introduce a new portfolio of proven products not previously available in the U.S. We are excited to introduce these new products along with several developed by Oro Agri for the 2023 season. All these new products will be available through Oro Agri distributors.

ORGANIC PRODUCTS (All OMRI-listed)

MILAGRUM PLUS: The next generation *Bacillus subtilis* that prevents and eradicates downy mildew and other foliar diseases caused by oomycetes, ascomycetes, and basidiomycetes. It is formulated with Bioevology®, a process that utilizes co-formulants to stabilize and maximize the efficacy of Milagrum Plus against disease.

ATTITUDE: An acidifier and water conditioner formulated for reducing the pH of the spray tank solution, particularly post-emergent herbicides. It can improve the efficacy of pesticides requiring a pH of 5 or lower. Do not use with sulfonylureas or copper-based products.

THYMIC: A bactericide, insecticide and fungicide formulated using food-grade thymol oil. Use it for preventive and curative control of a wide variety of pests/diseases including aphids, thrips, white fly, anthracnose, *Botrytis* and *Xanthomonas*.

CINNACTION: A combination of two cinnamon oils to maximize knockdown and efficacy against mites and powdery mildew.

GARLAND: Directly kills thrips and forms a strong vapor layer on the plant surface for up to two weeks after application. Uses 100% pure garlic essential oil.

NON-ORGANIC PRODUCTS

VIRTUS: An early season application of VIRTUS significantly increases a crop's root mass, fortifies its cell walls and strengthens its vascular system. Its lignosulfonate and chelated zinc and manganese boost photosynthesis during the crop's active growing stages.

IGNEOUS: A colorless, liquid sulfur also containing chelated manganese and zinc to improve a crop's NUE, cell wall strength and immune system. It is readily taken up by both roots and foliage.

FORT-SOIL: A strong soil revitalizer formulated with prebiotic molecules, organic matter rhizogenic substances and calcium. It protects and improves the roots resulting in greater flower and fruit production.

TROYA: A 100% complex of copper and heptagluconic acid that is very easily assimilated by plants, leaving no residue. It can be mixed with other copper products, conventional pesticides and micro-organisms with no compatibility or phyto concerns. Troya can be applied to the soil or the foliage.

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GROW WITH CONFIDENCE

Effects of competition from California weedy rice biotypes on a cultivated rice variety

Elizabeth Karn[1], Teresa De Leon[2], Luis Espino[3], Kassim Al-Khatib[4], Helaine Berris[5], and Whitney Brim-DeForest[3]

[1]Staff Research Associate, University of California Cooperative Extension; [2]Rice Breeder, California Cooperative Rice Research Foundation; [3]Rice Advisor, UCCE; [4]Professor, University of California Davis; [5]Agricultural Technician, UCCE

Introduction

Weedy rice, also called red rice, is a conspecific relative of cultivated rice that infests cultivated rice fields (Langevin et al. 1990) and can reduce the yield and value of harvested rice (Shivrain et al. 2010; Singh et al. 2017a). Weedy rice's phenotypical similarities to cultivated rice make it difficult to identify until late in the growing season and challenging to control. In California, weedy rice is controlled predominantly through cultural practices, such as using a stale seedbed, planting clean seed, hand pulling, or fallowing. Studies of yield loss due to weedy rice competition indicate maximum yield losses from 49% to 90% (Estorninos et al. 2005; Marambe and Amarasinghe 2000; Shivrain et al. 2009). To understand and quantify the effects of weedy rice infestation on cultivated rice, plant competition between cultivated rice and weedy rice in California was investigated in this study. The objectives of this study were to (1) measure the impact of weedy rice competition on cultivated rice growth and yield components using an additive design competition experiment, (2) examine how growth rates of cultivated and weedy rice are altered under competitive conditions, and (3) characterize the different competitive strategies of weedy rice biotypes in California.

Materials and Methods

The 'M-206' rice variety and five weedy rice biotypes from California were used in competition growth experiments conducted in a greenhouse, because of a lack of field sites where weedy rice could be grown uncontrolled. Weedy rice types were Type 1, Type 2, Type 3, Type 4, and Type 5. Experiments were performed under a randomized complete block design where blocks were planting time, and treatments were weedy rice density and weedy rice biotype. Each block consisted of 25 pots (18.9-L), each containing four M-206 rice plants, representing a density of 32 plants m^{-2}. Each pot also contained one of five weedy rice biotypes at a density of 0, 1, 2, 3, or 5 weedy rice plants per pot, representing a planting density of 0, 8, 16, 24, or 40 plants m–2. M-206 yield-component measurements were taken for plant height, tiller number, panicle number, panicle weight, seed weight adjusted to 14% moisture content, fresh biomass, and dry biomass. Yield-component measurements for the high-density treatment of weedy rice biotypes were collected for plant height, tiller number, panicle number, panicle weight, fresh weight, and dry weight.

Two-way ANOVA was conducted for weekly M-206 rice plant height and tiller number data with repeated measures to determine the significance of block, weed biotype, and weed density each week. R software, version 3.5.1 was used (R Foundation for Statistical Computing, Vienna, Austria). Differences among biotypes were tested by a Tukey honest significant difference (HSD) test. Harvest yield component measurements were analyzed by ANOVA, and differences among biotypes were tested by a Tukey HSD test. Three-parameter logistic curves were fitted to M-206 weekly height data for the 0 and 40 plants m^{-2} treatments and to weedy rice measurements for 40 plants m^{-2} using the self-starting logistic model function SSlogis in R.

RESULTS AND DISCUSSION

Effect of Competition of Rice

In the presence of weedy rice competition, M-206 tiller production during early growth was reduced by varying amounts by different weedy rice biotypes. Differences in tiller number among weed density treatments became significant by week 3 for all five weedy rice biotypes.

Competition from all weedy rice biotypes resulted in similar trends of reduction in M-206 rice height with increasing density, with a maximum height reduction of 13% (Figure 1). Differences in height between weed density treatments became significant by week 2 and resulted in diverging plant height over time between weed density treatments.

ADVERTORIAL

Wake Up your Buds!

Now you can help your growers get a more uniform, high-yielding harvest with Dormex®. This tool allows you to help manage the growth of crops better — by maximizing bud break and advancing the harvest window to maximize profit opportunities for growers.

Other benefits of starting the crop right with Dormex® include reducing labor requirements, streamlining mechanization, and narrowing the harvest window to reduce the number of passes. Everyone knows it's easier to manage a healthy, more consistent crop.

SEE MORE LEAVES SOONER

This unique plant growth regulator called Dormex® works to initiate the natural bud break process. With a single application, leaf buds and bloom buds open together…more uniformly and earlier than before. Instead of relying on stored energy inside the plant, new energy from photosynthesis in the leaves helps fuel growth as blooms open.

OPTIMIZE THE POLLINATION WINDOW

For pollination, timing is everything. Dormex® can help bring orchards and vineyards into synchronous bloom. Just one application can help male and female flower buds open at the same time. This helps the crop benefit most from those hardworking bees.

MINIMIZE ALTERNATE BEARING YEARS

Dormex® can help even out alternate bearing years for certain crops or varieties. By opening more buds each and every year, more branches are produced. So it is possible to get more consistent yields, year after year, to help improve your grower's profitability.

SHAPE UP YOUR TREES AND VINES

Uniform bud break activates secondary terminals and buds so new lateral shoots form. The suppression of apical dominance adds to the productive capacity of plants over time and reduces the need for pruning. New fruiting branches can help young trees grow stronger and old orchards can be renewed naturally.

TABULATE THE DIFFERENCE AT HARVEST

Dormex® helps to manage crops better all the way to harvest. By directing energy toward opening more buds and more uniform, productive growth, your customers will see more consistent results in yield, quality, and maturity at harvest.

Thank you for trusting Dormex®. We manufacture the product in Germany to our exacting standards—so you can be confident using it every year. AlzChem is the original inventor of Dormex® and still the best.

Contact John Meyer
559.545.4701 or email
john.meyer@alzchem.com
DormexUSA.com

alzchem group

FOR ALMONDS, CHERRIES, GRAPES, PISTACHIOS, AND MORE TO COME

To examine further the effects of weedy rice competition on M-206 growth, relative growth analysis was conducted for weekly plant height measurements in the absence of competition and at high weed density competition. The relative growth rate, calculated as the change in plant height relative to the already accumulated height of the plant per week, showed that rice grew fastest relative to its size initially and slowed over time. M-206 growth was already affected by competition at the earliest measured growth stages, with an initial relative growth rate of 0.47 cm^{-1} wk^{-1} without competition versus 0.53 cm^{-1} wk^{-1} with competition. The competition then resulted in a steeper decline in relative growth rate over time. This indicates that M-206 rice detects and responds to competition very early on, initially growing rapidly to compete with the weed. But this competition slows growth earlier and results in a shorter mature size than rice grown in the absence of competition.

Yield-component measurements at harvest of M-206 rice showed a negative impact of weedy rice competition on most yield components. In contrast, panicle number, total panicle weight, yield per plant, and aboveground biomass of M-206 rice were highly sensitive to weedy rice competition, with a yield reduction of more than 50% for each yield component at 40 plants m^{-2}. The exception to the trend of decreasing yield with increasing weed density was 100-seed weight, which did not decrease significantly.

Weedy Rice Competitive Strategies

Differences in the impact of weedy rice biotypes on M-206 yield components may be due to differences in the competitive abilities of biotypes to take up available resources required for M-206 growth. Overall growth patterns are similar between weedy rice biotypes and M-206 rice, but weedy rice biotypes vary in their early growth and final yield components. Only the highest-density weedy rice treatment of 40 plants m^{-2} is considered here because lower-density treatments had correspondingly smaller sample sizes.

