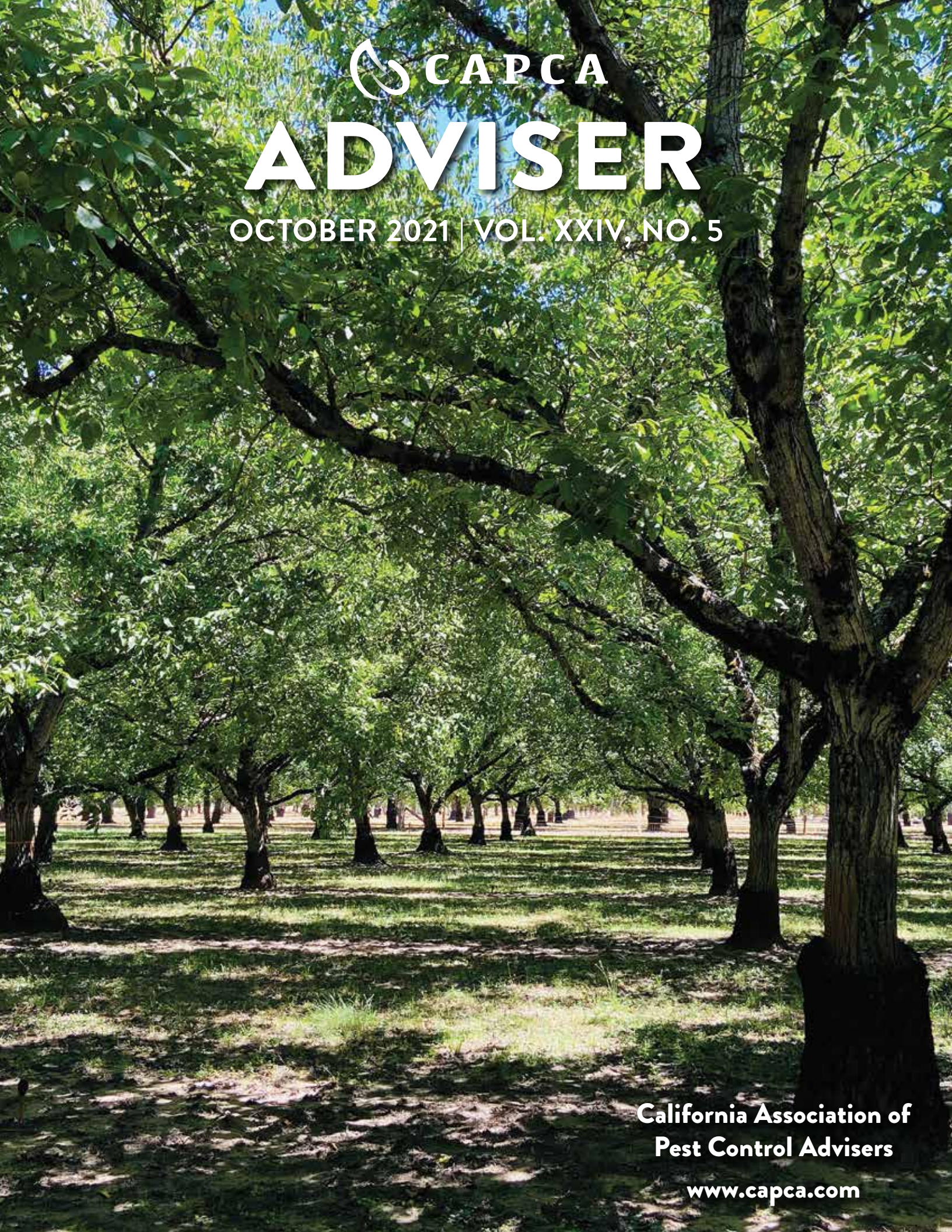


CAPCA

ADVISER

OCTOBER 2021 | VOL. XXIV, NO. 5

California Association of Pest Control Advisers

www.capca.com

ADVERTORIAL

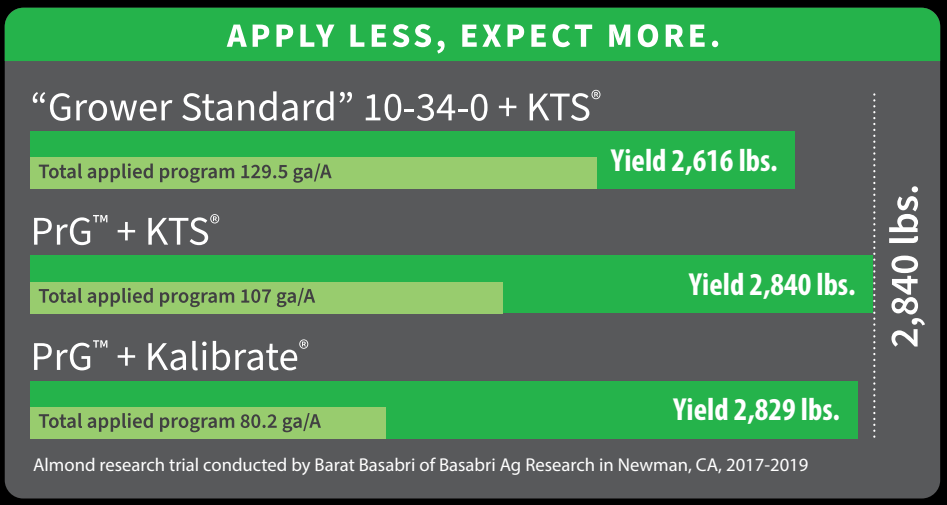
A quality crop demands quality nutrition?

PRECISELY.

With over 2.4 million acres of trees planted, California grows over 85% of the world's almonds. Virtually all commercially harvested almonds produced in the U.S. come from California. Most of that is due to the climate: warm, dry summers and cool, rainy winters are key to setting the tree up for success. But, we know it takes more than a temperate climate to maximize a crop's potential. AgroLiquid crop nutrition can be a valuable tool in producing an abundant and quality almond crop. In an effort to determine the best sources, rates, timings and methods of application for this important crop, AgroLiquid is on the third year of a full-scale research trial in almonds in California.

AgroLiquid has long believed in proving our technology through rigorous research and field testing. In western soils, we are looking at our technology performance compared to conventional fertilizer sources. Almonds are the perfect crop to test our Flavonol Polymer Technology, given how much potassium is needed to produce a crop. AgroLiquid's proprietary technology allows us to chelate/encapsulate nutrients within the sweet spot—not too loose, but not too tight. Our multi-year almond trial has been conducted by Barat Basabri of Basabri Ag Research in Newman, CA.

APPLY LESS, EXPECT MORE.



Almond research trial conducted by Barat Basabri of Basabri Ag Research in Newman, CA, 2017-2019

Kalibrate® Precision Potassium
Soluble Potash
with Flavonol Polymer Technology (FPT)

Trial details: Each plot consists of five trees and was replicated six times across the orchard. Throughout the growing season, 50 gallons per acre (ga/A) of UAN-32 is applied as a constant in every plot and EDTA Zinc (Zn) applied four times during the season for a total of 2 ga/A.

Yield results in the three plots were statistically insignificant, meaning yields were comparable despite the substantial differences in application rates.

Using AgroLiquid products with Flavonol Polymer Technology, growers are able to use less fertilizer in gallons compared to conventional treatments and achieve equal to better results in yield and quality. The Flavonol Polymer also allows for unmatched tank mix compatibility, all AgroLiquid products are able to be mixed together and will stay in suspension without "fallout." AgroLiquid products can even be mixed with most with most conventional fertilizers to help aid with every crop's nutrient needs.

AGROLIQUID

AgroLiquid.com

See page 8

Annual CAPCA Conference & Agri-Expo

Photos, cover & this page: Cindy R. Kron, UC IPM
See pg 48

2021 CAPCA Photo Contests
See pgs 24-28

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CAPCA
AT THE CENTER OF PLANT HEALTH

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With BRANDT® EnzUp® Zn Patent Pending Enzyme Technology

- Delivers a high concentration of enzymes that are treated with a patent pending process
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[1]*Source: BRANDT Field Trials 2016-2018*

CAPCA
AT THE CENTER OF PLANT HEALTH

The Times They Are a-Changing

CAPCA is changing. We are evolving toward permanently integrating the technology that helped us continue to operate and support members during the pandemic. In the last year and a half, you may have noticed fewer direct mailings, a dedicated email to submit support questions, and Member Mondays on social media providing relevant updates to our membership. We noticed your habits are changing too. We saw fewer purchases made by checks, even while CAPCA maintained the same interaction with members by phone, email, and resources through the website.

Over the last year, CAPCA has rolled out new technology supporting ways to maintain your license professionally. We developed an Online CE platform and upgraded your membership dashboard to easily check hours and integrated a quick print feature for official certs. Behind the scenes, the team is working to automate some time-consuming tasks that will allow us to focus on larger projects that serve our members.

My goal as CAPCA CEO has been to spend less to give members more. We hope you have already taken advantage of the early registration price for the CAPCA Annual Conference. Members receive a deeply discounted price of $150 to join us in Reno. My archives don't go back far enough to a year when CAPCA hosted members at Conference for only $150.

Furthermore, we moved our physical location to spend less on the overhead of an office that was sitting nearly empty since March 2020. We sent more emails instead of mailing dues forms, flyers, and postcards – focusing instead on a few key outreaches. We shifted our staff focus to a simple question: "How does this serve our members?" We hope that you feel the positive impact of these changes and the value of your membership as you renew for 2022!

This also means we need you to come with us too. We want you to know to check your email inbox for important CAPCA alerts instead of your mailbox. We want you to set up a membership account at CAPCA.com so that you can easily renew, but also so you can take online CE with ease from the same dashboard. We want you to know that CAPCA staff is here and working diligently to serve members. Even if we aren't mailing out a dues form, we are simply moving with the times as things continue to change.

Ruthann Anderson, Editor
ruthann@capca.com

© Fred Rehrman, Elysian Fields

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
CAPCA Adviser is published bi-monthly by the California Association of Pest Control Advisers (CAPCA), 555 University Ave., Ste. 260, Sacramento, California 95825. Web: www.capca.com, (916) 928-1625. POSTMASTER: send address change to CAPCA. A portion of CAPCA membership dues is used to provide subscription privileges to the Adviser magazine. Non-member subscriptions are $30/year. Third class bulk postage paid at Tucson, AZ and at additional mailing offices.

PRINTING:
Sundance Press
Tucson, Arizona




License renewal needs to change

What should it look like?

Patrick Dosier, CAPCA Chair

During the first quarter of this year, we heard from many Members who were frantic about when they would receive their renewed license. Some had waited until the last minute - that is, the later weeks of December - to submit their renewal packets. It is no secret that this is too late for a quick renewal. DPR and CAPCA have always been transparent about the timelines for last-minute renewals. However, there were anecdotes from PCAs who submitted before November and who did not receive their renewed license until February, March, or even April. As some ag commissioners took a hard line, "license-in-hand," approach, some PCAs scrambled to find colleagues to cover their early season recs.

Suffice to say, the PCA renewal process needs to be improved, and clarified, to be tenable.

CAPCA's position is that 4+ month renewal delays are unacceptable and that DPR must fund the licensing department before spending tens of millions on vanity projects like the Statewide Pesticide Notification app. The delay robs PCAs of the fall months, which are commonly the most convenient time to obtain quality CE. It is hard to understand why there should be such a long renewal delay for CAPCA Members, as they submit their official CE report from CECPM to DPR. It should take an entry-level employee less than five minutes to process a renewal. We know they can move quickly because they cash our renewal checks within days of receipt!

The reality is that ranting to DPR about their poor performance will not lead to better outcomes. However, there have been some DPR staffers who will admit, in private, that the PCA licensing process is strained, if not broken. CAPCA will work with DPR to improve this process. We are challenged with offering constructive advice which leads to a better experience for PCAs and works within DPR budget and staffing constraints.

What does a better renewal experience look like?

We need your input on this big question! It is impossible for us to advocate for you if we don't know what you want. We have heard some great suggestions from our Advocacy Committee and Chapter Leadership. Many of these suggestions are incomplete or are contradictory to each other. Hence, we need to hear from the broader Membership. It's time for a survey!

Coming in September, a survey will be conducted for you to provide your feedback and comments. There are a limited number of questions to gauge your current renewal experience and to prioritize items for improvement. It will take less than 2-3 minutes.

CAPCA will analyze the survey results to define a strategy that maximizes the benefit to Membership. Then, we will engage with DPR with data about the current system and with clearly articulated suggestions for how to improve.

Thank you for documenting your personal experience, reflecting on ways to improve, and for providing a few minutes of your valuable time. See you at Conference! ■

License Renewal Survey

https://www.surveymonkey.com/r/BZRDTHY

THE POWER OF WE™ WILBUR-ELLIS AGRIBUSINESS CAPCA

Standing the Test of Time, Together

This past June, Wilbur-Ellis celebrated our 100th year of doing business and we're proud to be sponsors of this year's CAPCA Conference and even more proud to have been a sustaining member of CAPCA for 40-plus years. So, join us in celebrating a century of Wilbur-Ellis history.

100 Years of Wilbur-Ellis

The story starts in 1921 when three young men took a leap of faith and launched a company that has captured the opportunities, weathered the storms, and continues innovating, giving and evolving to grow our business for the next 100 years.

Throughout these years, we're proud to have worked with you to provide the best solutions for you and your growers. To learn more about our history and our 100-year celebration, visit wilburellis.com/100th-anniversary today.

Celebrating by Giving Back

Giving back to the communities where we live and work has always been a priority for Wilbur-Ellis. As part of our 100th anniversary celebration, we launched the Giving Program to help people in need worldwide.

Each month, we posed a new question for employees and friends of Wilbur-Ellis, as well as for the children in employees' families. For each response received, the company added to a donation for the Red Cross. In total, the Giving Program raised $52,000 USD for the Red Cross, building on the company's $100,000 donation in 2020.