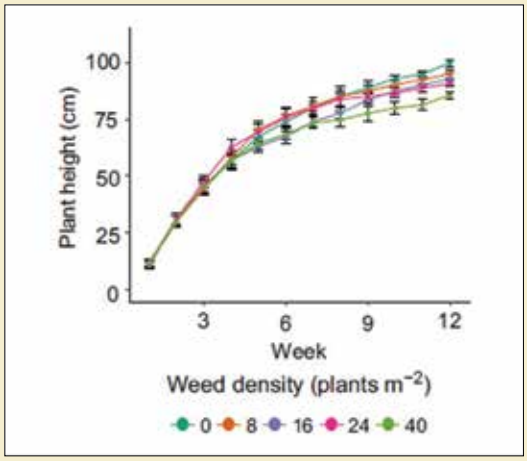


FIG. 1. Weekly early growth measurements of M-206 rice height per plant when grown in competition with weedy rice biotypes at varying weed density. Effects of competition on rice height was not significant between biotypes.

All weedy rice biotypes had higher yield per plant under high competition than did M-206 rice (Table 1), indicating these biotypes are highly successful competitors. The wide variation in growth and yield components between weedy rice biotypes suggests multiple strategies for success as a weed with the differing allocation of resources to height, tillering, or seed production. Tall plant height and tiller production, like that seen in many biotypes, may contribute to competitive ability in the current growing season, whereas

TABLE 1. Final measurements of yield components of weedy rice biotypes when grown at a density of 40 plants m^{-2} in competition with M-206 rice.

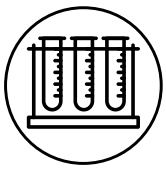
Biotype	Plant height[a]	Tiller	Panicle	Yield plant^{-1}	Fresh weight	Dry weight
	cm	no.	no.	g		
1	121.0 c	6.7 a	6.1 ab	11.1 a	27.4 bc	10.8 b
SE	4.3	0.5	0.4	1.0	4.2	0.7
2	120.5 c	7.9 a	6.6 b	12.8 bc	31.0 c	10.2 b
SE	3.7	0.8	0.5	0.8	2.9	0.4
3	115.2 bc	10.0 ab	9.0 c	14.1 c	28.3 c	10.9 b
SE	3.2	0.6	0.8	1.3	3.2	1.0
4	78.9 a	11.6 b	8.0 c	12.7 ab	18.3 a	5.4 a
SE	2.3	0.6	0.6	0.9	1.7	0.3
5	111.8 b	6.8 a	5.7 a	12.4 ab	24.8 b	10.3 b
SE	2.3	0.4	0.3	0.6	3.0	1.0

[a]Letters indicate significant differences between weed biotypes arranged vertically, determined by Tukey test ($\alpha = 0.05$).

GET THE MOST FROM YOUR WATER AND POSTHARVEST HERBICIDES WITH EMBER

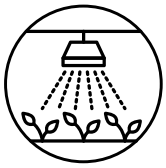
EMBER™

Poor water quality can render even the most powerful herbicide ineffective. Through its partnership with Buttonwillow Warehouse Company (BWC), Mar Vista Resources® helps enable growers to get the most from their applications with EMBER™ herbicide activator and water-conditioning adjuvant.



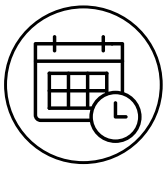
THE MAKEUP OF EMBER

The adjuvant complements and enhances herbicide applications, enabling common products like glyphosate, glufosinate, 2,4-D, Dicamba and paraquat to control weeds at their full potential without being tied up by hard water. EMBER contains a nonionic surfactant and organic acid buffer to promote effective, uniform spray coverage with strong crop safety, even in extreme environments and in low-volume applications.



HOW EMBER MAKES HERBICIDE WORK HARDER

When added to postharvest herbicide spray solutions at a rate between 1 and 4 quarts per 100 gallons, EMBER conditions spray water, enhances the penetration of herbicide anionic acid or salt formations and ultimately improves herbicide wetting and deposition characteristics that promote more uniform application, especially when added to a glyphosate-based spray mix. When following specific label instructions for mixing and application, the adjuvant also can enhance the contact effect of most post-emergent herbicides.



YEAR-ROUND HERBICIDE APPLICATION BENEFITS

In other words, EMBER enables growers to maximize the efficacy of their herbicide programs, year-round and across a diverse range of crop fields. It helps ensure even if water quality doesn't meet the bare minimum for facilitating full herbicide action, that water doesn't impede one of a range of herbicides to do its job when applied.

FROM THE LAB TO THE FIELD

EMBER is the product of Corcoran, California-based Mar Vista Resources' proprietary laboratory product testing and development capabilities. The adjuvant is the latest product to exemplify the Mar Vista commitment to growers' success in overtaking roadblocks that can stand in the way of realizing maximum crop quality and output potential in both conventional and organic production systems.

BWC Buttonwillow Warehouse Company

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orders@marvistaresources.com

the high allocation to seed production seen in Type 3 could lead to a larger weedy-rice seed bank and more severe infestations in future growing seasons if not controlled effectively.

It is possible in some areas that multiple weedy rice biotypes could be present in the same field, and it is unclear whether the combined action of different weedy rice biotypes may result in greater yield loss, similar levels of yield loss as observed for each biotype alone, or if their competitive strategies may interfere with each other, resulting in lower M-206 yield loss. It is also unclear from this study how competitive California weedy rice biotypes would be against other cultivars of rice because cultivars can differ in their competitive abilities (Estorninos et al. 2002). M-206 rice accounted for 46% of California rice acreage in 2018 (California Cooperative Rice Research Foundation 2019).

Additional studies will be needed to determine whether the results of this greenhouse study translate into similarly high rice yield losses under field conditions. Field studies of weedy rice competition in other areas have shown yield losses ranging from 22% to 90% (Estorninos et al. 2005; Marambe and Amarasinghe 2000; Shivrain et al. 2009; Vidotto and Ferrero et al. 2005), putting the results of this greenhouse study in the top half of that range. Additional weedy rice experiments have recently begun in research fields. To limit the spread of weedy rice, weedy rice cannot be grown uncontrolled for yield-loss studies in grower fields. However, it is clear from the results of this study that California weedy rice biotypes are highly competitive and have the potential to cause high-yield losses in rice. ■

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STANDARD OF CONDUCT

Adopted 1989

CAPCA members will conduct themselves in a professional manner according to their code of ethics by observing all laws and all regulations, broadening their abilities through continuing education, and respecting the needs of their clients, the environment and public safety at all times.

CODE OF ETHICS

Adopted 1992

INTRODUCTION

The California Association of Pest Control Advisers (CAPCA) recognizes the unique ethical and professional responsibility of the licensed pest control adviser (PCA). PCAs have the responsibility to support and promote the highest standards of conduct in the performance of their duties to the public, the environment and their clients.

CAPCA members will observe and obey all laws and regulations pertaining to our industry, and will voluntarily assume the obligations of self-discipline, honor, and environmental respect set forth in the CAPCA 'Code of Ethics.'

ARTICLE I: Obligation of the PCA to the Public and Environment

- Prescribe environmentally sound pest management methods which do not jeopardize the public health and welfare.
- Ensure that alternative measures for pest management situations have been reviewed, as provided by law.
- Maintain an awareness of public concerns and be willing to address those concerns in a sound, scientifically-based manner.
- Serve as a leading advocate of safe and effective pest management technologies.
- Participate in the advancement of pest management and professional knowledge.

ARTICLE II: Obligation of the PCA to the Client

- PCAs have an affirmative ethical obligation not to conceal their source of compensation when asked.
- Help the client keep abreast of relevant regulatory and technological changes which could impact the client's business.
- Provide the client with pest management advice which meets the following criteria:

- environmentally, economically, and ethically sound
- legal uses that are objective and are research-based

ARTICLE III: Obligation of PCA to the Profession

- Refrain from making false or misleading statements about the work of other PCAs.
- Recognize the duty to report illegal practices to the proper authorities.
- Maintain state-of-the-art knowledge of pest management through conscientious pursuit of continuing education.
- Participate in industry affiliated organizations and activities which encourage the betterment of the profession.
- Foster and support research and education for the advancement of pest management.

Drought, heat, and pest resistant trees for a changing climate

Janet Hartin, Area Environmental Horticulture Advisor, San Bernardino, Riverside, and Los Angeles Counties, University of California Cooperative Extension; jshartin@ucanr.edu

Urban trees provide a wide variety of ecosystem and societal benefits. They cool urban heat islands through shade production, filter pollutants from air and water, reduce soil and water erosion, provide wildlife habitat, attract and enhance pollinator populations, beautify neighborhoods, absorb and store (sequester) carbon dioxide, and improve mental and emotional health (Alizadeh and Hitchmough 2019).

With 95 percent of Californians residing in urban areas, enhancing tree canopy cover to cool hot impervious surfaces is increasingly important. Shade produced by a single well-placed urban tree can cool black asphalt by more than 165 degrees F in inland cities during summer and more than 50 degrees F along the coast (Hartin 2021).

Urban trees cool urban civic centers, and can decrease asphalt surface temperatures by 40-67 degrees F.

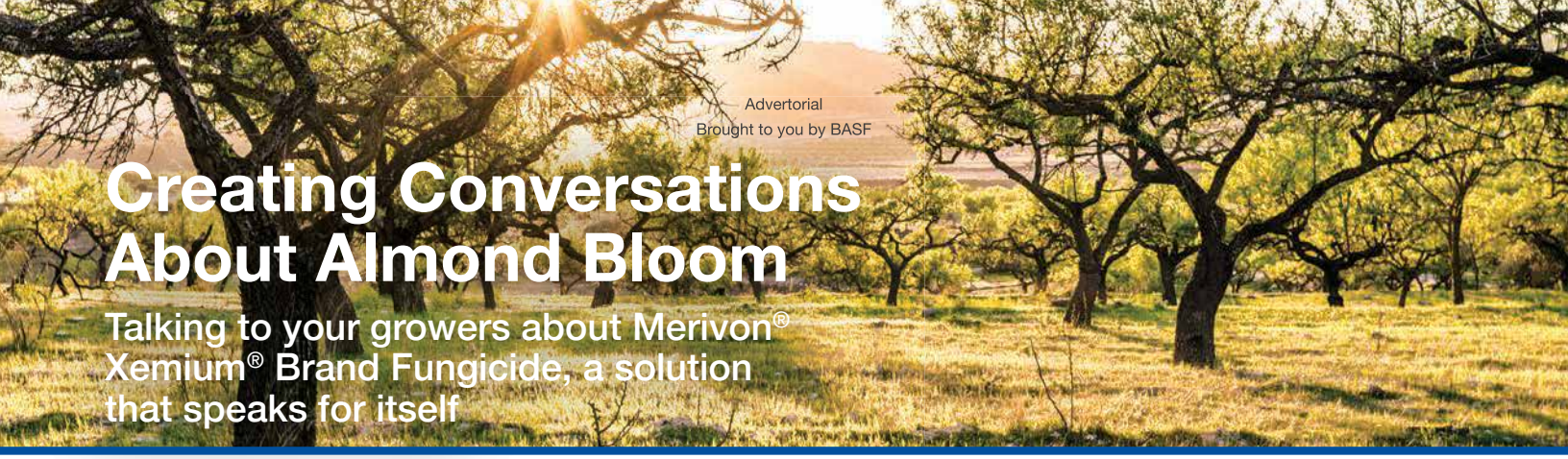
While including native trees is always a good starting place when developing plant palettes to cool urban heat islands, augmenting them with non-native (yet non-invasive) tree species is often recommended. Why? Because, unfortunately, many of our native trees no longer thrive (or even survive) in urban heat islands. Welcoming non-native adapted species expands the plant palette and enhances biodiversity, wildlife habitat, and pollinator populations. It also reduces the chance of an invasive pest severely damaging or killing large plantings of single-species (monoculture) trees.

Below are examples of drought, heat, and pest-resistant trees performing well in our UC ANR/United States Forest System "Climate-ready landscape trees" and other UC ANR studies that include California natives and other adapted trees. They are also low maintenance, a definite plus:

Netleaf Hackberry *(Celtis reticulata)* is a California native, deciduous tree that grows up to 35' tall and 30' wide. It attracts many species of birds and is low-maintenance. It also grows well in alkaline and well as neutral soil pH. It is recommended for Sunset zones 1 - 3, 10 - 13, 18 – 19, and USDA zones 3 - 9.

Red Push Pistache *(Pistacia × 'Red Push')* hails from Arizona and is a deciduous tree that grows up to 40' tall and 20' wide. It grows well in a wide variety of soils and pH range. It is deer-resistant and has strong branch strength. It is recommended for Sunset zones 8 – 24 and USDA zones 7 - 9.

Thornless Honey Mesquite *(Prosopis glandulosa 'Maverick')* is native to the southwestern United States, deciduous, and grows up to 35' tall and 35' wide. It has fragrant flowers, attracts birds and grows well in a wide variety of soils and pHs. It is



Advertorial
Brought to you by BASF

Creating Conversations About Almond Bloom

Talking to your growers about Merivon® Xemium® Brand Fungicide, a solution that speaks for itself

"Hey, let's talk almond bloom." That may not be the most impactful way to start a conversation with your growers about their fungicide decisions. But it's an important topic for growers to understand as we head into this critical, yield-defining season.

When almonds begin to flower, they become more susceptible to disease and environmental conditions that can lead to crop loss. Fungicide protection is an important consideration when it comes to helping growers achieve their desired yields and protect overall tree health.

Recommending that almond growers choose a fungicide that delivers results that speak for themselves is obviously the goal for any PCA. But how do you start a detailed dialogue about this important subject matter that speaks to their specific needs?

Consider the following top five "conversation starters" to get your growers focused on almond bloom and the benefits of choosing Merivon® Xemium® Brand Fungicide from BASF:

Did you know the foundation is not the place to compromise? — The foundation of your fungicide program is key to your overall almond season success and, therefore, isn't a place to skimp. Considering the spectrum of disease and environmental pressures your almonds may face, it's important to choose a solution like Merivon fungicide, which provides the full package of disease control performance, residual activity, growth efficiency, and stress mitigation.

Would you like to set yourself up for success no matter what the season brings? — There's no time more important to moderate stress on your almond crop than at bloom. No matter what the upcoming season has in store, Merivon fungicide Plant Health benefits have you covered. Stress tolerance, check. Disease control and gowth efficacy, check. Longer-lasting protection with consistent performance, also check. These benefits help produce higher yields in even the most unpredictable seasons.

Do you know how to get longer-lasting disease protection? — Merivon fungicide is powered by Xemium® fungicide and F500®, a formulation that distributes its active ingredients throughout the leaf to deliver season-long disease protection. This combination delivers longer-lasting disease protection; Plant Health benefits; and healthier, higher-quality outputs.

Would you like to protect both your crops and the longevity of your trees? — If left uncontrolled, some diseases can result in defoliation of trees, which leads to not only immediate yield loss in the current year, but also compounded productivity losses in the years to come. Merivon fungicide's Plant Health benefits uniquely protect both this year's almond crops and the longevity of your almond trees.

Do you want to achieve more consistent performance and better results? — Adding Merivon fungicide to your spray program can help provide a better result each season. This advanced fungicide helps maximize yield potential by offering improved control of key diseases, proven Plant Health benefits and the longest-lasting protection available. Merivon fungicide gives you more consistent performance for maximum crop potential.

Contact your local BASF representative to learn more about Merivon fungicide.

Merivon®
Fungicide

BASF
We create chemistry

Urban trees cool parks, provide habitat and pollinators, and provide many other ecosystem and societal benefits.

Invasive Trees to Avoid Planting in CA

(not inclusive)

Athel *(Tamarix aphylla)*

Black Locust *(Robinia pseudoacacia)*

Blackwood Acacia *(Acacia melanoxylon)*

Brazilian Pepper *(Schinus terebinthifolius)*

Chinaberry *(Melia azedarach)*

Chinese Tallow Tree *(Triadica sebifera)*

English Hawthorn *(Crataegus monogyna)*

Peruvian Pepper Tree *(Schinus molle)*

Red Gum *(Eucalyptus camaldulensis)*

Russian Olive *(Elaeagnus angustifolia)*

Saltcedar *(Tamarix ramosissima, T. gallica, T. chinensis)*

Silver Wattle *(Acacia dealbata)*

Smallflower Tamarisk *(Tamarix parviflora)*

Tasmanian Bluegum *(Eucalyptus globulus)*

recommended for Sunset zones 10 - 13, 18 – 24 and USDA zones: 6 -10.

Desert Willow 'Bubba' *(Chilopsis linearis)* is native to California, Texas, and Mexico, deciduous, and grows up to 25' tall and 20' wide. It has lovely lavender tubular flowers in spring and fall that attract birds and pollinators. It is deer-resistant and grows well under alkaline as well as neutral pH. It is recommended for Sunset zones 3, 7 - 14, 18 – 23 and USDA zones: 8 – 9.

Chaste Tree *(Vitex agnus-castus)* is native to the Mediterranean and is a wonderful tree for a small space or screen. It grows up to 15' tall and 15' wide and has striking purple flowers in summer and fall that attract bees. It is deer-resistant and tolerates a wide variety of soils and alkaline soil. It is recommended for Sunset zones 4 – 24 and USDA zones 6 – 10.

Fringe Tree *(Chionanthus virginicus)* is native to the southeastern Unites States and is another great choice for a small space or screen. It grows up to 20' tall and 20' wide and features showy white or green flowers. It is deer-resistant and tolerates a wide range of soil textures and pH levels. It is recommended for Sunset zones 2 - 6, 15 – 24 and USDA zones: 4 – 9.

Avoid invasive plants! When selecting non-native tree species, avoid those that have become invasive and crowd out other plants in our California landscapes. Avoid the trees listed to the left that have been identified by various sources (including the California Invasive Plant Council) to be too aggressive and habitat/resource-depleting for further planting. ■

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L-R: ***Julia Netto*** (Central Valley Division Digital Adoption Specialist), ***Shaunicy Thomas*** (Southwest Division Digital Adoption Specialist), ***Casey Medley*** (Coastal Division Digital Adoption Specialist), ***Austin Flores*** (North Valley Division Digital Adoption Specialist), ***Blake Batman*** (Northwest Division Digital Adoption Specialist), ***Breanna Errotabere*** (West Region Digital Adoption Lead)

Putting Innovation to Work

Nutrien Ag Solutions® isn't just keeping up, we're leading the field. Our significant investment in innovation provides our growers with smarter tools to ensure their hard work pays off with hardier crops and healthier profitability.

Nutrien Ag Solutions has both proprietary products that push plant health further and sophisticated tools that improve overall operational efficiency. From cutting-edge biocatalysts to precision ag technology, our performance-driven corporate portfolio helps both a grower's bottom line and the environment.

The West Region Digital Adoption Team is here to help bring awareness, train and assist with adoption of our digital and precision ag tools for our sales employees and customers alike. Nutrien Ag Solutions is proud to offer a Digital Hub which includes an employee hub, customer hub and precision ag tool that provides innovational ways to stay connected, allowing us to help growers manage their farming operation with a one-stop, secure online support.

Employee Hub

We offer the full e-commerce experience including the ability to place product order requests and create quotes or contracts on behalf of customers. We can also combine customers' soils with performance data and environmental science to help select the right seed variety for each field. Additionally, within the employee hub, our team can access field level weather insights, create field plans and view the grower account overview.

Customer Hub

Our customers have several reasons to take advantage of the Customer Hub:

- Ag-focused, local weather stories
- Payment options and details, including pre-pay and scheduling
- Invoices and statements
- Product information, SDS and labels
- Review purchase history
- Field-level insights

Our Digital Adoption team can help enroll our customers so they can take advantage of the many features that help make their farming operations be more productive and profitable.