During the celebration, the company's employees also contributed to the Wilbur-Ellis Fund Drive to Stop Hunger. A total of $30,000 was raised through employee contributions and company matching funds, benefiting Feeding America in the U.S., Second Harvest of Canada, and Action Against Hunger internationally.

CAPCA Through the Decades

In the last hundred years and the next, we're excited to give customers and PCAs access to groundbreaking technologies on a local level. The quality and commitment from Wilbur-Ellis will stay the same. From water management to biological pesticides to organic-approved formulations, we have the most advanced crop protection technology on the market. That means everyone who works with Wilbur-Ellis has access to a full suite of products that addresses any and every challenge—so you can be sure your growers are getting the best solutions available.

To start finding the right solutions for you, contact your local Wilbur-Ellis representative or visit **WilburEllisAgribusiness.com** today.

WILBUR-ELLIS 100 YEARS SINCE 1921

CAPCA 47th ANNUAL CONFERENCE

October 17-19, 2021 | Grand Sierra Resort, Reno NV

Sept. – Dec., 2021 | Online Continuing Education

CAPCA.COM/CONFERENCE
for registration, hotel, hours and more!

47 Annual CAPCA Conference & Agri-Expo

ADVERTORIAL

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Maximizing Plant Growth

Ocean Organics Guarantee® Seaweed Extracts and Stress Rx Ag® provide:

1 INDUSTRY LEADING STRESS MANAGEMENT BENEFITS

Increased Tolerance to Heat, Drought, Salinity, High and Low Temperatures

Dr. Bingru Huang at Rutgers and Dr. Erik Ervin at Virginia Tech established that our extracts' natural plant-available compounds promote stress tolerance.

- In trial after trial, our research shows more vigorous growth and yield.
- Research on salt-stressed strawberries:
  Treatment with Stress Rx Ag on salt stressed strawberries resulted in an increase of $2792 to the grower's return per acre for the season, compared to the grower standard.

2 MAXIMUM BENEFICIAL PLANT ACTIVE COMPOUNDS YIELD CONSISTENT, POSITIVE RESULTS

Our extraction processes maximize beneficial plant compounds with multiple modes of action that produce:

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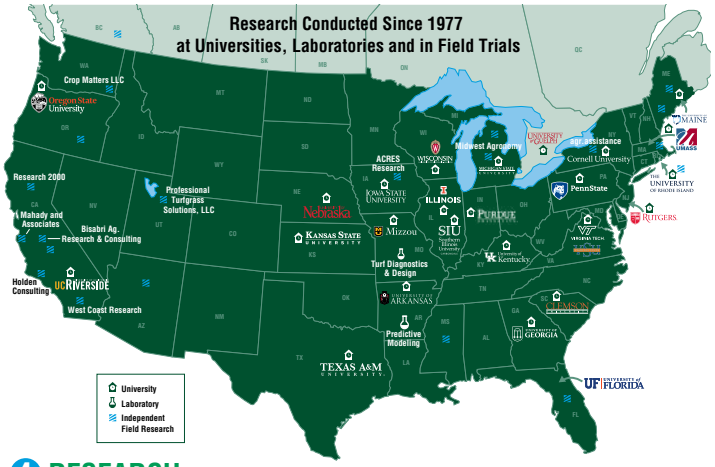
3 LOWER SOLIDS FOR BETTER MIXING AND EASE OF APPLICATION

Using innovative techniques both sophisticated and sustainable, Ocean Organics produces seaweed extracts that are richer than others but with fewer solids and inert ingredients. Lower viscosity allows easy mixing and application.



4 RESEARCH

For four decades we've focused our research and development on extract-based products that add a level of growth management, stress tolerance, and overall plant performance that are impossible using only traditional root applied fertilizers. We've researched our materials in more than 35 universities, with a dozen independent researchers, and in numerous field trials.

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CAPCA 47th ANNUAL CONFERENCE & AGRI-EXPO

2021 Conference Registration is Now Open!

RENO EVENT: OCTOBER 17-19, 2021

Grand Sierra Resort, Reno, NV
Program to feature:
7.5 DPR Hours Total (.5 Laws & 7.0 Other)
Please note: no Label Update session will be held in Reno.

SUNDAY, OCTOBER 17, 2021

- **Nitrogen Management & Irrigation Update**
- **Crop Round Table Meeting**
  Panelists: Kent Stenderup, *almond grower;* **Leon Etchepare,** *grower, Emerald Farms & Wellnut Farms;* **Emily Symmes,** *Suterra;* **Mohammad Yaghmour,** *UCCE Area Orchard Systems Advisor;* **Drew Wolter,** *Senior Specialist, Pest Management, Almond Board of California;* **Brian Gough,** *Helena, PC*
- **Exhibitor Presentations**

MONDAY, OCTOBER 18, 2021

- **General Session** - Welcome, Licensing and Hours Recap
- **CACASA Update**
- **Drift Issues with High Value Crops: Mitigation and Best Practices**
- **State of Fresh Fruit**
- **Herbicide Resistance in California: Identification and Management**
- **Current Integrated Pest Management Research in Avocados and Citrus**
- **IPM for Fruit and Nut Tree Diseases**
- **Exhibitor Presentations**

TUESDAY, OCTOBER 19, 2021

The Reno event will include private events hosted by Sponsors and Exhibitors on Monday & Tuesday afternoon. Activities will vary from CE sessions to hosted lounge areas. Registered Reno Attendees: *Watch your Inbox for details.*

No on-site registration available. Reno registration ends 10/1/21 and may close early, based on venue capacity.
Registration (after 8/27/21 through 10/1/21):
Member $250 | Non-Member $400
PLEASE NOTE: Registration for the Reno event **does not include online CE hours**. Add ***'Full Online Program'*** to your registration to access all 21.5 DPR hours.
No unique pricing for Student, Spouse, Child, or Exhibitor.
No Refunds.

KEYNOTE SPEAKER:

Joshua C. Walters, Esq
Pres. & CEO, Walters Strategies

Harvesting Victory: From Seed to Success

Rome wasn't built in a day, and neither is a winning legislative strategy. Creating an environment for success requires intentional, sustained and targeted actions. In this session, Josh Walters will analyze the state-of-play for agriculture in California's Legislature today, before discussing how some Ag groups, including CAPCA, are working together to shift perceptions and ensure Ag is well-positioned to succeed in the political landscape. Your dues are at work in Sacramento. Don't miss this opportunity to hear more about how the Association represents all of California's PCAs.

Joshua C. Walters is a resourceful political professional and attorney with a background in politics, campaigns, legislative process, issue advocacy, as well as association and litigation management. Walters is a proven crisis manager, combining nearly two decades of legislative and political experience to develop winning campaigns and creative solutions to complex political, policy and legal problems on behalf of elected leaders, political coalitions, ballot measure committees, independent expenditure committees, employers, and employee associations in a variety of high-stakes environments. Walters specializes in developing campaign strategy, coalition building and management, and crafting compelling and effective messaging that achieves results across the media spectrum.

A proud native Californian, Walters is a UC alum, attending UC Davis for his undergraduate education and UC Hastings College of the Law. He is a member of the California Bar. When not helping his clients navigate California's political landscape, you can find Walters SCUBA diving in the warm waters of some far-off land or honing his skills as an amateur chef.

RUBEN ARROYO
Riverside Co. Ag Commissioner

CACASA Update
Ruben is a Past President for the California Agricultural Commissioner and Sealers Association. He is Chairman of the Pesticide Regulatory Affairs Committee for CACASA and a representative for the Commissioners on the US EPA Pesticide Program Dialogue Committee, Pesticide Registration and Evaluation Committee, and the UC IPM Program Advisory Committee. Arroyo has 28 years of experience in serving the public with a county ag department and 10 years prior to that working directly with the citrus industry in Lindsay, California, where he was born and raised.

PAUL SQUIRES
PCA

Drift Issues with High Value Crops: Mitigation and Best Practices
Paul has been a crop consultant since 1994. In 2002, he founded Squires Ag Consulting, where he consults on thousands of acres throughout the Sacramento Valley. He is also a partner in a farming entity in Meridian, CA. Paul has shared his ag industry expertise as a professional witness on various legal cases, is a part of Ag Leadership Class 37, and makes time to mentor upcoming PCAs.

IAN LEMAY
California Fresh Fruit CEO

State of Fresh Fruit
A lifelong resident of the San Joaquin Valley, Ian serves as President for the CA Fresh Fruit Association, a voluntary public policy organization that serves as a liaison between regulatory and legislative authorities by acting as a unified voice for its members – growers, shippers, marketers and associates – on issues that affect member commodities. From 2011 to 2015, Ian served as District Director for Congressman Jim Costa (16th Congressional District). In his role, Ian advised the Congressman on issues such as ag, water, and transportation.

DREW WOLTER
The Almond Board of California

Herbicide Resistance in CA: Identification & Management
Drew Wolter is the Senior Specialist in Pest Management for the Almond Board of California (ABC). He is a graduate of the UC Davis Horticulture and Agronomy program, with an emphasis on weed science. At the ABC, he spearheads all pest management research with the goal of equipping growers and PCAs with the best information and tools to support the almond industry in producing high quality almonds, profitably and sustainably. Furthermore, given his undergrad background in ecology, he is especially excited to bring ecological principles to pest management.

DAVID HOLDEN
Holden Research and Consulting

Current Integrated Pest Management Research in Avocados and Citrus
David has 45 years experience as a PCA and Ag Production Consultant. He specializes in avocados, berries, citrus, vegetables, and wine grapes. He does production-related field research for a variety of manufacturers of nutrient and pest management products (conventional and organic). He has worked with the CA Avocado Commission, CA Celery Commission, CA Pepper Commission and the University of California. David received a B.S. from Cal Poly, Pomona in 1976.

MOHAMMAD YAGHMOUR
UCCE Area Orchard Syst. Advisor

IPM for Fruit & Nut Tree Diseases
Mohammad Yaghmour joined University of California Cooperative Extension in 2015 as an Orchard Systems Advisor for Kern and Kings counties. Prior to his appointment, he completed his Ph.D. from the University of California, Davis, where he focused on plant pathology, particularly fungal diseases of orchard crops. Mohammad's research and extension activities include almonds and temperate deciduous fruit trees such as cherries, and other stone fruits.

NEED ADDITIONAL HOURS?

Add the Online CE Program to Your Registration.

FULL ONLINE PROGRAM

Access October through December 31, 2021

14.0 DPR Hours (4.5 Laws & 9.5 Other)
17.0 CCA Hours

Full Online Program registration includes:
Label Update *(access starts in Sept.)*
General Sessions *(access starts in Oct.)*
Breakout Sessions *(access starts in Oct.)*
Nitrogen Management Update *(access starts Oct. 17th)*

LABEL UPDATE-ONLY

Access September through December 31, 2021

4.0 DPR Laws Hours
4.5 CCA Hours

Looking for a small number of CE hours in Laws?

Register for the Label Update-Only to access online, on-demand, from September through 12/31/2021.
(No Label Update Session will be held in Reno)

2021 MEMBERSHIP DISCOUNTS AVAILABLE*

**2021 Active and Associate Members only. No post-purchase discounts will be given.*

Online Continuing Education for the CAPCA Conference will be available anytime, on-demand, at your convenience, beginning in September (for Label Update), with General Sessions and Breakout Sessions released at the beginning of October, and the Nitrogen Management Update released on Sunday, October 17th.
All program content is accessible online through December 31st, 2021.

See Sessions and Speakers:

https://capca.com/conference/conferenceprogram/#online

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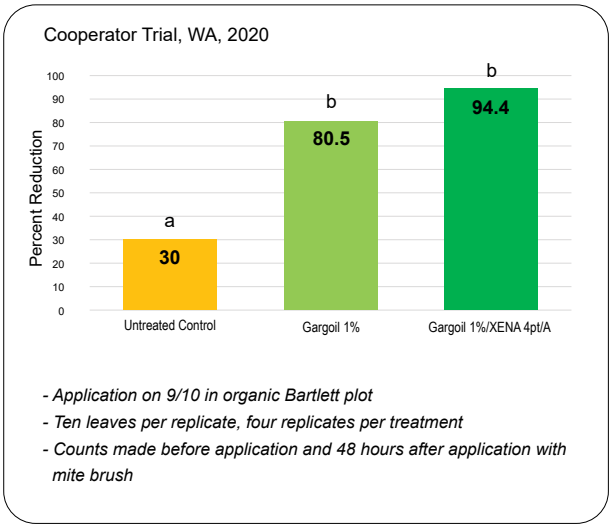
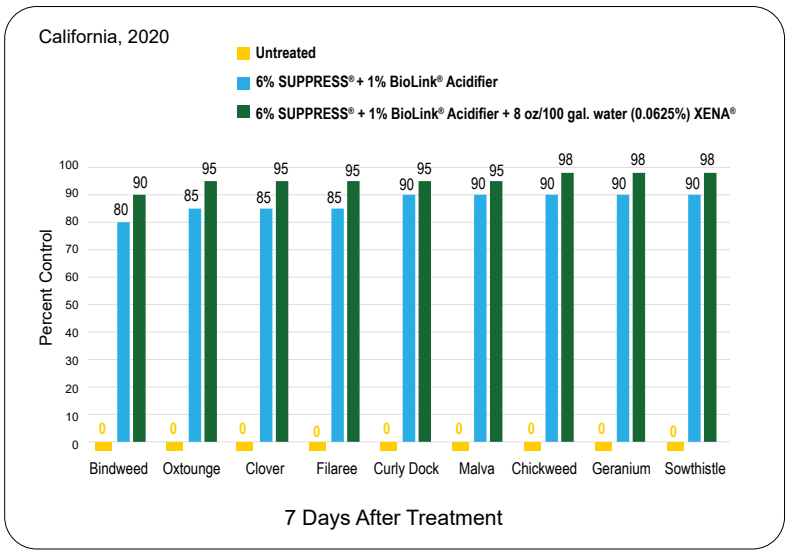
- It can increase the area contacted with the same amount of spray.
- Compatible with most pesticides.
- Approved for Certified Organic Crop Production.

XENA® Spreader-Sticker and Gargoil® Control of Pear Rust Mites on Bartlett Pear



- Application on 9/10 in organic Bartlett plot
- Ten leaves per replicate, four replicates per treatment
- Counts made before application and 48 hours after application with mite brush

XENA® Spreader-Sticker and SUPPRESS® Herbicide EC Control of Large Established Weeds in Almonds



California State Registration Pending

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CAPCA CONFERENCE 2021

CONTINUING EDUCATION ONLINE PROGRAM

Available On-Demand, October–December, 2021

Online Continuing Education for the CAPCA Conference will be available anytime, on-demand at your convenience beginning in September (for Label Update), with General Sessions and Breakout released at the beginning of October, with access through December 31st. Our Online Program includes these knowledgeable presenters:

MICHAEL CAHN
Helena Chemical

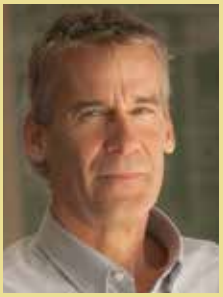
Assessing and Managing Salinity

SCOTT OCKEY
Certis USA

Induced Resistance Technologies in Agricultural Production

MICHELLE MOYER
Washington State Extension

Powdery Mildew Biology and Control in Grapes



DR. SCOTT STEINMAUS
Horticulture and Crop Science, Biological Science, California Polytechnic State University, SLO

Managing for Target-Site or Non-Target Site Herbicide Resistance: It makes a difference.

NICK CLARK
Helena Chemical

Nutrient Management in Forage Crops

DR. SURENDRA K. DARA
Cooperative Extension Advisor-Entomology and Biologicals

Spotted Lanternfly: Risk areas in California and Current Management Options

RICK GURROLA
Shasta County Ag Commissioner & 2021 - 2022 CACASA President

CACASA Update

DAVID HAVILAND
Farm Advisor, Cooperative Extension Kern County

New innovation in IPM - Navel Orangeworm BMPs

BEN FABER
UC Cooperative Extension

Who's Afraid of Avocado Root Rot?

ALEX PUTMAN
UC Riverside

Soilborne Diseases of Strawberry: Precision Fumigation and Impact of Irrigation

PRECISE DEFENSE

By 2050, the world population is expected to reach nearly 10 billion people.[1] Experts believe food production worldwide will need to increase by approximately 60 percent.[2] In theory, it seems simple. Plant more seeds, add water, grow more crops. But that simple equation gets significantly more complicated when you add – or subtract, to be specific – one condition: water scarcity.

Food production, in the United States and beyond, is a complex ecosystem that encompasses monoculture farming and agriculture corporations as well as small-scale growers. Their ethics and ethos may be wildly different, but none are immune from the consequences of climate change, which is underwriting the urgency in how companies are developing solutions to farm more efficiently.

There's certainly reason to be optimistic, as a new generation of growers and innovators invest in solutions to extend or eliminate the seasonality of food production. Examples include indoor vertical farms and greenhouse farming. And while change does come from a groundswell at a local level, the question remains whether this is sufficiently scalable.

The heart of this global crisis is *how* we farm.

Currently, 70 percent of the world's water use goes to agriculture, but that amount is only irrigating 20 percent of the arable land.[3] It's a model of stunning inefficiency: 77 percent of that land is still being irrigated through surface irrigation, the literally ancient practice of flooding the land with water.[4] Not only does it waste water, it also discounts the importance of incorporating crop protection, a critical component that affects yields. In California, approximately half of the state's perennial crop acreage is impacted by elevated plant parasitic nematode populations.

Building a More Sustainable Future:

- Drip Irrigation provides uniform crop growth, along with high yield and quality potential.
- With Netafim Precision Irrigation, nutrients and crop protection are delivered directly to the root zone, significantly reducing waste.
- 50% of California's perennial crop acreage is impacted by nematode populations.[5]
- Netafim and Bayer team up to deliver the effective solution for almonds: Precise Defense.

Agronomists have spent decades researching the benefits of precise application of water, fertilizer and crop protection to each crop, which is best applied through drip irrigation.

As the industry continually moves to improve its sustainability practices, companies like Netafim™ and Bayer are partnering to innovate and develop solutions that are scalable, sustainable and easy to use.

The Precise Defense program brings together the dynamic combination of Netafim's innovative drip irrigation technology and Velum® One Nematicide from Bayer, a proven crop protection product that suppresses nematodes and helps increase canopy area and trunk growth in new almond plantings.

Netafim's Precision Drip Technology delivers Velum® One straight to the root zone to maximize the residual efficacy. Simply put, it's a powerful solution that works together to build a more sustainable future.

For more information about the Precise Defense program, visit **www.precisedefense.com**.

1 https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html
2 Graziano Da Silva, José. "Feeding the World Sustainably." https://www.un.org/en/chronicle/article/feeding-world-sustainably
3 https://www.worldbank.org/en/topic/water-in-agriculture
4 https://www.usgs.gov/special-topic/water-science-school/science/water-qa-what-most-freshwater-us-used?qt-science_center_objects

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Annual CAPCA Conference & Agri-Expo

CAPCA CONFERENCE 2021 ONLINE CE PROGRAM PRESENTERS (cont.)

BRAD HANSON
UC Davis

Current Weed Management Issues and Control Strategies

DREW ZWART
Plant Pathologist & Physiologist at Bartlett Tree Experts/Bartlett Tree Research Lab

Phytophthora in California: Beyond Sudden Oak Death

DANIELLE KIRKPATRICK, PH.D.
Trécé

Comprehensive Almond Insect Management

JIM ADASKAVAGE
UC Riverside

Efficacy Data for Conventional Practices and Associated Diseases

ROB SCHERZINGER, Aspen Helicopters & CAAA Chairman

Communication: Vital to protecting surrounding crops, sensitive areas, farm workers and the environment

DR. GABRIELE LUDWIG
Director, Sustainability & Environmental Affairs, Almond Board of California

Pesticides in the Orchard 2025

IGOR LACAN
Bay Area Environ. Hort. and Urban Forestry Advisor, Coop. Extension San Mateo/San Francisco Counties

Something Old, Something New: The return of the eucalyptus longhorned borer, & a new problem in acacia trees

JOHN PALUMBO
Extension Entomologist, University of Arizona

Insect Management for Fall Produce

JHALENDRA RIJAL
Area IPM Advisor, University of California Cooperative Extension

New Innovation in IPM - Leaffooted & Stink Bugs BMPs

MARGARET LLOYD
UCCE Small Farm Advisor, Yolo County

Nitrogen Budgeting with Organic Sources

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/

2021 CONFERENCE SPONSORS

MANAGE GRAPEVINE PRUNING DISEASES

ADVERTORIAL

Diseases such as ESCA are imminent threat to grapevines, especially immediately after pruning is completed. While growers have a number of options to "cover" the wound, a highly effective biofungicide is available featuring a proven combination of two species of beneficial *Trichoderma* fungi that are active against the pathogens across a wide range of environmental conditions.

ESCA is a grapevine wood disease that affects vine yield and longevity, particularly troublesome in vineyards with a history of grapevine pruning disease. The main causal agents are the deuteromycetes fungi *Phaemoniella chlamydospora* and *Phaeoacremonium* spp, and the basidiomycete *Fomitiporia mediterranea*. The pathogens most relevant to California growers include *Eutypa lata*, *Neofusicoccum parvum* and *Phaeoacremonium minimum*. Recent studies show excellent control of these three using a new viticultural tool.

"The advantage to our product Bio-Tam® 2.0 is that the two species of Trichoderma fungi colonize the pruning wounds and form a shield that prevents pathogenic fungi from spreading within the plant," according to Duane Canfield, marketing manager for SePRO Ag, based in Carmel, IN.

TREATMENT OF GRAPEVINES

Pruning of grapevines should be conducted after the peak of low temperatures has passed. A single, directed application of Bio-Tam® 2.0 is used at a rate of 1/lb/acre diluted in 25 to 50 gallons of water. A dye in the tank-mix will help ensure thorough coverage of all susceptible tissue, including cordons, spurs and all cut surfaces. Application should be made within 24 hours of pruning, and a respray is needed if rain occurs within six hours of treatment.

The combination of two active species works in a broader temperature range, *T. gamsii* starts working at 44.6ºF and *T. asperellum* at 53.6ºF, allowing for a wide application window across varying environmental conditions. These strains were selected for high activity against fungi responsible for pruning diseases.

A second application of Bio-Tam® 2.0 is recommended when:

- Pruning high risk vineyards:
  - Vineyards with a history of grapevine pruning disease
  - New vines replanted over a highly infested area
  - Where high disease pressure from the surrounding area is present
- Rainfall or high humidity persist resulting in environmental conditions favorable to disease development.

Double pruning is another common activity, and it is recommended to wait until the second pruning pass if environmental conditions do not favor disease development into tissue beyond where the final pruning cuts will occur. Under this scenario, apply Bio-Tam® 2.0 within 24 hours of the second pruning cuts.

SAFETY PROFILE

"Safety is key for this biofungicide," Canfield said. "These fungi strains are safe for the vines, organic or conventional, but also safe for workers with a four-hour REI. This is key to ensure continued pruning operations."

Additionally, Bio-Tam® 2.0 meets NOP standards, is OMRI-Listed, has a zero-day PHI and offers no limitations on exports.

Excerpts* from UC Davis | Studies 2019-2020

	Location/yr	Bio-Tam	Conventional Industry Standard	Control (Innoculated)
Mean % infection of Eutypa lata	Davis/'19	7.69%	92.31%	100.00%
	Elk Grove/'20	5.00%	10.00%	75.00%
	Kern Co./'20	0	5.00%	25.00%
Mean % infection of N. parvum	Davis/'19	70.51%	64.10%	100.00%
	Elk Grove/'20	0.00%	10.00%	75.00%
	Kern Co./'20	10.00%	10.00%	45.00%
	Yolo Co./'20	0.00%	0.00%	40.00%
Mean % infection of P. minimum	Yolo Co./'20	5.00%	20.00%	70.00%

*For complete summaries and research details visit https://ucanr.edu/sites/eskalenlab/Fruit_Crop_Fungicide_Trials/

A UNIQUE PRODUCT

"With grapevine pruning so important, Bio-Tam® 2.0 has been marketed primarily as a biofungicide to address those economically devastating diseases," according to Duane Canfield, marketing manager for SePRO Ag.

"But globally including in the U.S., Bio-Tam® 2.0 is widely used to control soil-borne diseases in vegetable, fruit, row, and ornamental crops, as well as to protect cuttings and bare-root transplants."

Bio-Tam® 2.0 aggressively colonizes the soil rhizosphere and outcompetes pathogens for nutrients and space, surrounding soil to form a living barrier that is antagonistic to disease infection from major disease-causing fungi including *Pythium, Phytophthora* and *Rhizoctonia*. Inoculating early enables the crop to establish quickly, weather in season abiotic stresses and increase yields. This disease protection actively grows along with the crop.

The unique blend of two highly active Trichoderma strains provides consistent performance across a wider range of environmental conditions (soil temperature, soil pH, organic matter) when compared with single species formulations.

BIO-TAM® 2.0 OMRI LISTED

SePRO

SePRO Corporation | Carmel, IN

2021 CONFERENCE EXHIBITORS

A4 Promotions & Incentives
ADAMA
Afrikelp-USA
Ag1Source/Integra Partner
AgNet West Radio Network
Agrian By TELUS Agriculture
Agri-Pulse Communications, Inc.
AgroLiquid
Albaugh, LLC
Almond Board of California
AlzChem
AMVAC
Atticus, LLC
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BASF
Bayer Crop Science
BioFlora
BioSafe Systems
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BRANDT
Central Life Sciences
Certis Biologicals
Corigin
Corteva Agriscience
Cultiva
D&V Unlimited
Diamond K Gypsum
DTN
Duarte Nursery
Eastman
FMC Corporation
GAR Bennett, LLC
Gowan USA, LLC
Green Leaf Ag
Grower's Secret
Helena Agri-Enterprises
Heritage Crop Science, LLC
Hortau
Huma Gro
ICL Innovative Ag Solutions
Insero
JH Biotech
Katana AgriScience Corp
Kemin Crop Technologies
KeyPlex
Koppert Biological Systems
Lallemand Plant Care
Lida Plant Research, LLC
Magna-Bon II, LLC.
Malcolm Media Ag Publishing
Marrone Bio Innovations
MarVista Resources
Mazzei Injector Company, LLC
Miller Chemical and Fertilizer, LLC.
Momentive
Motomco
Nature Safe Organic Fertilizers
Netafim USA
Neudorff North America
Nichino
NovaSource
Novihum Technologies
Nutrien Ag Solutions * Loveland Products * Actagro
Nutrient Technologies, Inc
Ocean Organics Corp
Oro Agri
Pacific Biocontrol Corporation
Plant Food Systems, Inc.
Polymer Ag, LLC
Precision Laboratories
Proagrica
PureCrop1
QualiTech, Inc.
Redox
Rotam
Semios
Simplot Grower Solutions
Smart Guided Systems
Spectrum Technologies, Inc.
SQM North America
Summit Agro USA
Suntton International Inc
Suterra
Syngenta
Tiger-Sul Products, LLC
TKI - Crop Vitality
Trece, Inc.
True Organic Products Inc.,
UPL
Valent U.S.A. LLC
Verdegaal Brothers, Inc.
Vestaron
Vive Crop Protection
Westbridge Agricultural Products
Western Milling
Western Region Certified Crop Advisers
Yara

Innovations in Post Patent Active Ingredients: *F Value® Technology from Albaugh®*

By **Mark Helt**, North America Commercial Director & **Chad W. Shelton**, Global Director of Innovation Technology

"Launched from Albaugh's Global Innovation Platform, F Value® Technology delivers advanced performance and enhanced return on investment to newly formulated fungicides for farmers around the world," states Chad W. Shelton, Albaugh's Global Director of Innovation Technolgy. "F Value Technology is Albaugh's innovation platform that allows us to identify unique and novel technologies around the globe that can be used in formulations to enhance the performance of individual fungicide active ingredients."