Precision Agriculture

In the world of agronomy and agronomic advice, our precision ag tool, Echelon, is unique. Nutrien Ag Solutions' crop consultants work with growers to create a precise map of their fields, giving customers the confidence to make better decisions in both planning and execution. They know that the way to help get the best results is to combine local knowledge with timely, actionable data. This includes farm management, data management and zone mapping. Every farm comes with unique business and agronomic issues. Using our agronomic expertise and precision farming technology can overcome a wide range of production challenges.

NutrienAgSolutions.com

Management of watermelon productivity and plant health using grafting and Trichoderma-containing biofungicide

Zheng Wang, Vegetable and Irrigation Advisor, UCCE Stanislaus Co.; Kenny Abeloe, Lab Assistant, UCCE Stanislaus Co.

Research background

Although disease resistant commercial cultivars become more available, soil-borne pathogens such as Verticillium wilt (*Verticillium dahliae*), remain the top threatening diseases to California's watermelon production, resulting in continuously increased use of soil fumigants to treat the pathogens in watermelon fields. Worse, with more watermelon being planted early in the season for an early market presence, reports of infection of other soil-borne diseases which usually favor cooler and wetter soil conditions and were not commonly found on watermelon increased. Therefore, watermelon growers need to implement more environmentally sustainable and productive farming methods to sustain fruit yield and manage disease problems to cope with the more restrictive regulations of minimizing environmental threats. Watermelon grafting and biological pesticide are such methods aiming to enhance yield and safeguard plant health while securing soil and water quality. While there is a lack of studies from California, tremendous amount of research studies in other parts of the U.S. and the world has demonstrated multiple economic and horticultural benefits of using grafted watermelon plants with multi-pathogen resistant rootstocks and applying Trichoderma-containing biofungicide regarding yield enhancement, soil-borne disease prevention, and environmental protection. In 2021, we launched a project funded by the California Department of Pesticide Regulation to evaluate the potential of reducing soil fumigation in California's seedless watermelon production using grafting and Trichoderma-based biofungicides.

Project setup

A field trial was conducted in the summer of 2022 on a commercial watermelon field in the northern San Joaquin Valley. Three watermelon rootstocks (Cobalt, RS841, and Flexifort) were grafted onto a field scion, Summer Breeze, by a local greenhouse. The study was designed to also include two ways of inoculating two Trichoderma-based biofungicides. First, two fifths of the grafted and non-grafted transplants were inoculated with two different Trichoderma-containing biofungicides by soaking the root balls into the solutions a day before transplanting (May 18, 2022). Active ingredients of the products are *Trichoderma harzianum* Rifai T-22 and *T. virens* G-41. Both strains are naturally occurring fungi that are used as microbial biocontrol agents to prevent crops and seeds from various fungal pathogens. The trial was mechanically transplanted on May 19 and 20, 2022. Each treatment row is 60 feet long containing ten grafted or non-grafted plants and three grafted and non-grafted pollinizers. The second way of inoculation was then performed on June 18 and July 22, 2022 (30 and 64 days after transplanting) by chemigating both products through the drip system at a rate of 2 lbs./acre to another two fifths of the plants in the field (Figure 1). All treatments were replicated four times.

Data collection

Vine collapse. Vine collapse in each treatment row was visually assessed on July 7, July 27, and August 4. The assessment was based on a 1-5 scale, where 1 was rated as no vine collapse found in a given row; 2 as up to 25% of the vines collapsed; 3 as vine infection up to 50%; 4 as collapse symptoms up to 75%; 5 being collapse observed for the entire treatment row.

FIG. 1. Chemigation of Trichoderma-containing biofungicides into watermelon rows. Photo taken on June 18, 2022 (30 days after transplanting).

PROTASSIUM+®

ADVERTORIAL

UNDERSTANDING SALINE SOILS FOR OPTIMAL GROWTH AND YIELD

For growers in the West, the effect of soil salinity on crops is a justifiable concern. In areas of saline soils, the ability for plant roots to absorb water and nutrients can become limited. This can result in smaller or fewer leaves, shorter stature, reduced root length and mass, decreased yields and possibly plant death. Plants in the emergence and seedling stages are more susceptible to plant failure in saline soils than a more mature plant. The degree to which growth is stunted by salinity differs greatly with species and, to a lesser extent, varieties within a species. It is important to understand how and where saline soils can occur, the usefulness of soil testing and how to provide nutrition to crops in saline soils.

Regions Susceptible to Salt Buildup

Salt accumulates in soil over time, occurring from both natural and human-caused events such as mineral weathering, fertilizer applications, irrigation practices, precipitation or drought. Arid or semi-arid regions (including deficit irrigated areas) typically contain soils with an excessive accumulation of soluble salts, caused by a lack of rainfall or water movement preventing salts from leaching out of the plant root zone. Soil salinity may also be impacted by irrigation water that contains soluble salts leaving excess salt deposits behind after evaporation. Salinity build-up in soil is typically measured by laboratory analysis of a soil sample, and periodic soil tests are needed to ensure proper management of saline soils.

Applying Fertilizers in Saline Soils

When salts concentrate at higher levels in soil, the use of low salt index fertilizers is critical. Fertilizers with a higher salt index can create an area of high osmotic pressure near plant roots, causing moisture to be drawn from the plant and leaving unwanted salt behind. Plant root tips injured because of excess salts in the soil become unable to absorb water and essential nutrients.

Plant growth in saline and water stress conditions is influenced by the ability of the plant to regulate potassium/sodium ratio in the plant tissues. The severity of detrimental effects of sodium are greater under low potassium concentrations, and plants having efficient activity of potassium transporters are better able to maintain optimal levels of potassium required for normal growth. Applying a potassium fertilizer with a low salt index is a sound management practice to achieve optimal crop growth and yields.

Table 1. A comparison of the salt index per unit of K_2O of all major potassium sources.

Potassium Fertilizers	Salt Index	Salt Index Per Unit of K_2O
Potassium sulfate/SOP (0-0-50 17S)	42.6	0.852
Potassium nitrate/NOK (13-0-46)	69.5	1.219
Potassium chloride/MOP (0-0-60)	116.2	1.936
Potassium sulfate-magnesia/SOP-M (0-0-22 11Mg, 22S)	43.4	1.971
Potassium thiosulfate/KTS (0-0-25 17S)	68.0	2.720

Protassium+®

Protassium+ (0-0-50 17S) high-quality sulfate of potash (SOP) delivers 50% potassium and 17% sulfur with low chloride and **the lowest salt index per unit of K_2O of all major potassium sources** (Table 1). When compared with other low-chloride potassium fertilizers, Protassium+ SOP offers a better cost value per unit of K_2O. Protassium+ products are mined and manufactured by Compass Minerals through methods that promote sustainability and minimize environmental impacts. Organic forms of Protassium+ SOP are CDFA and OMRI certified.

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Canopy coverage. Canopy coverage was measured starting on June 10 until August 4, 2022 at an approximate 7-day interval using the Canopeo App (https://canopeoapp.com/#/login, developed by the Oklahoma State University). When scanning with the smartphone, the camera was paralleled to the ground and kept a height of 30 inches between the phone and the top watermelon canopy.

Yield and fruit quality. The trial was harvested three times on August 9, 16, and 24, respectively. All mature melons from each treatment row were cut by the grower's crew. Fruits were then counted, and the average fruit weight was collected from representatively selected five fruits. In the first harvest, two melons were selected from the group of five within a treatment row and taken back to the lab for quality measurements, including fruit length, width, rind thickness, total soluble solid (°Brix), and flesh firmness.

Results

Vine health assessment and canopy coverage. Overall, the effects of grafting on preventing vine collapse and maintaining ground coverage were much stronger than the effects of using both biological fungicides. For the non-grafted watermelon plants, receiving the inoculation of biofungicide regardless of application method had very little impact on reducing vine collapse. However, vine collapse was significantly reduced for grafted plants even without inoculation of any product (Figures 2 and 3). In the meantime, the synergistic effects of grafting and biofungicide provided some but limited benefits to plant health compared to the single factor of grafting (Figures 4 and 5).

Fruit yield and quality. The cumulative yield followed the similar trend as the vine collapse. The overall effect of

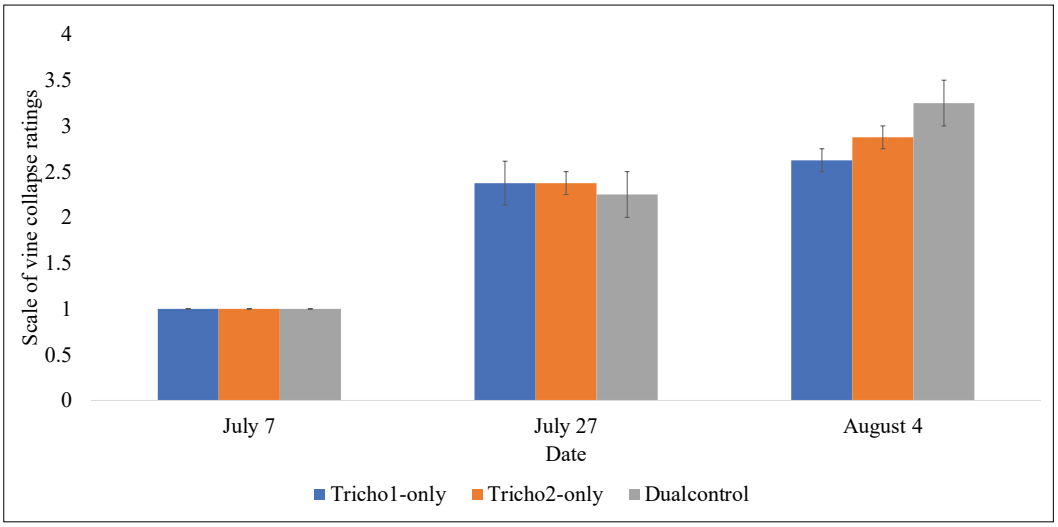

FIG. 2. Comparisons of vine collapse ratings between nongrafted watermelon plants that received the inoculation and those without any inoculation. Tricho1 and Tricho2 represent the two different Trichoderma products. Dualcontrol refers to non-inoculated, non-grafted plants.