"Our focus with the F Value Technology platform is to enhance the performance and value of world-class active ingredients. The successful introduction of MiCrop® fungicide in the spring of 2021, is a perfect example of our strategic focus on combining targeted innovation and proprietary technology with post patent crop protection products," explains Mark Helt, Albaugh's North America Commercial Director.

Driven by market needs and customers' input to help identify technologies that can improve performance, fill an unmet market need or address specific culture practices; Albaugh first used this focused strategy to bring unique technologies to the market like CoAxium® Wheat production System driven by Aggressor® herbicide. That innovative combination of technology gives wheat growers vastly improved control of grassy weeds in wheat.

Work in the herbicide tolerant trait business continues as Albaugh partnered with the California Cooperative Rice Research Foundation to develop and launch ROXY® RPS (Rice Production System) which will be the first non-gmo herbicide tolerant trait in rice owned and developed by the rice growers of California. The ROXY RPS is currently not registered for use or sale in the US market.

The F Value Technology platform has allowed Albaugh the opportunity to partner with companies and technologies to deliver innovation to fungicide market. MiCrop Fungicide Powered by F Value Technology, targeting corn, soybeans, cereals and rice in 2021, is an optimized formulation developed specifically to revitalize two proven chemistries: Propiconazole and Azoxystrobin are respectively 40- and 25-years old.

MiCrop fungicide is delivering true innovation to give these two fungicide active ingredients new life in the market with enhanced performance and value. Micronized active ingredients help enhance uptake to better target disease control, which leads to healthier plants—helping maximize yield potential and fungicide return on investment.

Leading up the introduction of MiCrop fungicide, Albaugh has launched a 'Seeing is Believing' campaign. A 2-year, localized research program, 'Seeing is Believing' allowed channel partners to put MiCrop fungicide to the test in with their farmer/customers in commercial field applications.

Ag retailers and their growers conducted more than 89 MiCrop fungicide commercial field splits. Seeing the results and impact firsthand proved to be an excellent development process. In these field trials, MiCrop increased yields versus competitive fungicides and untreated checks in all crops tested.

The Albaugh Innovation Platform promises many new developments with traditional active ingredients, such as MiCrop Fungicide Powered by F Value Technology. That, in turn, presents channel partners an opportunity to truly deliver added value and enhanced performance to their customers.

2022 CAPCA Spring Summit

February 1-2, 2022

Marriott Resort in Napa, California

https://capca.com/spring-summit/

Sign up to receive notices for:

- Label Update
- Sponsorship Opportunities
- Registration
- CE Information

2022 CAPCA 48th Annual Conference

October 9-11, 2022

Disneyland Resort Hotel

2022 Exhibitor applications open 10/20/2021.

Watch our website at:
https://capca.com/conference/exhibitor-information/

Exhibit Hall placement for 2022 begins 1/14/22 - don't delay!

Maximize Water Use Efficiency with the Power of **FBS Transit™**

The most important issue to California farmers this year is water. Many farmers are not receiving any allocations of water from the Central Valley Project. These growers must rely on poorer quality well water. To increase crop yields despite these challenges will require a comprehensive approach to water management, as well as the use of advanced agricultural technology that increases plant water use efficiency (WUE).

Plants have evolved specific internal and external adaptations to take up, utilize, and conserve water - physiological processes that allow plants to maximize their WUE. FBS Transit technology, sold commercially as Transit Soil® and Transit Foliar®, encourages the expression of these processes to increase WUE, thereby increasing yields with less water.

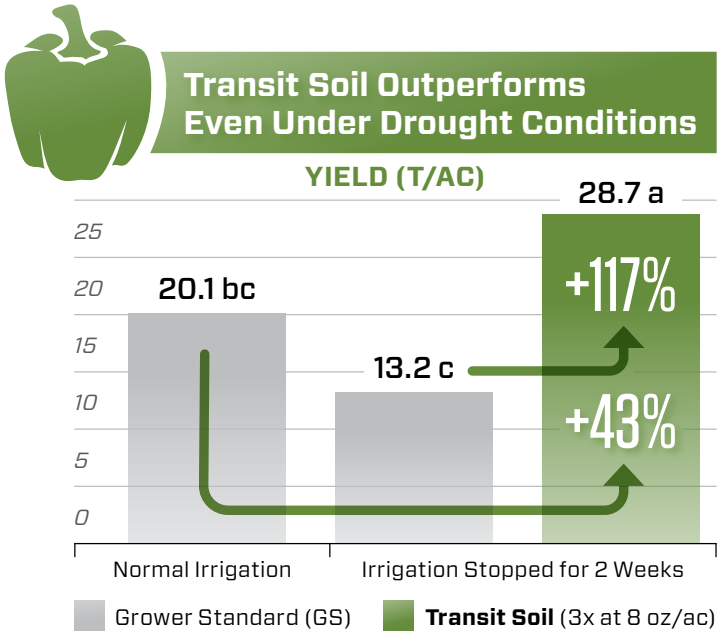
Compounds Found in Nature Hold the Answer

Soil organic matter (SOM) has an intimate and complex relationship with plant life. A less studied aspect of SOM is the process by which it is broken down by soil microbes. As organic matter is decomposed through microbial activity, it is converted to a complex mixture of soluble carbon compounds including organic acids and other metabolites. Plants take up these soluble carbon compounds through their roots resulting in a positive impact on growth. Normally there is only a minimal amount of these compounds in the soil, limiting the influence on plant growth. But FBSciences has developed a unique and proprietary process to extract large amounts of these biologically active compounds from a rich source and concentrate them into their refined technology FBS Transit.

The carbon compounds in FBS Transit are sourced from young, rich material, not mined from ancient deposits deep in the earth, resulting in higher plant activity that works systemically through the plant. FBS Transit increases nutrient uptake and translocation, improves abiotic stress mitigation and recovery, and consistently increases plant WUE.

FBS Transit Improves WUE through Two Mechanisms:

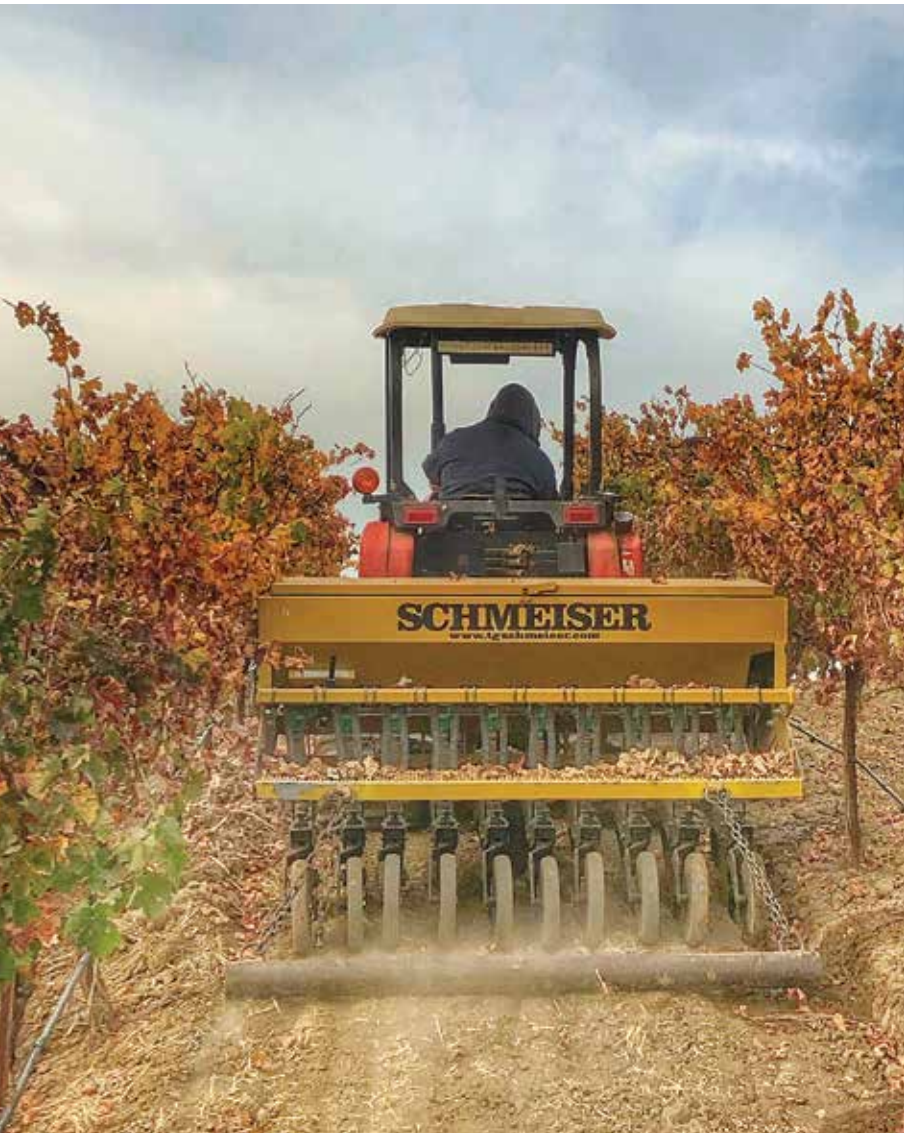
1. **Enhanced Root Growth** - Transit Soil increases both root length as well as the number of root hairs. This greater root mass, often seen in desert plants can access a larger volume of soil water, enabling the plant to better withstand drought stress.
2. **Improved Stomatal Conductance** - Stomates allow the plant to release heat through evaporative cooling and are essential for obtaining carbon dioxide to produce glucose via photosynthesis. Transit Soil, in cooperation with Ca, K, and B, increases both number of stomates and their functionality, minimizing the effects of heat stress and improving crop yields as photosynthetic activity increases.



As water restrictions become more of a challenge, we need to adapt and utilize technology that improves plant WUE and access to soil water. Transit Soil is an effective tool to accomplish this goal. These products are available to and highly valued by many farmers in California for their ability to increase crop yields in all growing conditions.

fbsciences®

Learn more at **FBSciences.com**
or toll free 866.360.7598



Announcing the
2021 CAPCA MEMBER PHOTO CONTEST*
and the
2021 AG STUDENT PHOTO CONTEST**

*See pg 26 | **See pg 28

Entry deadline: 12/01/2021

Photos from 2020 entries, clockwise from top left:
"Seeding" - M. Jeffries
"Little Shasta Road" - E. Kersh
"Rainbow Grapes" - R. Rianda
"Family Business" - L. Parker
"Lacewing Keeping Citrus Thrips at Bay" - K. Tavares

ADVERTORIAL

Microbial Biostimulants are the Key to Soil's Fertility.

Microbial Biostimulants and Their Significant Benefits to Soil's Health.

Microbial biostimulants are products containing living microorganisms that promote plant growth by increasing soil's nutrient availability. Understanding the functions of beneficial microbes helps us utilize them to their greatest potential profitability.

In many soils, nutrients are present in large amounts but are locked in forms that plants cannot use. Microbials utilize natural biological processes such as helping nitrogen fixation, phosphorus solubilization, and potassium mobilization to counter these unavailable forms. Microbial biostimulants play important roles in improving soil health and its biodiversity by increasing micronutrient availability to plants, supporting soil fertility, crop quality, and yields. Crops that use microbial technology see a **60% increase in yields**, **14.5% ROI**, and a **40% improvement in fertilizer efficiency**.

Microbial products are free of any chemicals harmful to the environment and living soils. By practicing natural and eco-friendly growth stimulation, microbial products help restore soil's natural nutrient cycle and build its necessary organic matter. Blending microbial technology with our expertise, JH Biotech's biological product line highlights its growth promotion strengths to vigorously improve your bottom line. Experience it for yourself with some of our most popular products.

OMRI LISTED For Organic Use

Finding the right Biofertilizers and Biostimulants

Soluphos SP

Phosphorus-Solubilizing Microbes

In soil, the concentration of phosphorus is high, but most of it is present in unavailable forms. Phosphorus-solubilizing bacteria like *Bacillus* and *Pseudomonas*, utilized in **Soluphos® SP,** can increase phosphorus availability to plants by mobilizing it from soil's unavailable forms.

MYCORMAX

Mycorrhizal Biofertilizers

Mycorrhizal fungi, the key ingredient in **Mycormax®**, optimizes root systems and soil environments for key nutrient accessibility. Orchards and tree plantations thrive under this functions as mycorrhizal fungi enables roots to harvest moisture and various micronutrients from deeper and distant niches in the soil, increases nutrient mobility and availability, and enhances growth.

Fulzyme

Mineral-Solubilizing Biofertilizers

Soil-dwelling microorganisms can further be used as biofertilizers to provide nutrients such as potassium, zinc, iron, and copper. Certain rhizobacteria, such as *Bacillus subtillus* found in our own **Fulzyme®**, can fully colonize plant roots where they perform a number of functions beneficial to plant health. In **Fulzyme®**, this includes solubilizing insoluble potassium forms, which is another essential nutrient necessary for plant growth.

promot

Plant Growth Promoting Microbes

Natural plant growth promoters, such as **Promot MZM®**, increase the amount of active beneficial micronutrients in the rhizosphere creating an environment dominated by micronutrients. Likewise, our plant growth promoter **Promot Plus®**, delivers growth promoting microorganisms in the form of spores, protecting them from adverse environments and ensuring easy germination.

Contact us and get a free sample for your trial.

For more information on Microbial Products, visit jhbiotech.com/farming-with-microbials

For additional product information, call **(805) 650-8933** or visit our website: **www.jhbiotech.com**

JHBiotech, Inc.
Innovation for a Greener Earth

2021 CAPCA Member Photo Contest

2021 CAPCA Photo Contest Official Rules

Eligibility:
Entrants must be eighteen (18) years or older, must be an amateur photographer (one who does not regularly receive income from photography), and must be a current 2021 CAPCA Member.