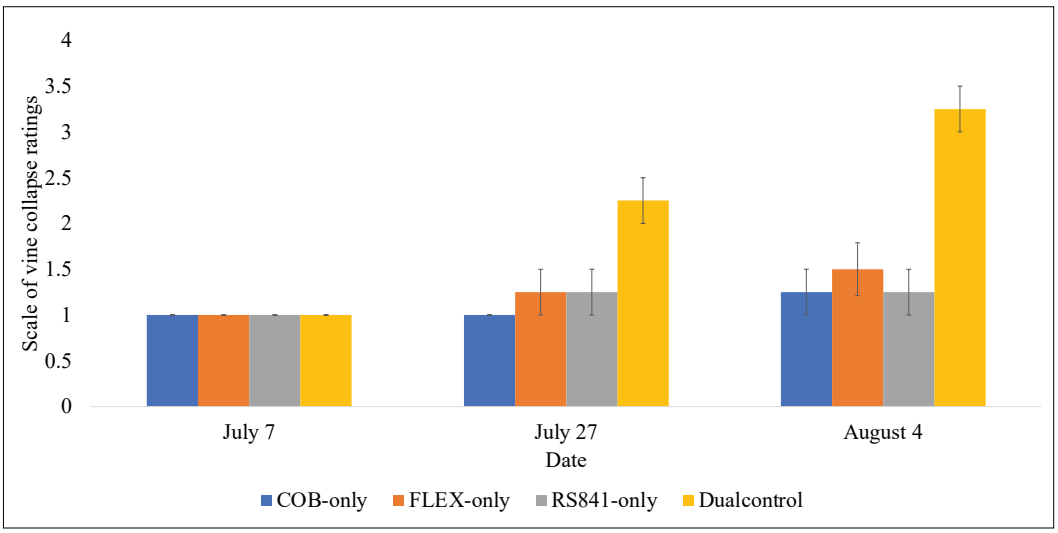

FIG. 3. Comparisons of vine collapse ratings between non-inoculated watermelon plants that were grafted with different rootstocks and the non-grafted control. COB, FLEX, and RS841 are the three rootstocks used in this project (Cobalt, Flexifort, and RS841). Dualcontrol refers to non-inoculated, non-grafted plants.

using biofungicide did not offer a greater watermelon yield compared to the control regardless of the application method (soaking vs. chemigation). Yield enhancement was well observed for plots using grafted watermelon plants (Table 1). For fruit quality from the first harvest, grafting also made much more significant impacts than biofungicide on fruit rind thickness and flesh firmness (Figures 6).

Disease diagnosis. Plants showing symptoms of vine collapse were excavated on August 20 and were shipped to Dr. Cassandra Swett's Fungal Pathology Lab at UC Davis for pathogen identification. Based on the symptomatology, initial diagnosis indicated that the primary diseases were *Fusarium falciforme* crown rot and Phytophthora crown and root rot. Both are soil-borne fungal pathogens, and further

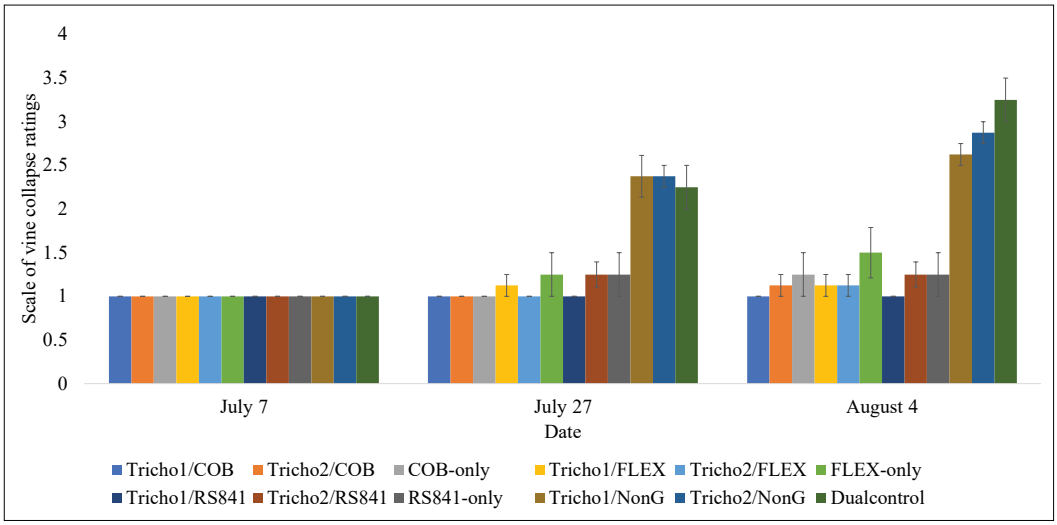

FIG. 4. Effect of the interaction of Trichoderma biofungicide and grafting on the vine collapse ratings. Tricho1 and Tricho2 represent the two different Trichoderma products. COB, FLEX, RS841, and NonG are the three rootstocks used in this project (Cobalt, Flexifort, and RS841) and non-grafted control. Dualcontrol refers to non-inoculated, non-grafted plants.

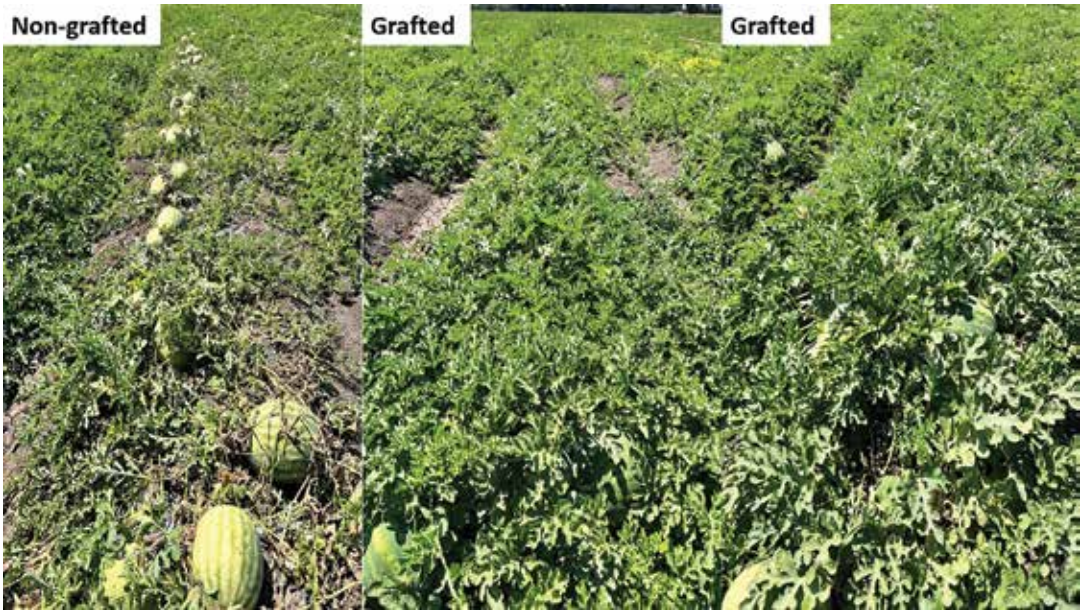

FIG. 5. Left: rows grown with non-grafted, non-inoculated plants; Middle: rows grown with grafted but non-inoculated plants; Right: rows grown with grafted and inoculated plants. Photo taken on August 2, 2022 (76 days after transplanting).

Table 1. Cumulative watermelon yields (tons per acre ± standard error) at each harvest when plants were inoculated with two Trichoderma biofungicides and grafted onto three rootstocks.

Product	First harvest	Second harvest	Third harvest
Tricho-1	29.0 ± 1.71 A	37.5 ± 1.94 A	39.2 ± 1.64 A
Tricho-2	29.4 ± 1.07 A	35.6 ± 0.95 A	37.6 ± 0.92 A
Control-1	28.3 ± 2.88 A	38.2 ± 1.68 A	39.6 ± 1.73 A
Rootstock			
COB	34.5 ± 1.49 A	45.0 ± 1.57 A	47.1 ± 1.40 A
FLEX	24.6 ± 2.24 B	32.4 ± 1.73 B	33.7 ± 1.74 B
RS841	32.8 ± 2.68 A	44.1 ± 2.97 A	47.0 ± 2.64 A
Control-2	24.2 ± 0.83 B	25.9 ± 0.86 C	26.8 ± 0.98 C

Tricho-1 and Tricho-2 represent the two different Trichoderma products.
COB, FLEX, and RS841 are the three rootstocks used in this project (Cobalt, Flexifort, and RS841).
Control-1 refers to the average cumulative yield from all non-inoculated watermelon plants.
Control-2 refers to the average cumulative yield from all non-grafted watermelon plants.
Cumulative yield values followed by different letters indicate a significant yield difference between treatments based on the Least Significant Difference at $P < 0.05$.

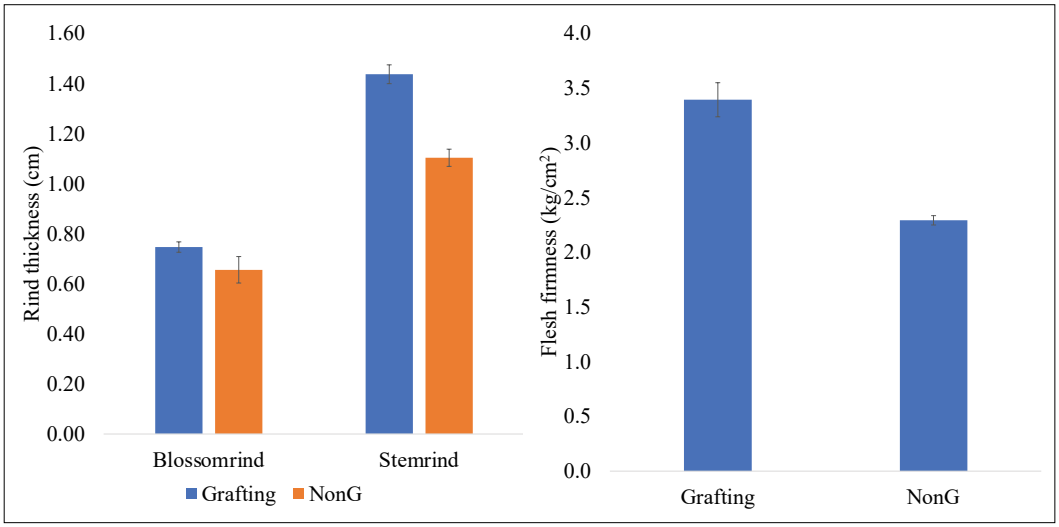

FIG. 6. Effects of grafting on rind thickness measured at the blossom end and stem end (Left) and flesh firmness (Right). NonG = non-grafted watermelons.

molecular confirmation is underway. More research is being conducted at Swett's lab to characterize the *F. falciforme* as a pathogen of diverse California crops, including watermelons.

Summary and take-home message

Grafting onto the hybrid squash rootstocks were tested to be an effective way to reduce the threat of soil fungal pathogens. However, the effects of applying biofungicides in the first-year trial did not stand out. First, the timing of chemigating these living microorganisms through drip lines is crucial. Trichoderma species will be unlikely to inoculate if crop roots are absent or low in volume at or below drip tapes. Therefore, applying these biofungicides before root grows down to the drip line could cause poor inoculation. Second, if chemigation occurs with an irrigation event, it is highly recommended that the chemigation begin at the last part (e.g., one third) of the irrigation depending on the duration. This can limit the length of flushing drip lines and prevent the microbes from draining before they inoculate roots. Root ball soaking seems impracticable for large-scale producers. The reason to include this application method is to test if it is an actionable way to massively inoculate roots before the plants are transplanted into the complex soil environment. In the future, watermelon growers may request the greenhouse to apply multiple times through overhead misting and tray drenching until the transplants are shipped. ■

Acknowledgments

We thank California Department of Pesticide Regulation for the funding support and the cooperative grower for helping with chemigation and fruit harvest. We also thank technical staff, Shirley Alvarez and Alex, for their help with trial setup and data collection.

Note: *Funding for this project has been provided in full or in part through a grant awarded by the Department of Pesticide Regulation. The contents may not necessarily reflect the official views or policies of the State of California.*

Making Input Decisions in a Time of Uncertainty

By Galynn Beer, National Strategy & Product Management Lead

The 2022 harvest was not short on excitement or volatility, much the same as the one before. Even the nimblest producers are having to make input decisions tempered by a climate of supply chain unpredictability. However, the growing season will soon be upon us and now is the time to be thinking about input decisions and how to make the most of the opportunity and promise a new season can bring.

Profit Over Revenue

If you evaluate production cost versus revenue, it's been a long time since proactive growers could secure inputs at low prices early in the season and benefit from rapidly appreciating commodity prices to hedge revenue during the spring. Several years of strong potential profit margins led to greater demand for inputs, increasing costs. Elevated costs eat away at revenue. Every input decision carries a heightened level of uncertainty. Coupled with supply chain issues and input scarcity, and you end up with growers making decisions based on fear of not being able to procure a needed input. When this happens, rational decisions often become irrational, and it happens more often than we probably think.

Crops need what they need to grow, and some nutrients aren't optional. The question presented by the current market climate is how to make sound decisions for the upcoming growing season. There are no easy answers, and there is no single solution that works for everyone. However, there are a number of tools available to evaluate what will work best for you.

Working Through Your Options

The first step is getting a soil test. After evaluating the inventory of nutrients in the soil, the next steps in the decision-making process should be feet-in-the-field observation of the crop, and tissue testing which can reveal possible deficiencies. Why are these tools important? An understanding of the nutrients in your soil and how the plant utilized them will be critical in determining what trade-offs can be made. For example, for heavy nitrogen (N) consuming crops the easy route is to cover the N need and see what is left in the budget for other nutrients. But it helps to consider tradeoffs - giving up 40 pounds of nitrogen to make room in the budget for phosphorus (P), potassium (K), sulfur (S) and micros might coax the best results out of the crop.

If a nutrient appears to be limiting, research options to answer questions such as: What forms of this nutrient are available? To what form or application will the crop best respond? How will it be applied? Are there opportunity costs, meaning can we produce a positive enough response to offset something else we should be spending time and money on?

Someone with strong crop nutrition skills will be able to determine the impact of soil issues, cultural practices and available assets for application and timing. All of these variables aid to provide a good cost-benefit analysis. Diminishing returns can happen when pushing the yield envelope. It's easy to let achieving gross revenue through maximum yield production drive a decision because it's a simple calculation. But the best utilization of fertilizer in a year when it is expensive may be a little below maximum yield, where each nutrient input is leveraged into maximum production.

What's Right for Your Farm?

In addition to making sure you've used all tools available to make informed decisions, it is critical to make sure you keep emotions in check. Pressure to secure supply can result in hasty decisions. Have a process to prevent 'I know I need it' type of decision making. Identify what crops will work best for your farm. It's generally better to stick with a crop you are good at producing and have a local market for. After you've determined the crop fit for you and you've taken an inventory of soil nutrients through a soil test and tissue analysis from the previous season, consult with a fertilizer specialist to understand the limitation for the yield you desire, as well as determine application timing and methods and their fit in your program.

One of the last steps in the process is to make sure you don't become a victim of 'group think'. That is don't assume that others you might see on social media or elsewhere have taken all the necessary steps to make informed decisions. Do your own analysis, make your own choices. It's your money. It's your farm. By all means seek outside advice as part of the process, but don't let outside advice be your entire process.

Yield Win Versus Economic Win

There is opportunity in every growing season. It's a time for decisions to be made with due consideration of the steps needed for them to be informed and well-reasoned. Cost benefit analysis has never been more difficult -- or more important. Seeking sound advice from experts should be part of the equation. Market and supply chain volatility and uncertainty can cause skewed conclusions, so check your emotions. Have a process for making decisions. Follow that process and you will be able to capitalize on the opportunity coming your way. ■

Lilac borer, *Podosesia syringae* (Harris), as a new pest of commercial olives in California: biology and management

Jhalendra Rijal, University of California Statewide IPM Program and Cooperative Extension, San Joaquin, Merced, and Stanislaus Counties

Pest Status

In the summer of 2019, multiple olive growers reported pest damage in orchards, including a 1-year-old olive orchard in San Joaquin County. A high percentage of trees in the orchard were infested with a type of borer. Affected trees had yellowish-green leaves (Fig. 1), and the trees ultimately wilted and died. The stems of those trees were girdled at 1 to 2 ft high from the ground (Fig. 2). By the end of fall, the grower had to pull about 20 to 30% of the trees from the orchard. Additionally, we visited a few mature orchards (7 to 10 years old) with trees with similar larvae attacking the trunks, limbs, and branches. After carefully looking at the morphological characteristics of the larvae and based on the nature of feeding, plus trapping done the following year (2020), we identified the pest as lilac borer, *Podosesia syringae* (also known as ash borer—but not the invasive emerald ash borer). In addition to finds in San Joaquin, we have received reports of lilac borer infestations in several olive orchards in Stanislaus County in the last 2 years.

Lilac Borer Biology

Lilac borer (or ash borer) (Fig. 3) is a type of clearwing moth (Lepidoptera: Sesiidae) with a "clear" hind wing. The larval stage "borer" can feed and cause damage to the woody part of the Oleaceae plant family. Adults emerge in the mid-mornings during the spring season through the summer. Females are ready to lay eggs within an hour of mating on the same day. Egg-laying occurs on the rough bark or any wounds on the tree. One female can oviposit over 350 eggs over 7 to 10 days after emergence. Depending on the temperature, the eggs hatch in about 7 to 14 days, and young larvae bore into the bark. The larvae grow up to 1-inch long and finally settle into the heartwood (Fig. 4) and pupate before emerging as adults the following spring. Lilac borer has one generation in a year but has an extended period of adult emergence. Lilac borer was introduced in California around the 1970s and has been present in the Central Valley since then. The infestation of this pest was reported in landscape trees of the Oleaceae family (such as lilac, privet, etc.), but has never been an issue in commercial olive plantations until recently.

FIG. 1. Yellowish-green leaves are an early indicator of lilac borer infestation in young trees. Credit: Jhalendra Rijal, UC IPM.

Seasonal Phenology

In the 2020 and 2021 seasons, we coordinated the trapping efforts with local pest control advisers and deployed the lilac borer pheromone traps in mid-March in multiple olive orchards in San Joaquin County. We used a commercial lilac borer pheromone lure in delta traps for trapping. Delta traps, combined with specific attractants, are commonly used in orchard and vineyard systems to monitor several economic pests. In the study, we used 29 traps in 2020 and 36 traps in 2021. We divided trapping data into two categories, 1) high

pressure (>100 moths/season for 2020 and >50 moths/season for 2021), and 2) low pressure (≤100 moths/season for 2020 and ≤50 moths/season for 2021). The monitoring results showed that moth activity begins around the first week of April. The capture rate increased substantially from mid-April in both years and continued through mid-May (Fig. 5). The complete trap shutdown was observed by the end of May 2020 and mid-June 2021. Moth capture trends between the high-pressure and the low-pressure traps were similar for both years. Altogether, 1,961 and 1,188 moths were captured in traps in 2020 and 2021, respectively.