Important Dates:
Submission Deadline: December 1, 2021

Winner Announcements via email: January 2022

Winning Photos Published: February 2022 in the CAPCA Adviser magazine, on the CAPCA website, and throughout CAPCA social media platforms.

Judging:
Judging will be held by committee/panel review. All decisions are final. CAPCA reserves the right to disqualify any entry that is deemed inappropriate or does not conform to stated contest rules.

Prizes:
Each entrant may enter as many photos as they would like but is eligible to win only one (1) prize.

Winners will be chosen for each of the following prizes:
- One Grand Prize winner $500
- One First Place winner $250
- One Second Place winner $100
- Honorable Mentions - The committee will make decisions about Honorable Mentions based on content submitted and may choose 2-3 winners. Honorable Mention winners will receive CAPCA swag and may be featured in the February issue of the Adviser or future issues.

Rules & Submission Specifications:
- All photos must be original work taken by the entrant. No third party may own or control any materials the photo contains, and the photo must not infringe upon the trademark, copyright, moral rights, intellectual rights, or rights of privacy of any entity or person.
- The photo must be in its original state and cannot be altered in any way, including but not limited to removing, adding, reversing, or distorting subjects within the frame.
- The prize must be collected by the winner and is non-transferable.
- Entrants must submit photo(s) in digital format with a resolution of 6 megapixels or greater, and in JPEG format only.
- Photos on which a date stamp, photographer's name, or watermark is visible will be disqualified.
- Photos may not contain any product placement or promotional material (e.g. company logo).
- Entrants must submit photo credit information, title of photo, and caption/description for each photo submitted.
- Photo subject matter must be related to California Agriculture/Horticulture Industry operations and taken in 2020 or 2021.
- A completed entry form must accompany all photo submissions.
- Images not meeting the contest submission specifications will be ineligible for prize selection. However, they may be selected to be viewable on an online gallery on the CAPCA website.

Notification of Winners:
Winners will be notified via the e-mail address provided during entry. If no response is received after three business days, a new winner will be selected and the previous winner will forfeit all rights to the prize.

Photo Usage Agreement:
By entering the contest, entrants agree that any photo(s) submitted can be used by CAPCA for public relations, advertising, marketing, and/or promotional purposes, across all CAPCA platforms (website, social media, print, etc.).

Online entry form is available at:
https://capca.com/2021-photo-contest/

ADVERTORIAL

Gowan®

EcoSwing® BOTANICAL FUNGICIDE

QUINTEC® FUNGICIDE

METTLE® 125 ME FUNGICIDE

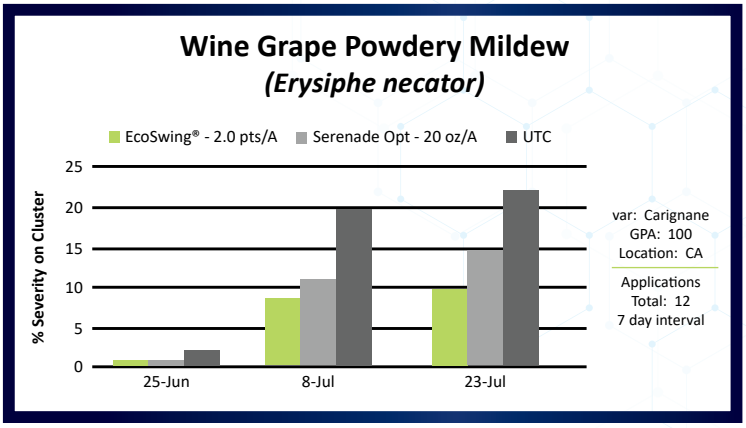
TORINO® FUNGICIDE

Powdery mildew is a fungal disease that will infect a variety of crops including grapes, cucurbits, strawberries, fruiting vegetables, pome fruit, and stone fruit. Multiple fungicide applications are typically required throughout the growing season to control powdery mildew. The overuse and over reliance on only a few fungicide modes-of-action will eventually lead to tolerance followed by resistance in your powdery mildew population. When targeting powdery mildew on your crops, think about long term, sustainable control by constantly rotating fungicides with different FRAC codes.

Torino® Fungicide and Quintec® Fungicide have been classified by FRAC as a Group U6 and a Group 13, respectively. Both of these FRAC groups are unique and are NOT shared with any other fungicide currently on the market today. As a result, Torino and Quintec can be slotted into your powdery mildew spray programs at any point in the rotation without having to worry about what fungicide was used prior or intended to be used next.

Torino is best used as a protectant, applied prior to disease development, but will offer a low level of curative control in situations where low levels of incidence have already occurred. Quintec only provides protectant control and therefore must be applied prior to disease development.

Mettle® is a highly systemic Group 3 fungicide for cucurbits, fruiting vegetables, grapes, and strawberries. The active ingredient, Tetraconazole, is known for its optimally balanced hydrosolubility and liposolubility for Enhanced Systemic Protection of both treated and non-treated plant tissue. Mettle has a great fit early in your fungicide program to provide total protection during rapid growth stages or immediately after pruning in grapes.



EcoSwing® is created using proprietary plant extracts from the *Swinglea glutinosa* leaves. EcoSwing's active ingredient includes a unique combination of bio-active compounds including phenols, sesquiterpenes, triterpenoids, and coumarins. Incorporating EcoSwing as a preventative application allows for the addition of an alternative mode of action for improved disease control and resistance management. EcoSwing is currently classified as FRAC group BM 01, which encompasses biologicals with multiple modes of action derived from plant extracts. These products are considered to have a low risk of resistance due to their multiple modes of actions against pathogens.

For Additional Product Information

800.883.1844

GOWANCO.COM

Gowan® USA

2021 CAPCA Ag Student Photo Contest Official Rules

Sponsored by the Stanley W. Strew Educational Fund

Eligibility:
Entrant must be a middle or high school student under eighteen (18) years of age, must be an amateur photographer (one who does not regularly receive income from photography), and must be a current California Ag Student.

Important Dates:
Submission Deadline: December 1, 2021

Winner Announcements via email: January 2022.

Winning Photos Published: February 2022 in the CAPCA Adviser magazine, on the CAPCA website, and throughout CAPCA Social Media platforms.

Judging:
Judging will be held by committee/panel review in December. All decisions are final. CAPCA reserves the right to disqualify any entry that is deemed inappropriate or does not conform to stated contest rules.

Prizes:
Each entrant may enter as many photos as they would like but is eligible to win only one (1) prize.

Four winner(s) will be chosen. Each winning student will win one $250 gift card for classroom funds to the Ag teacher of their choice, along with the following:

- One Grand Prize winner $100 gift card
- One First Place winner $75 gift card
- One Second Place winner $50 gift card
- One third place winner $50 gift card
- Honorable Mentions - The committee will make decisions about Honorable Mentions based on content submitted and may choose 2-3 winners. Honorable Mention winners will receive CAPCA swag and may be featured in the February issue of the Adviser or future issues.

Rules & Submission Specifications:

- Photo(s) must fall under one or both of the following categories: Pests or Ag Around the Classroom.
- All photos must be original work taken by the entrant. No third party may own or control any materials the photo contains, and the photo must not infringe upon the trademark, copyright, moral rights, intellectual rights, or rights of privacy of any entity or person.
- The photo must be in its original state and cannot be altered in any way, including but not limited to removing, adding, reversing, or distorting subjects within the frame.
- The prize must be collected by the winning student(s) and Ag Teacher(s) and is non-transferable.
- Entrants must submit photo(s) in digital format with a resolution of 6 megapixels or greater, and in .jpg format only.
- Photos on which a date stamp, photographer's name, or watermark is visible will be disqualified.
- Photos may not contain any product placement or promotional material (e.g. company logo).
- Entrants must submit photo credit information, title of photo, and caption/description for each photo submitted.
- Photo subject matter must be related to California Agriculture/Horticulture Industry operations and taken in 2020 or 2021.
- A completed entry form must accompany all photo submissions.
- Images not meeting the contest submission specifications will be ineligible for prize selection. However, they may be selected to be viewable in an online gallery on the CAPCA website.

Notification of Winners:
Winners will be notified via the e-mail address provided during entry. If no response is received after three business days, a new winner will be selected and the previous winner will forfeit all rights to the prize.

Photo Usage Agreement:
By entering the contest, entrants agree that any photo(s) submitted can be used by CAPCA for public relations, advertising, marketing, and/or promotional purposes, across all CAPCA platforms (website, social media, print, etc.).

Online entry form is available at:
https://capca.com/2021-student-contest/

WE KNOW CALIFORNIA
GROW WEST
LET'S GROW CALIFORNIA

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**

2021 CAPCA Scholarship Winner Bianey Medina

2021 CAPCA Scholarship Winner Announced

Each year CAPCA, through the Stanley W. Strew (SWS) Education Fund, awards a scholarship to an exceptional student who is pursuing a career in the pest management industry. The Stanley W. Strew Educational Fund, Inc., mission statement states: "We promote and communicate the development and implementation of educational and scholarship programs to insure the future prosperity of our nation's food, fiber and ornamental enterprises." The Fund is dedicated to establishing educational opportunities and career growth avenues for the students of today and the leaders of tomorrow.

The Stanley W. Strew Education Fund administers these programs. Applications were distributed to interested students, universities and were posted on CAPCA's website. The CAPCA Scholarship recipient receives $3,000. This year we congratulate our 2021 Stanley W. Strew Scholarship recipient, Bianey Medina.

Bianey Medina
2021 CAPCA Scholarship Recipient

Bianey is a senior attending California State University, Fresno this fall. Her major is Plant Science and she plans to graduate in the winter of 2021 and become a Pest Control Adviser, obtain her QAL and Certified Crop Adviser certificate. After completing her degree and licensing, Bianey would like to continue working in the San Joaquin Valley gaining experience with a large variety of crops. She plans to obtain her Master's degree, and eventually return home to the Salinas area to run her own strawberry patch. Her early experience working as a strawberry picker to help her family, and more recently, as the Project Manager for the Fresno State Plant Science Club and Student Research Technician with FMC, have solidified her desire to build a career in agriculture. Looking back on her experiences, Bianey is cognizant of the people and opportunities that have impacted her journey and makes an effort to pay forward those benefits even now, while also looking forward to future opportunities. One of her references commended her energy, optimism, self-confidence, and passion for agriculture, stating, "I have worked with Bianey through California Women for Agriculture and noticed her willingness to help on various projects and events and sacrificially give of her time. It is significant to know that Bianey has risen to a level of high determination, after having come from a hardworking migrant family from Mexico. Despite the numerous and diverse challenging circumstances, she has overcome them all and shows a strong desire now to pursue her goal of receiving a bachelor's degree in Plant Science."

Continued

We received the following letter from Bianey this summer:

I want to thank all of you for taking the time to select me as one of your winners for the 2021 CAPCA/Stanley W. Strew Scholarship in the amount of $3,000. With this generous opportunity I plan to continue to pursue and achieve my career goals.

I am currently a senior, majoring in Plant Science. Being first generation in my family and coming from immigrant parents inspired me to pursue a career in agriculture. Currently I am in my two last semesters. I have really enjoyed being part of this amazing university. I have been involved with the Plant Science Club through my college experience being able to be part of this wonderful organization. I was able to meet other students that have the same interests and goals as I have.

Currently I am working full time at FMC Corporation in Madera CA as a Student Research Technician. After graduation, I plan to get my PCA, CCA and QAL license. I plan to work for a couple of years and if god is great, come back to get my Master's Degree. My goal is to come back to Fresno State once I have enough money saved up to pay my tuition.

By awarding me with this amazing opportunity, you have reduced the amount of my financial needs. Which will allow me to focus on my academics and not worry about how I am going to pay for school. I hope one day in the near future I will also be able to help struggling students like myself reach their goals in their higher education by assisting them the same way you are helping me. Once again thank you for your generosity. I truly appreciate it.

Kind Regards,
Bianey Medina

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.

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California Department of Pesticide Regulation

ADVERTORIAL

BEHIND BOTANICAL BIOPESTICIDES

THE ADVANTAGES & BEST APPLICATION TIPS FOR IPM PROGRAMS

TetraCURB™ concentrate | TetraCURB™ organic | TetraCURB™ MAX

Botanical oil-based pesticides are effective tools for integrated pest management programs. Beyond having a smaller environmental footprint, botanical products also are efficacious in their pest knockdown, provide safe conditions for field workers and maximize production efficiencies. However, many specialty crop growers are still learning how to unlock the advantages of such crop protection tools. We want to further the education of growers on these botanical oil-based products as their mindsets shift toward more sustainable farming methods. This advertorial shares some key benefits of our miticide-insecticide & repellent line TetraCURB™ and multiple application tips growers should know before using them in their IPM program.

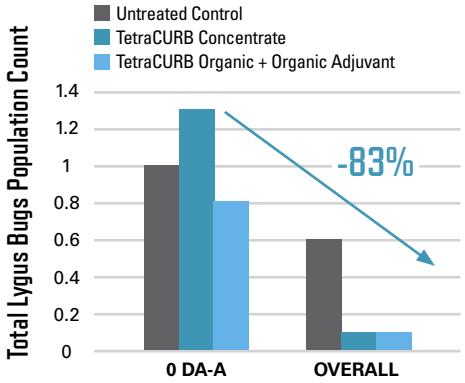
Application Tips & Best Practices When Using Botanical Oil-Based Biopesticides

1. Update the rotation program: Specialty crop growers committed to reducing insecticide resistance create an IPM program that includes various chemicals with different modes of action in rotation.
2. Growers should always adopt a proactive approach instead of a reactive one as the IPM programs helps prevent the pest populations from growing to a rescue level.
3. Understand the recommended application rate on the label: Some products have a recommended rate based on crop heartiness or phytotoxicity concerns, but most of the time, the rate indicates the product performance from internal field trials.
   - Growers should apply a lower rate if there are known phytotoxicity issues in the specific crop.
   - To prevent pests throughout the season, growers should spray at a lower rate consistently. The lower rate, most times, can be sprayed repeatedly on crops without risks of phytotoxicity and keep pest populations at bay.
   - The highest rate is often for rescue use, or rather when the pest population has grown to a point where a more aggressive spray is needed.
4. Oil-based biopesticides will be most effective if they make contact with the pest. Therefore, an even application coverage is key to ensuring the product controls pests the way intended. Calibrate the sprayer accordingly.
5. Always follow the recommended interval application period between sprays mentioned on the label. It allows the insects to emerge and the pesticide to attack different life stages of the pests.

"PESTICIDE ROTATION DOES NOT MEAN SIMPLY SWITCHING PRODUCTS.

Growers need to switch chemical classifications to receive a true rotation with limited pest resistance. Growers using conventional chemistries should absolutely consider the addition of botanical biopesticides into their tank mix as they are highly effective, easy-to-use and offer multiple modes of action due to their complex set of active compounds, reducing the risk of pests developing pesticide resistance."

– Michael Hull, Technical Services Manager at Kemin Crop Technologies



Total Lygus population (adult and nymph) count on California strawberry before application and over the course of the trial. Treatments evaluated: Negative control: Untreated; TetraCURB Concentrate: 64 fl oz/100 gal; TetraCURB Organic + Adjuvant: 64 fl oz/100 gal + 8 fl oz/100 gal. Four total sprays applied 5 to 7 days apart from 11/06/2019 to 12/02/2019.

TETRACURB™ LINE TOP BENEFITS

1. **IPM PROGRAM:** Compatible in rotation for preventative and curative pest control.
2. **USE SITES:** Non-target specific. Ideal for all crops included but not limited to conventional and organic agriculture, nursery and greenhouse.
3. **TARGET PESTS:** Control all mites, aphids, whiteflies, lygus, thrips, mealybugs and other small, soft-bodied insects.
4. **ACTIVE INGREDIENTS:** Botanical oils such as rosemary, peppermint, clove, castor bean.
5. **PHYTOTOXICITY:** None observed at the highest labeled rates.
6. **MODE OF ACTION:** Suffocation, paralysis, desiccation through contact foliar spray with added repellency.
7. **ZERO-HOUR REI:** Safe for workers and helps maximize productivity levels.
8. **ZERO-DAY PHI:** Allows for same-day harvest.
9. **MRL EXEMPT:** Ideal for audit and exportation programs.
10. **LABEL:** No label restrictions on the number of times applied.
11. **FLEXIBILITY:** Tank mix compatible with most chemistries or use as a stand-alone insecticide.

READY TO INCLUDE TETRACURB IN YOUR IPM PROGRAM?

RICHARD JONES, SALES MANAGER CALIFORNIA
626-372-1153, RICHARD.JONES@KEMIN.COM

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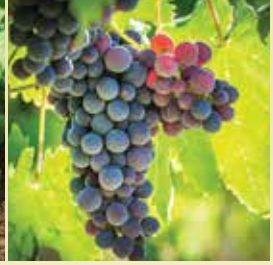


PCA Profile: Krista Tavares

By CAPCA Staff

Krista Tavares graduated from the University of California, Davis with a Bachelor's degree in Crop Science and Management, a minor in Spanish in 2009 and obtained a Masters in Agricultural Education in 2014. She obtained her PCA license in 2010 and also holds a QAL. Some of the major crops she consults in are: Almonds, Pistachios, Citrus, Grapes, Tomatoes, Onion, Garlic, Lettuce, Cucurbits, Cotton, and Stone Fruit throughout Fresno county. With over 350 crops grown in the region, Krista has consulted on the majority of them in some way in the last eleven years! Krista specializes in Almonds, Pistachios and Citrus crops, and Phytophthora management. She is passionate about educating people about agriculture in any context and loves to network within the industry to help people connect to meet their goals.

Prior to her current position, Krista worked as an In-house PCA with S&J Ranch (now Wonderful Citrus) for three years, and then two years as High School Ag Teacher in Esparto & Firebaugh. Now she works for Syngenta as the Fresno County Sales Representative, a position she's had for the last 7 years. She talks about her job as being to educate growers and PCAs on how to use Syngenta products in the right way, at the right time, for the right pest as well as help them solve problems they are having with difficult to control pests. "I absolutely love what I do – it is the perfect use of my education and agronomic skills."

Talking about how she became a PCA, Krista says "I was born and raised in the middle of the city of Los Angeles, right by LAX airport, by a fire chief and a real estate agent. I am one of the few that came from a suburban upbringing to be part of this incredible industry. Although we have become increasingly removed from our food production, there are more and more people entering agriculture with no family background in it." She says gardening was her introduction and what hooked her into agriculture. Krista recalls: "As a 13-year-old, I planted my first garden and immediately fell in love with figuring out how to grow things, the thrill of learning from each season, and improving upon it the next. My most memorable experience was when I proudly served my first homegrown steamed broccoli – with a side

of loopers by accident! Oh how we all screamed, but I thought it was so cool how camouflaged they had been – insects are amazing!" After the Plant Science unit in her AP Biology class, she was hooked and asked her college career counselor for a job that would allow her to work part-time outdoors in the field, and part-time indoors (because, Krista admits, "I love paperwork and would have made a *killer* executive assistant.") Her counselor advised becoming a PCA, "And I never looked back," Krista says. "This career has been the best decision of my life. It even led me to my *other* best decision: my husband, Adam. Being a PCA allows me to work outside, help people, play a small part in feeding the world, challenges my critical thinking skills on a daily basis, puts my scientific training to use, and allows me to work with incredible professionals who are true experts in their fields."

Asked how she describes her job to those outside the industry, Krista says, "Coming from Los Angeles, there are many people and many family members in my world who have zero ties to Agriculture. When I explain what a PCA is, I tell them that we are like Plant Doctors. It is our role to assess a crop's health by looking at the whole picture, and then make recommendations

for how to optimize growth and yield in order to create the safest, cleanest, healthiest crop possible for the consumer. I also like to explain how we are blessed with an incredible toolkit that we can use to do this, from releasing beneficial pests, to adjusting cultural practices, to utilizing pesticides that have evolved to be incredibly site-specific, in many cases, to target very limited pest spectrums."

Looking back on the experiences that have helped her to be successful today, Krista sees how all of it has been beneficial, but one thing she credits with making her a better PCA is her training to become a teacher. "Although I am not officially an educator anymore, learning how people learn, how to communicate so people listen and how to increase retention of information helps me in my profession: when I am doing outreach for CAPCA or within CAPCA, and when I am helping support the next generation of agriculturalists. My teacher training really allows me to come at presentations with a different viewpoint and group of skills than many in the industry, and I truly believe it helps me be more successful in communicating my messages, whatever the context."

Krista says the biggest highlights of being a PCA have been twofold: Helping play a role in a crop coming to a successful harvest, and supporting the next generation of PCAs. She says, "Knowing that all the nights I ran wind machines in the citrus all night long for 40 nights straight kept the fruit from freezing, seeing less than 1% NOW packouts come off the almonds and pistachios because we timed our sprays correctly & worked with our spray crews to get best application practices in place with the best chemistries for the job, checking citrus bin counts and seeing no scale, thrips damage or black mold, watching almond orchards with phytophthora rebound after years of yield drop off and so much more! It is empowering to know that my expertise in pests can help growers maximize their ROI." Additionally Krista recalls how much advice, mentorship and support she received as a young PCA with zero ag background. Now, it's a big highlight for her to do her best to support as many up and coming PCAs as possible. She regularly speaks in FFA classes, helps teach and judge FFA teams, and has students interested in the profession ride along with her. She's helped coordinate Fresno State students sponsored by the local Fresno-Madera CAPCA Chapter attend the CAPCA Annual Conference, facilitating connecting them to exceptional PCAs in the industry to learn from. Krista shares, "Through a wonderful opportunity from CAPCA, I was able to support the Student Networking events and help college students start with their best foot forward in networking, interviewing and resume writing. [W]ith young scouts and PCAs starting out as trainees in the field, I sincerely enjoy training them on the Syngenta portfolio, new diseases or crops they are unfamiliar with, by putting on field days and giving them guidance on how to succeed in the industry."

Some of the moments that have made her most proud were as an In-house PCA and being part of a strong team that helped farm a successful crop from start to finish. "As a Manufacturing rep, I am proud to be a part of bringing new tools to PCAs and growers that help solve their pest issues with new technology, specialized chemistries and excellent educational training. I am also super proud to be part of bringing the Student Networking Event to life. I think the most rewarding wins are when I am recognized as an agronomically strong representative who makes best recommendation possible for the situation."

Sharing about why she became a CAPCA member, Krista acknowledges, "I became a CAPCA member initially to get help tracking my hours as a new PCA who had no idea what I was doing." "But," she says, "over the years I have discovered that CAPCA has so much to offer PCAs in every stage of their career. As a new PCA the CAPCA team and website have incredible resources for jobs, license prep, continuing

Your crop shouldn't satisfy every appetite.

Whether they're chewing or sucking, nothing ruins a tasty vegetable like a hungry insect. But with Besiege® insecticide, you can protect your crop from worms and other pests. It has two complementary modes of action for fast knockdown and long-lasting residual control. Which is just what you need to satisfy a market that demands high-quality vegetables. To learn more, see your local Syngenta retailer or visit **SyngentaUS.com/Besiege**

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education and networking opportunities." Krista has served in multiple roles in her local chapter as well as with CAPCA at the state level: she was the Fresno-Madera Chapter Secretary from 2014-2019, and has been the Vice President since 2020. "I enjoy helping with the local chapter in order to support the local PCAs' CE needs, to help decide how the Chapter can support the community through scholarships and donations, and to learn what is going on with the County and DPR on a monthly basis." Looking back and considering what involvement with CAPCA has to offer PCAs, Krista says: "I would encourage all PCAs to get involved with CAPCA, even if it is in some small way. From providing feedback on CE they want to see, to attending a chapter meeting, or to speaking to their local community about what PCAs do to raise awareness for our profession. CAPCA does FAR more than just track your hours, and much of the Association's success rests on PCAs who choose to volunteer their time to keep our organization successful. It is imperative that we continue to hold our profession and professionalism to the highest standard, and that is getting harder to do with the many obstacles we face. Tools are being taken out of our toolkits; global companies are dictating what we can do on the farm with very little scientific knowledge to back it up, and there is fear about food safety. If we [PCAs] do not speak up, our livelihoods will cease to exist. I encourage all PCAs to ask their local chapter how they can get involved. Pick something you are passionate about (government relations, mentoring young PCAs, speaking to the community about what you do) and start there. If we all give back in a small way, we will continue to strengthen this industry."

Krista is committed to agriculture, as well as the work CAPCA is doing to foster the next generation of PCAs. "I support CAPCA because I feel it is imperative to tell our story as PCAs in this ever-changing world of misconceptions and misunderstanding about how our food is grown. I am also heavily involved in helping the next generation of students be prepared to become PCAs because I feel strongly that if we can get students interested in agriculture in high school or before, as I was, we will be able to draw incredible talent and keep a steady influx of students to maintain the extremely strong level of professionalism that we have in this industry."

Outside of work and involvement with CAPCA, Krista says, "I have two beautiful daughters Brooke (5) and Madison (2) who keep my husband Adam and I very busy & highly entertained at all times!" Her husband Adam Tavares is also a PCA and Sales Rep for AMVAC, from Fresno to Bakersfield. She notes, "I am extremely fortunate to share this career path with him as we make each other stronger advocates for the Industry, more knowledgeable when we put our crop skills together and great resources for each other." Her other favorite hobbies include cross stitching, knitting, ballroom dancing, line dancing, gardening, reading and spending time making memories with her family. ■

In a recent interview, Krista shared some of her best advice for women interested in a career in Ag:

"Don't think of yourself as a 'Woman in Agriculture.' Think of yourself as a ***Professional*** *in Agriculture.' Never be intimidated because this is a male-dominated industry. It has been amazing in the last 10 years to go from being one of about 2% in the room, to easily 10-15%! As women, we have some very different skill sets we can bring to the table that help the Industry, so capitalize on that!*

"If anyone is interested in agriculture, my advice is to find ways to get hands-on experience working in the fields so you can begin to grow your knowledge base and understand what growers go through every single day to bring that commodity to market. No matter if you want to be in marketing, sales, boots on the ground, or technical support, knowing what it takes to grow or raise that commodity will allow you to better understand what the 'Real World' is like, and how to best help your customers. The classes are an important foundation, but working in the field you will learn even more to build on that basic understanding.

"Use your network! Get to know other female PCAs. In 2019, I decided to pull together all the female PCAs from different parts of the Industry who I knew in the Central Valley to give us a casual time to get to know each other better. We have had a dinner, done a craft night, and a cooking class. It has been a great chance to build our network. If you want to be a part of our next gathering, let me know!"

krista.frelinger@syngenta.com

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Moving forward - CAPCA chapters are in-person again

Crystelle Turlo, Chief Operations Director

As we head away from 2021 and into 2022, CAPCA Chapters are moving forward and planning in-person events, including fundraisers and continuing education meetings. If you are interested in an event or would like more information about future events, please take a moment to reach out to your chapter. Don't see anything for your chapter? Remember, planning in-person continuing education and fundraiser events takes time and volunteers. If you would like to see more offerings from your chapter, we invite you to get involved, share your ideas and volunteer! The state office is always happy to assist a member trying to get in contact with their chapter; just let us know!

For those who are not quite ready to return to in-person meetings, CAPCA continues to provide quality online and on demand continuing education.

NorCal
In-person Chapter meetings last Wednesday of the month
September - Annual Trap Shoot Scholarship Fundraiser

Desert Valley
November 2021 - CEU Meeting date/time/Farm Credit Services - TBD
April 2022 - Annual Scholarship Fund Golf Tournament Del Rio County Club - TBD

Central Valley
January 20, 2022 - Stockton - Continuing Education Seminar; details TBD.