Monitoring and Management Strategies

Seasonal pheromone trap counts should provide a reasonable estimation of the beginning, peak, and cessation of the adult flight, and this information should be used to decide spray timing. The lilac borer pheromone lure is available commercially from several vendors and can be used with delta traps. The lure attracts male moths even from a long distance. Weekly monitoring is recommended from mid-March through June. Borer active infestation can be detected by examining the bases of the trees for fine sawdust-like larval excreta (i.e., frass), oozing sap, a circular exit hole, and the shed pupal skins sticking out from the infested wood (Fig. 6).

FIG. 2. Lilac borer girdled (yellow arrow) 1-yr-old olive tree. Credit: Jhalendra Rijal, UC IPM.

FIG. 3. Lilac borer adult. Credit: Jesse Christopherson, Bugwood.org, licensed under a Creative Commons Attribution-No-Derivs-Noncommercial 1.0 License (https://creativecommons.org/licenses/by-nd-nc/1.0/).

FIG. 4. Overwintering lilac borer on olive stem heartwood. Credit: Jhalendra Rijal, UC IPM.

Lilac borer is a new issue in commercial olive production in California. It is critical to pay attention to lilac borer activity in or around the orchard, especially for young trees, as a single larva can potentially kill the entire tree. Cultural practices such as removing the infested and dead branches should help reduce the population over time. Heavy pruning before and during the flight should be avoided for young trees to minimize infestation through these fresh wounds.

No studies have been performed to evaluate the efficacies of insecticides for lilac borer in olive orchards in California. However, based on the literature and practice from other states in non-crop systems, a timely spray of the trunk or whole tree with larvicidal and other contact insecticides can be used to manage this pest. The bottom line is that the insecticide should target the recently hatched larvae

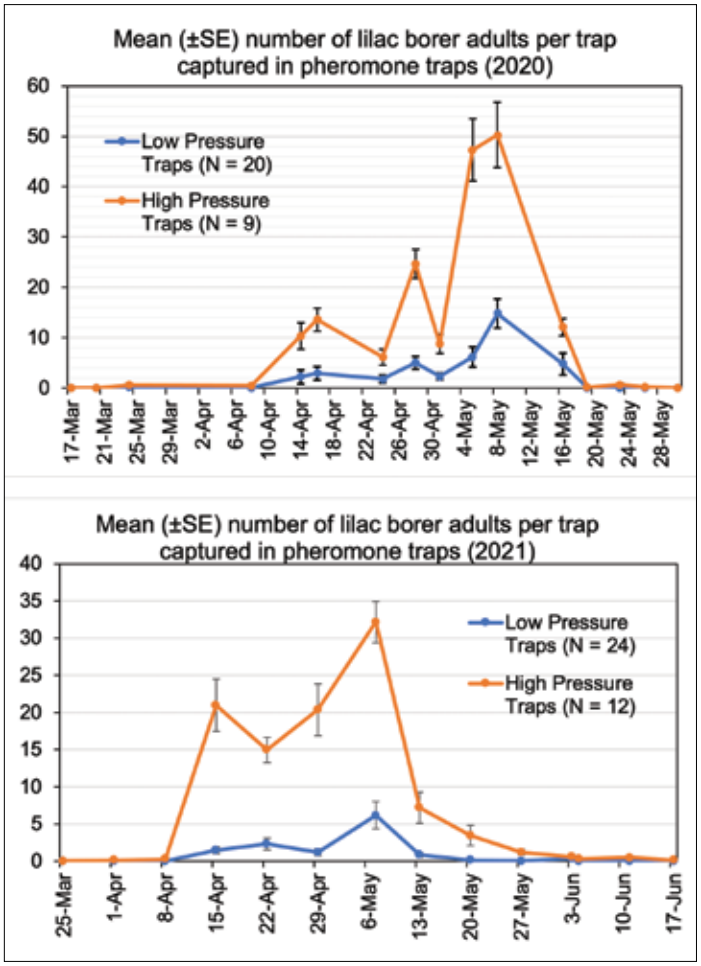

FIG. 5. Seasonal trapping data of lilac borer using pheromone traps, expressed as weekly average moth counts per trap (y-axis). High Pressure Traps = >100 moths/season for 2020 and >50 moths/season for 2021); Low Pressure Traps = ≤100 moths/season for 2020 and ≤50 moths/season for 2021; N = number

before they bore into the bark and wood. Since we know the adult flight period is concentrated within 1-month from mid-April to mid-May, one-to-two applications based on the area's trapping history should help minimize the damage. Insecticides proven effective against this borer in other systems include bifenthrin, carbaryl, permethrins, and chlorantraniliprole. Imidacloprid, a systemic insecticide often used against various tree borers, is not effective against lilac borers, and should not be used. With an extended period of adult emergence (6 to 8 weeks likely) and, consequently, an extended period of egg-laying, multiple sprays may be necessary to cover the entire flight. Always check the label before using any pesticide products in the targeted crop. ■

Acknowledgments

My special thanks to Andy Vignolo, a local pest control adviser, for his coordination and efforts in collecting trapping data. I thank Mohamed Nouri (Orchard Systems Advisor, UCCE San Joaquin), and all participating growers and PCAs for cooperating in this study.

FIG. 6. Shed pupal skin sticking out from the olive limb. Credit: Jhalendra Rijal, UC IPM.

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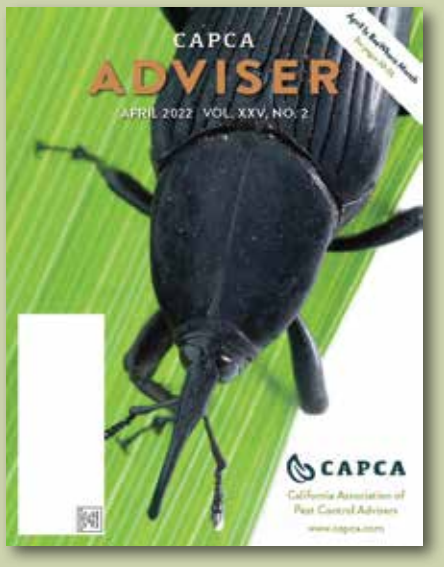

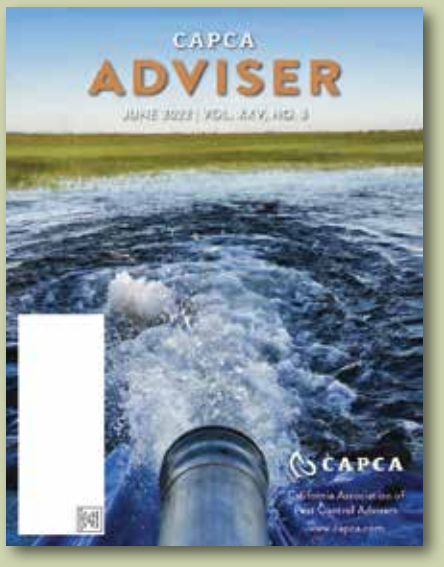

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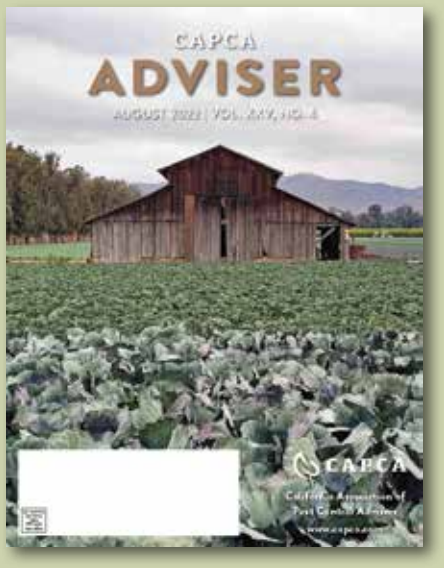

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Terramera
Trical
Wonderful Nurseries

BRONZE

Ag 1 Source
AgBiome
APC Agro
Baicor LLC
Bio Ag Services Corporation
Blue Mountain Minerals
California Safe Soil, LLC
Central Life Sciences
Corigin
Duarte Nursery
EP Minerals
Grower's Secret
Heliae Agriculture
Hortau
KeyPlex
Lallemand Plant Care
Magna-Bon II, LLC.
The Morning Star Company
Motomco
Nutrient TECH
Pacific Biocontrol Corporation
Polymer Ag, LLC
Pursell Agri-Tech
San Joaquin Grower Services
Semios
Southern Valley Chemical Co. Inc.
Spectrum Technologies, Inc.
Summit Agro USA
TeeJet Technologies
Tiger-Sul Products, LLC
Trapview North America, LLC
Western Milling Agribusiness
West. Region Certified Crop Advisers

Save the Date for the 8th Annual BioSolutions℠ Conference & Expo

North America's premier event devoted to the effective use of biological tools and technology solutions in sustainable crop management systems.

The BioSolutions Conference & Expo, presented by *American Fruit Grower, American Vegetable Grower, Greenhouse Grower, CropLife*, and the Global Ag Tech Initiative, will take place February 23-24, 2023, at the Peppermill Resort in Reno, Nevada. The event is co-located with the Biological Products Industry Alliance (BPIA) Annual Meeting and Symposium.

"BioSolutions is a must-attend event for PCAs to get a targeted focus on biologicals with grounded, real-world production information."

Since 2015, this event — formerly known as the Biocontrols USA Conference & Expo — has educated the specialty crop industry on the latest developments in biological tools and techniques for crop protection. In recent years, additional product categories like biostimulants and biofertilizers focused on enhancing plant and soil health have become mainstream. Additionally, new technologies have emerged to help growers across North America use these tools more effectively.

The new name for this event – **BioSolutions Conference & Expo** – reflects this evolution and our focus on uncovering the latest ideas and alternatives for advancing sustainable production solutions for growers and pest control advisers across the U.S. and North America.