Kern
October 12, 2021 – Bakersfield – Kern County CAPCA Label Update

Fresno Madera
November 16, 2021 - Fresno - Label Update Meeting

Monterey Bay
In-person meetings have resumed – Please reach out to your Chapter

Central Coast
In-person meetings have resumed. Please reach out to your Chapter.

Ventura
In-person meetings have resumed. Please reach out to your Chapter.

San Diego
September 22, 2021 – Escondido – Continuing Education
In-person Chapter meetings first Monday of every other month

SoCal
In-person meetings have resumed – Please reach out to your Chapter

Tulare-Kings
September 22, 2021 – Tulare – Continuing Education

CE HOURS REPORTED™

https://capca.com/events/

Photo: J. McNutt

The Future of Fungicide Is Near

Be the first to the future *with* BASF Cevya fungicide

California growers know how quickly disease can turn a beautiful, high-yielding crop into an ugly poor-producing one. As a grower's trusted crop advisor, making the right product recommendations demonstrates your dedication to their success.

Be the First to the Future

Pending California DPR approval, Cevya® fungicide is the first isopropanol-azole fungicide, providing fast activity and long-lasting residual control compared to other DMI fungicides currently on the market. Its unique chemistry offers the flexibility to manage complex diseases, making it an ideal fungicide for almonds, grapes, pome fruit and stone fruit — even for resistant strains.

Almonds:
scab, shothole, rust, anthracnose, Alternaria (spring and summer diseases)

Grapes:
Phomopsis, powdery mildew

Pome Fruit (apples): scab

Stone Fruit (peaches): brown rot

Stone Fruit (tart cherries): cherry leaf spot

The unique chemistry and long-term marketability of Cevya fungicide deliver a viable disease-control option for years to come, despite increasing fungal pathogen resistance and stringent global environmental and regulatory criteria.

How Cevya Fungicide Works

Fast-acting, Long-lasting, First-of-its-kind Chemistry

The groundbreaking technology behind Cevya fungicide allows for fast-acting, long-lasting control. Its flexible isopropanol-azole link allows for one-of-a-kind site-of-action binding activity to control many fungal pathogens, including resistant biotypes.

Resistance Can't Resist

Cevya fungicide is a broad-spectrum fungicide that moves inside the plant. Its flexible chemical structure allows the fungicide to adjust to changes in the mode-of-action binding pocket for key diseases, including grape powdery mildew, apple scab and Alternaria leaf spots. This flexibility enables Cevya fungicide to deliver powerful performance while staying ahead of ever-increasing fungal pathogen resistance.

Engineered for Today and Tomorrow

Cevya fungicide is intentionally designed with a grower's future in mind. It was built from the ground up to meet and exceed some of the world's most stringent environmental and regulatory criteria. This means Cevya fungicide helps growers access export markets worldwide while also delivering dependable crop protection, even as other DMI fungicide registrations and tolerances are withdrawn.

Swing by booth 405 at CAPCA to learn how you can be first to the future.

Cevya® Fungicide

BASF
We create chemistry

California Department of Pesticide Regulation

Pest Control Adviser exams heading to computer-based testing centers throughout California in fall 2021

DPR Staff

As the Department of Pesticide Regulation (DPR) celebrates our 30th anniversary, we are happy to announce DPR's Licensing and Certification Program is converting to administering computer-based examinations for the Agricultural Pest Control Adviser (PCA) license exams. We expect all PCA exams to be available at computer-based testing centers in late Fall 2021.

There are many new and exciting benefits and features associated with our new exam process. With over 30 test-center locations contracted throughout California, PCA applicants will be able to take their exams closer to home or work. They will also be able to schedule an exam date as soon as their application has been approved by DPR. Applicants will be able to self-schedule their exams via the internet 24 hours-a-day for a date, time, and location that is convenient for them. In many cases, applicants finish their exam quicker since they no longer have to fill in Scantron bubbles and applicants will also be given their results immediately after they complete their exam.

Here are just a few things to keep in mind if applying for a DPR exam:

- Applicants are strongly encouraged to include their email address on their application to allow for faster processing and notification.
- Each applicant must provide a separate and unique email address on their application. Using a duplicate email address for different people will render the applicant unable to schedule an exam.
- Payment must be included with the application. Acceptable forms of payment include checks, money orders, and credit cards (Visa/MasterCard only). All fees are non-transferable and non-refundable.
- Applicants must sign and date their application. Missing signatures will cause processing delays.

Once DPR receives an application and payment for a PCA exam and approves the individual to take the exam, the applicant will be contacted via email to schedule their exam date, time, and location at the testing center of their choosing.

All of us at DPR are excited about the new changes and we welcome prospective PCAs to come join us in our new endeavors. ■

Your CAPCA Dues at Work!

CAPCA dues were at work this year to advocate for a solution on behalf of the PCA exam. While CAPCA doesn't always take credit for everything we do, this is one of the activities we had direct impact on as we focused our comments to DPR over and over again on our concerns over infrastructure and the lack of equal access to exams.

A key goal of the CAPCA Leadership is to increase the voice of the PCA to the State and within the industry. We want to thank all the members for the support they provide to CAPCA to make this type of advocacy possible. CAPCA could not achieve the messaging of the importance of the Pest Control Advisers without the engagement of its members.

CAPCA
AT THE CENTER OF PLANT HEALTH

New Post-Emergence Herbicide Provides Thorough Kill of Weeds

Corteva Agriscience received California Department of Pesticide Regulation approval for Embed® Extra herbicide in June 2020. Embed Extra is a post-emergent herbicide, containing an innovative formulation of the active ingredient 2,4-D with near-zero volatility. In tree nuts, it will have an excellent fit in "post-harvest" clean-up sprays and in "residual" programs in late fall and early winter. Once residual herbicides reach their limit of effectiveness, Embed Extra can be used "in-season" prior to harvest. See label for PHIs.

Labeled Crops: almonds, pistachios, walnuts, pecans, stone fruit, apples, pears.

Labeled Weeds: 102 on the label, including marestail, lambsquarters, Shepherd's-purse, malva, filaree and field bindweed.

Thorough Kill of Weeds

Embed Extra is systemic, taken into plants through above-ground foliage, then traveling through phloem toward roots. The weed kill process is thorough, but not rapid, and foliage "burn" won't likely be visible within the first 24 hours. Burndown is not as rapid as glufosinate, paraquat or PPO herbicides, but weed control can be more thorough on several weed species. The slower movement of Embed Extra through the plant, by contrast, allows it to thoroughly kill weeds. That weed kill, down to the roots, can prevent regrowth.

Near-Zero Volatility and Low Drift Potential

Embed Extra contains 2,4-D *choline*, a completely new form of 2,4-D with near-zero volatility. All other 2,4-D herbicides used in California are an *amine* formulation. The use of choline salt to bind 2,4-D choline makes for a much more stable form of the herbicide. 2,4-D choline boasts an 87.5% reduction in volatility compared with 2,4-D amine and a 96% reduction over 2,4-D ester – resulting in near-zero volatility and minimal potential for physical drift.

▲ Above: Untreated at 36 days after treatments.

▼ Below: Embed Extra (3 pt/A) + glyphosate (3 pt/A) at 36 days after treatment.

Embed® Extra

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CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY • DEPARTMENT OF PESTICIDE REGULATION

Early Renewal REMINDER

The Department of Pesticide Regulation (DPR) will mail out renewal packets in August to license and certificate holders with surnames or business names starting with the letters M-Z.

AVOID PROCESSING DELAYS

Submitting earlier allows DPR staff additional time to deal with issues or problems that could delay processing your license.

SUBMIT BY OCTOBER

Please mail your application before November so that your license or certificate can be issued before it expires. Submit before October, and be renewed by early December to register with the County before the New Year.

HAVE QP RENEW EARLY

For pest control businesses, the qualified person must be renewed before the business license can be processed. Submit renewals at the same time **before** November.

California Environmental Protection Agency
dpr Department of Pesticide Regulation

If you do not receive your application in the mail, download a blank application at: www.cdpr.ca.gov/docs/license/lcforms.htm. If you need to contact Licensing at LicenseMail@cdpr.ca.gov, don't forget to include your full name (First MI. Last) and license number(s) so staff can assist you faster.

ADVERTORIAL

POWDERY MILDEW MANAGEMENT
DISEASE CONTROL IN GRAPE PRODUCTION

Powdery mildew can be a devastating disease for grapes. This fungal pathogen can result in reduced vine growth, yield, and fruit quality. The fungus can survive winter as chasmothecia, known as 'resting spores,' on the grapevine and nearby host sites, as well as mycelia infecting tissue inside dormant buds. Additionally, this fungus has been shown to have developed resistance to some commonly used fungicides.

Becky Garrison, thegrapevinemagazine.net

Combat powdery mildew and manage the development of resistance through prevention, such as dormant applications and continued measures throughout the growing season to protect plant tissue by reducing spores and inhibiting fungal development.

Year-Round Disease Control

Whether your vineyard is freshly planted or well established, BioSafe Systems' product solutions deliver innovative grower options from dormancy through harvest. For versatile grape powdery mildew control, **PerCarb**® and **OxiDate**® **5.0** work harmoniously in tank-mix and rotational programs to reduce disease pressure by eradicating spores and mycelium. OxiDate 5.0 knocks down plant pathogens on-contact and disinfests plant surfaces, while PerCarb provides on-contact activity with residual control.

Applying PerCarb during dormancy will help reduce the pressures of overwintering powdery mildew chasmothecia and botrytis spores hiding in the bark and woody structures of the vine. During the growing season, the most important growth stages to manage mildew are before and after bloom and through bunch closure. The use of PerCarb rotated with OxiDate 5.0 in a program comprised of oils and effective systemic/residual chemistries season long will provide the best protection against powdery mildew, thus insuring solid yields with the highest quality grapes California is known for.

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Since 1998, BioSafe Systems has led the industry in the manufacturing of peroxyacetic acid (PAA) based foliar disease control solutions. With our proprietary PAA technology and peroxide materials, we support growers with sustainable, effective and versatile growing solutions that maximize their bottom-line and quality. We strive for maximum efficacy with each of the products we manufacture, while holding true to our core mission of providing "simply sustainable" chemistries.

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DPR acting director continues shift away from toxic pesticides

Brad Hooker, Agri-Pulse

Julie Henderson assumed leadership of the California Department of Pesticide Regulation in early July and plans to continue the administration's effort to shift the state away from conventional and toxic pesticides, she told Agri-Pulse.

As one of her first efforts as acting director, Henderson toured urban and agricultural sites focused on adopting alternatives to traditional pesticides. This includes homes and buildings in Los Angeles County, a research program at the University of California, Riverside, parks and landscapes in Irvine and a UC extension program on invasive species. Notably, Henderson spoke with growers and activists in Ventura County, where pesticide conflicts drew special attention last year from the California Environmental Protection Agency, along with a directive from Gov. Gavin Newsom.

Henderson, who is maintaining her CalEPA role as deputy secretary for health and public policy while serving as acting director, said outreach, education and technical support are valuable for transitioning growers and urban applicators to pest management practices that focus more on environmental sustainability.

She was inspired by work at the Ventura County branch of the Rodale Institute, an organic research center supporting regenerative agriculture.

"A grower doesn't have to be entirely organic or regenerative to use practices that are in place," said Henderson. "That's part of what we want to try to facilitate, as part of this overall move to safer practices and more sustainable practices."

Through DPR's support, the center hopes to pull in agricultural economists to demonstrate the long-term value of organic and regenerative practices, including on leased land. Henderson also learned the benefits of hemp cultivation for using less water and capturing carbon.

Like the Rodale Institute, Henderson hopes to bring whole communities together to solve pesticide problems, using a model for collaboration DPR developed in the wake of cancelling the organophosphate insecticide chlorpyrifos.

At CalEPA, Henderson has worked closely with DPR on policies like this. The chlorpyrifos ban was one of the first things she worked on at the agency, she said. Henderson hopes to continue working with growers, community groups, UC researchers and agricultural commissioners to collaboratively solve these problems.

"DPR does have this strong robust system in place," she said. "But accidents happen sometimes. That's why we're working to develop this statewide system to provide notification of certain applications."

Henderson has taken the lead in launching a California-wide system to alert the public ahead of all pesticide applications, which take the form of text alerts or emails. Former DPR Director Val Dolcini helmed this policy as a personal pursuit, leading to conflicts with farm groups as well as the Kern County agricultural commissioner.

Henderson plans to visit Fresno County next to gain the community perspective on such challenges.

"It's really helpful to go out and see the work that's happening on the ground," she said. "You get a much better flavor for it."

DPR will also be partnering with agriculture commissioners to host "take back" events, allowing growers to drop off pesticides like chlorpyrifos that are now illegal to use. As part of its budget package for promoting pesticide alternatives, the department will increase monitoring activities and further community engagement efforts.

The state allocated $36.5 million in the current budget cycle to "accelerate the transition to safer, more sustainable practices," which includes research grants and outreach—both at DPR and the California Department of Food and Agriculture—and increased funding for pesticide use enforcement, ecosystem monitoring, and engagement with agricultural and farmworker communities. Another $32 million went to UC Agriculture and Natural Resources, expanding the division's research and extension efforts, she noted. ■

Herbicide Resistant Weeds found in California Almond Production Systems

It is presumed that all weed populations have individual plants, known as biotypes, which possess the necessary biological traits for resistances to take place. The selection pressure exerted by the repeated use of herbicides with the same mode of action, gradually increases the number of resistant individuals in a population, as shown in the diagram below (figure 1). Herbicides themselves do not cause resistance; instead, they select for naturally occurring resistant traits in a population. This results in the loss of adequate weed control by applications of that herbicide. Control can be one of the most obstructive facets of establishing a new orchard.