Now in its 8th year, **The BioSolutions Conference & Expo** is the only event offering North American growers, advisers, and researchers the latest information and real-world guidance on implementing biological solutions and technology tools in specialty crop production.

Attendees will discover:

- **How to use biologicals more effectively in today's evolving IPM programs**
- **New and innovative products**
- **New categories of biological tools — from biostimulants to biofertilizers — available to optimize your production**
- **How to apply new technology solutions to improve your decision making and maximize the effectiveness of these tools**
- **How it all comes together to provide sustainability for your production, for the environment, and ultimately for your business, your customers, and the consumer.**

Conference programming will provide high-level information and tools, as well as deeper dives into crop-specific topics. Attendees will learn from and network with their grower and adviser peers, share solutions to common challenges, and discover new and soon-to-be-released biological products and technologies. ■

BIO SOLUTIONS CONFERENCE & EXPO
Biological Products. Technology Solutions. Real-World Success.
February 23-24, 2023 • Reno, NV
Peppermill Resort Spa Casino

Biological Products. Technology Solutions. Real-World Success.
February 23-24, 2023 • Peppermill Reno • Reno, Nevada • a **Meister Media Worldwide** event
Hotel & Event Logistics Questions: Katie Smith • Show Director • ksmith@meistermedia.com
Registration Questions: Courtney Marshall • Events Assistant • cmarshall@meistermedia.com
Sponsorship Opportunities: Chris Pernell • Business Director • cpernell@meistermedia.com

www.biosolutionsconference.com

CAPCA 2023 Sustaining Membership Levels

BENEFITS	BRONZE	SILVER	GOLD	CHROME	DIAMOND	PLATINUM
	$750	$2,200	$3,500	$6,500	$10,000	$25,000
Sustaining Member Acknowledgement on CAPCA Website and in Each Issue of *Adviser* Magazine	✔	✔	✔	✔	✔	✔
Subscription(s) to *Adviser* Magazine	1	1	1	1	2	2
Job Opportunities Posting in *Adviser*		1	2	3	Unlimited	Unlimited
Half-page Ad in *Adviser* Magazine (October issue excluded)		1		1		
One-page Ad in *Adviser* Magazine					1	3
Adviser Magazine Advertorial*			1	1**	1**	1**
Discount on *Adviser* Ad Placement			10%	15%	15%	15%
Complimentary Mailing Labels	20% off 1 order	30% off up to 3 orders	2	2	3	5
Comp Conference Registration(s)***			1	2	2	3
Conference Booth Discount***				$100	$200	$300
				discount per booth, limit 4		
Priority Placement for Conference Exhibit Booth***	6th	5th	4th	3rd	2nd	1st
CAPCA Online CE Host or Collaboration Discount			$250	$500	$500	$750
Spring Summit Complimentary Registration***	1	1	1	1	1	1

* October issue fills quickly, first come, first served

** October issue guaranteed if booked by March 31, 2023

*** Complimentary Conference Registrations: Pending the availability of hosting in-person events in 2023. CAPCA reserves the right to limit benefits and/or adjust to online programming value due to unknown gathering and spacing restrictions. CAPCA will provide Sustaining Member companies redeemable Conference registration codes for their employees. $100 service fee will be applied to any refund requested for a registration purchased without use of the provided redeemable registration code.

The rights, privileges, membership benefits and unused portion thereof of CAPCA Sustaining Members applies only to the Company purchasing membership and cannot be transferred or assigned to said Company's subsidiary(ies) or any other entity(ies) of which the Company has full or partial ownership. The rights, privileges, membership benefits and unused portion thereof of CAPCA Sustaining Members applies only to the calendar year (Jan. 1-Dec. 31) for which the Company purchases membership and cannot be transferred or rolled over to any subsequent calendar year.

There is a limited window to sign up for 2023 Sustaining Membership:
Sept. 12, 2022 to Mar. 31, 2023
Don't Miss Your Benefits!

For Sustaining Membership sign-up, visit
www.capca.com/sustaining-membership

CAPCA

LOOK FOR THE MARK

Current partners of the CE Hours Reported trademark program include:

- **Buttonwillow Warehouse**
- **CA Farm Bureau Federation** *(Location for all listed meetings: Portola Hotel & Spa, Monterey CA)*

TITLE:	DATE:	TIME:	CE HOURS:
Updates	12/3/22	10:30-11:30 am	1.0 (1.0 Laws)
What to expect when being inspected	12/3/22	3:15-4:15 pm	1.0 (1.0 Laws)
Compliance 101	12/4/22	9:00-10:00 am	1.0 (1.0 Laws)
Pesticide use around bees	12/4/22	10:30-11:30 am	1.0 (1.0 Other)
Choosing the right pesticide	12/4/22	3:30-4:30 pm	1.0 (1.0 Other)
Common violations	12/5/22	1:30-2:30 pm	1.0 (1.0 Other)
Pyrethroid & neonic insecticide use	12/5/22	3:00-4:00 pm	1.0 (1.0 Other)

- **Oro Agri**
- **UC IPM Webinars**

DO YOU HOST DPR CE MEETINGS?

As a sponsor of CE meetings, your company can also take advantage of this promotional tool to assist you in marketing your educational events. CAPCA is offering the use of this trademark *at no cost to those CE sponsors who are dedicated to advancing the professionalism and educational training of all DPR license holders*. Promotion of the meeting includes a basic listing in the Adviser magazine, under CE provider-CE available listings and on our website. (The listing is informational to our members, not ad space for the meeting sponsor.)

For additional information contact Joyce Basan:
joyce@capca.com / (916) 928-1625 ext. 2

CAPCA
FRESNO MADERA

CAPCA Chapter of the Year Award

In 2022, CAPCA began a little competitive ranking program of chapters for the purpose of communicating to local members the value of chapter engagement and activities, developing a baseline of activities for each chapter to accomplish annually, and building some friendly competition between chapters. The highest ranking chapter would then receive the Chapter of the Year Award at the CAPCA Annual Conference.

When the tally was completed, the Chapter of the Year Award for 2022 was awarded to the Fresno-Madera Chapter.

The Chapter's reply was: "The Fresno-Madera Chapter is thrilled to be the inaugural winner of the Chapter of the Year Award. It has been a team effort, sharing pictures from the season, putting on huge informational CE meetings for our members, and supporting our local students & government officials. We look forward to continuing our engagement with our members and spreading the message of PCAs this coming year as we try for a back to back win!"

Fresno-Madera Chapter's President Adam Tavares accepting the Chapter of the Year Award at the CAPCA Annual Conference

Fresno-Madera Board (L-R): Ken Cunningham, Laura Gulley, Patrick Murphy, Krista Tavares, and Kalyn Bischel

Ventura Chapter Awards $4,500 in Scholarships

Every year, the Ventura Chapter's activities include fundraising to help students who are pursuing a PCA career in Ventura County.

Ventura Chapter is proud to announce their 2022 Scholarship Award winners: Raúl Coronado, Anthony Cancino, and Fernando Gómez.

CAPCA VENTURA

Congratulations to the winners!

Raúl Coronado - $2,500

Anthony Cancino - $1,000

Fernando Gómez - $1,000

Central Valley Chapter's Bowling Night at CAPCA's 48th Annual Conference in Anaheim, October 2022

CAPCA
CENTRAL VALLEY

Get Involved With Your Local CAPCA Chapter Today!

CAPCA Chapters are currently participating in a Chapter Ranking Program to build a little friendly competition and reflect value for all the volunteer lead activities happening at your local chapter. CAPCA Chapters are doing a lot in their community and for their profession.

We encourage all CAPCA PCA members interested in serving on their Chapter Board or participating in local Chapter events/activities to contact their local leadership members: https://capca.com/chapters/

Get Involved Today!

NOTE: The following job opportunities are abbreviated postings. To view the complete posting, please log into the **MEMBERS ONLY** section of our website https://capca.com/my-account/

Associate Sales Manager – (off-site) Northern California

Kemin Crop Technologies

Description: Kemin is seeking an Associate Sales Manager to continue growing market share. This individual will focus on key accounts and will achieve consistent growth in sales and gross margin in accordance with yearly sales budget. The Sales Manager is responsible for identifying market opportunities, along with developing and maintaining relationships with customers in commercial specialty agriculture.

Duties, Responsibilities & Qualifications: Establish and grow strong relationships with industry partners and university collaborators and with key customers to promote products and provide solution-based programs; Participate in seminars and trade shows that promote sales and create future business opportunities; Provide reporting on performance and keep customer information up to date in the CRM program; Min. of Bachelor's Degree. Preferred degree in Agriculture, Horticulture or a comparable field of study; 5+ years of previous sales experience in the agriculture or horticulture industry; Must have an insurable driving record.

Apply: See the full job description and apply here: https://careers-kemin.icims.com/jobs/8580/associate-sales-manager-%e2%80%93-northern-california/job.

CAPCA STATE OFFICE

HOLIDAY HOURS

The CAPCA State Office will be closed from Dec. 22, 2022 to Jan. 2, 2023,
in observance of the Christmas & New Year holidays.
The Office will re-open on Tuesday, Jan. 3, 2023.

Troubleshooting support for website and online CE is only available during CAPCA business hours.

For Continuing Education printouts, current members can download and print their official certification report directly from the CAPCA website. Log into your user account, click Hours Report and select the Print option.

IMPORTANT: Make sure to renew your membership no later than 12/20/2022 so that your account updates and your complete CE Hours show on your printout.

IN YOUR FIELDS.
BY YOUR SIDE.

Built from the ground up by a hardworking farmer, Simplot Grower Solutions has delivered hands-on farming innovation for over 75 years. Even now, as a leading national ag retailer, we remain grower-focused, American based, and family run to this day.

Our locally specialized teams help you maximize yields on every acre with personalized advice, accurate agronomic expertise, and preferred products and solutions ready for the unpredictable nature of farming.

Connect with your local crop advisor at
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