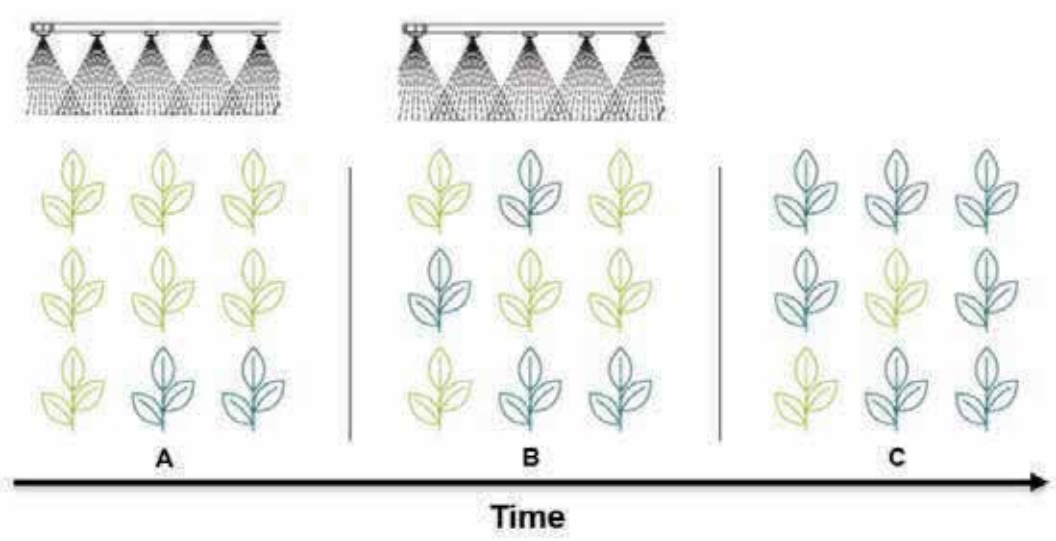


Figure 1. Figure 1 Illustrates how the selection pressure of using the same herbicide increases frequency of herbicide resistance in a population over time. A) Selection of resistant biotype which then goes to seed. B) Repeated use of the same herbicide allows for the population to keep growing. C) Establishment of resistant population.

How to identify herbicide resistance

Herbicide treatment failures may be mistaken for resistance developing in an orchard. For example, unfavorable weather at the time of application or spraying weeds that were too large may lead to what looks like the development of herbicide resistance. They key here is to not suspect herbicide resistance unless herbicide failure fits the following:

- The same herbicide was used year after year.
  - If you suspect resistance, check to see how often you've used the same MOA over the past couple of years.
- If you find a weed species, which normally should be controlled, and is not controlled even though all other weeds were.
  - In other words, "I used to be able to kill this plant with this herbicide, but now I cannot."
- Healthy weeds are mixed with uncontrolled weeds of the same species.
  - Scouting twice a year will help you identify the onset of a resistant population.
- A patch of an uncontrolled weed is spreading.

As of 2021, there are 30 confirmed occurrences of herbicide resistance in California. There are 13 weed species that are commonly found in almond orchards throughout the California Central Valley. Each of these weeds have had confirmed cases of herbicide resistant biotypes in California.

View an entire list of herbicide resistant weeds found in almond orchards, including suggested A.I. alternatives, at Almonds.com/WeedManagement.

Monitoring for the walnut husk fly in Lake County

Cindy R. Kron, Area IPM Advisor, North Coast, University of California Statewide IPM Program and Cooperative Extension

The walnut husk fly (WHF) (*Rhagoletis completa*) was first reported in California in 1926 and had spread throughout the Pacific Northwest by the 1950s. This fruit fly is a mid- to late-season pest of walnuts that negatively impacts walnut production in California. The female fly lays her eggs in the walnut's husk and the emerging maggot-like larvae feed and tunnel through the husk for 3 to 5 weeks causing the husk to soften and decay. When the larvae finish their development, they fall to the ground and overwinter in the soil as pupae. Adults emerge from the soil in early June until early September, then mate and lay eggs starting the seasonal cycle over again. Consequences of a walnut husk fly infestation include a stained walnut shell, difficulties in removing the hull, shriveled kernels, reduction in yield and up to a 30% loss in crop value.

Double sided yellow sticky 5.5 inches x 9 inches card traps baited with attractant lures were placed high in the canopy in four walnut orchards (two in Upper Lake, CA and two in Kelseyville, CA). Adult walnut husk flies were counted, sexed, and females were documented as gravid or not gravid every week from July to October. Documenting the initial presence of females with eggs helps predict the onset of egg laying and can assist in timing pesticide applications. Walnut husk fly damage was assessed near each trap on September 30, 2020, just prior to the beginning of harvest. The walnut husk fly damage in each orchard was estimated by counting the presence/absence of walnut husk fly damage in 200 walnuts (20 trees x 10 walnuts) near each trap. Trees chosen to count were the ones closest to each trap in the orchard.

Although trap counts were limited to four orchards in two regions of Lake County, the data collected can contribute to the understanding of the walnut husk fly's seasonal dynamics in Lake County (Fig. 1, 2). Documentation of the seasonal fluctuations in WHF populations and when gravid females are present are important baseline data that will be useful in timing future projects.

Left: Walnut husk fly in the orchard. Right: Walnut husk fly in the orchard canopy, circled in red.

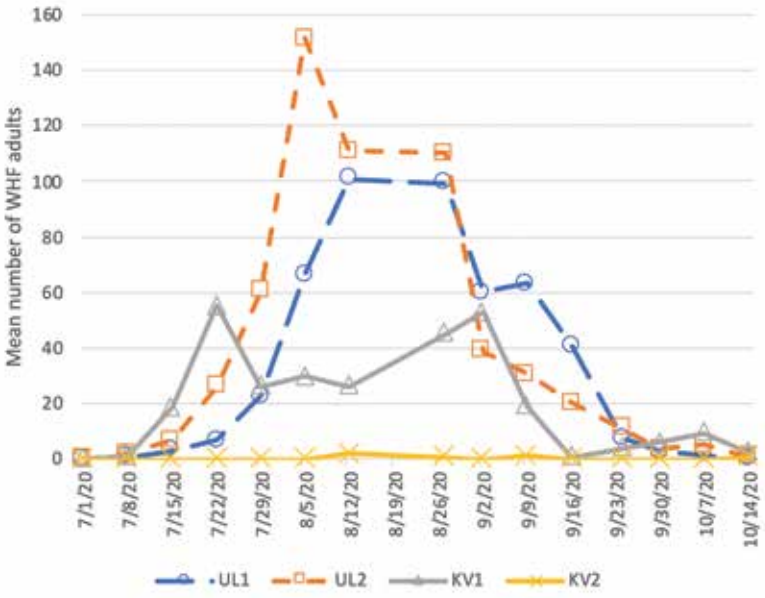


Fig. 1. 2020 Lake County walnut husk fly (WHF) trap counts by orchard (UL1, UL2, KV1, KV2 where UL = Upper Lake and KV = Kelseyville).

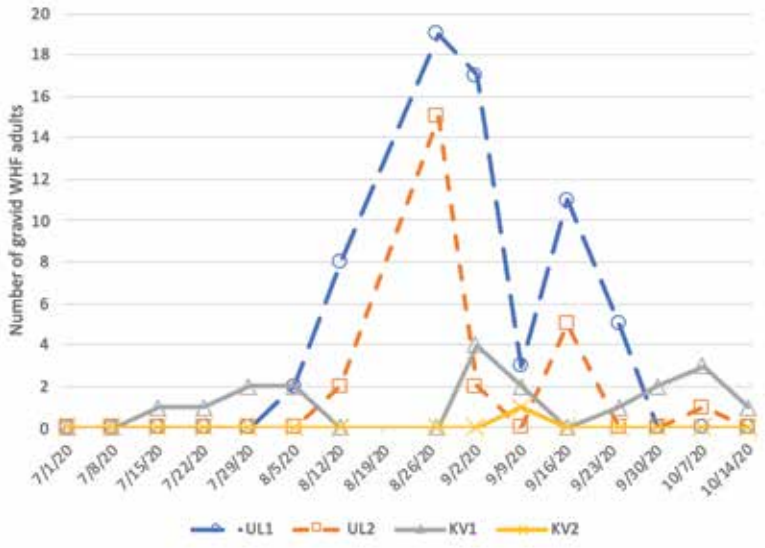
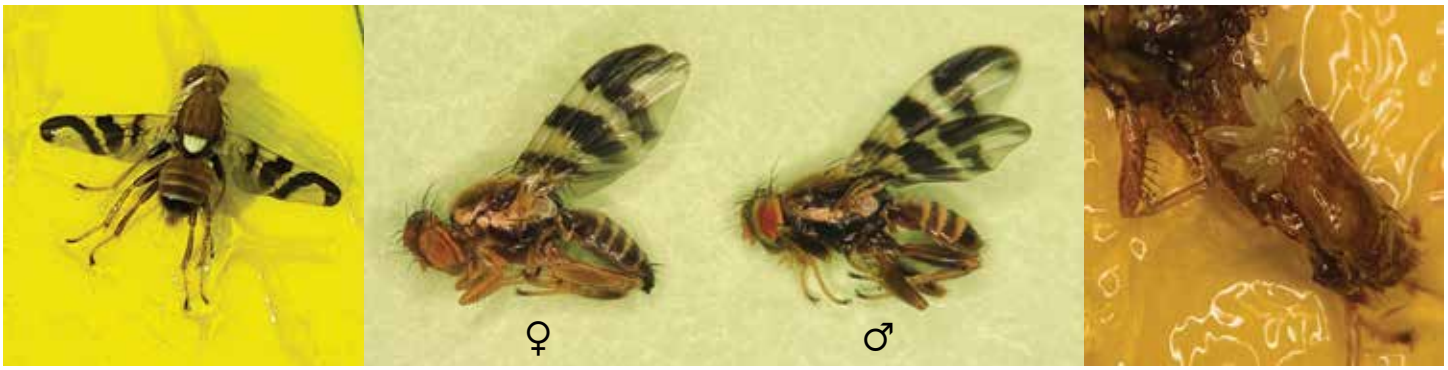


Fig. 2. Number of gravid female walnut husk flies (WHF) found in 2020 Lake County traps by orchard (UL1, UL2, KV1, KV2 where UL = Upper Lake and KV = Kelseyville).

Left: Walnut orchard in Lake County.
All photos by Cindy R. Kron, UC IPM



L-R: *Walnut husk fly on a yellow sticky trap; Female and male walnut husk fly—females have a straw colored first leg segment, whereas males have a darker first leg segment; Walnut husk fly eggs from a gravid female.*

In this study, the percent estimated WHF damage (Table 1) corresponded with the mean number of WHF adults caught in traps for the 2020 season (Table 2), meaning that as the number of adults caught in traps increased, so did the damage estimate at the end of the season. Although somewhat intuitive, this relationship is not true for all insect species in that trap counts do not always correspond with damage in other insect/crop relationships.

As an advisor working with walnuts for the first time, the collection of baseline data to develop future research projects from is useful and the time spent in the orchard over the season contributed to a better understanding of walnut production, phenology, and insects present in the orchard. The current walnut husk fly research project is the field evaluation of novel adult trap designs and lures for walnut husk fly in five walnut producing regions of California. Investigations into alternative integrated pest management tools and the possible modification of current methods are needed to improve our ability to help control this pest.

I would like to thank the California Walnut Board for their support in funding this research. ■

TABLE 1. Percent estimated walnut husk fly (WHF) damage by orchard (UL1, UL2, KV1, KV2 where UL = Upper Lake and KV = Kelseyville).

	UL1	UL2	KV1	KV2
Trap 1	6.5	12	3	0.5
Trap 2	13.5	23	9.5	0.5
Trap 3	No data	No data	6	No data
Average	10	17.5	6.2	0.5

TABLE 2. Walnut husk fly (WHF) trapped per orchard (UL1, UL2, KV1, KV2 where UL = Upper Lake and KV = Kelseyville).

	UL1	UL2	KV1	KV2
Trap 1	527	675	288	1
Trap 2	423	479	248	7
Trap 3	No data	No data	452	No data
Total	950	1154	988	8
Average	475	577	329	4

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ADVERTORIAL

A Proven Solution for Hairy Fleabane Control in California Alfalfa

By NovaSource

Mick Canevari is a University of California Cooperative Extension Advisor Emeritus who began his career in the mid-1970s, around the time when Velpar® was first registered as a herbicide for alfalfa. Over the years, he has conducted "countless amounts of research that includes Velpar in alfalfa," so we asked him about his thoughts for controlling hairy fleabane in alfalfa. Here's what he said:

"Hairy fleabane is not a new weed, but it's becoming more populated in our alfalfa system throughout the central valley of California. Every year, there's more and more fleabane popping up in alfalfa. It's one of the major weeds in California, and it's just a nightmare.

I first noticed it becoming a potential problem 10-15 years ago. At the time, I had some ongoing weed research in alfalfa that included Velpar — and Velpar was one of the herbicides doing a reasonably good job controlling fleabane. But back then, nobody thought too much about it.

Today, when it shows up in hay bales, fleabane has an odor, stems are woody and less palatable, and it lowers feed values which generally leads to discounted prices to the grower.

As a pre-emergent herbicide, Velpar provides good efficacy on fleabane for the window of germination during the alfalfa dormant period of November through February.

In fact, when a PCA or a grower asks for fleabane control recommendations, I routinely suggest Velpar as one of the few tools that are effective.

Velpar, in my estimation, has remained a foundation herbicide in alfalfa since its inception when used during the dormant period for controlling many of our broadleaf weed issues.

When you have a perennial crop like alfalfa that goes dormant, or growth is minimal in the winter, it leaves a wide-open canopy exposing much of the soil to sunlight. That allows fleabane and other weeds to germinate and establish without competition.

Velpar's mode of action is primarily root uptake with some foliar activity on small emerging dicot weeds. I have seen it control groundsel 2-to-3 inches tall. However, rather than relying on an aggressive rate of Velpar alone, I still recommend that it be tank mixed with many of the post-herbicides that are used during the dormant period. This approach can pick up the more difficult weeds such as fleabane, shepherd's purse and winter grasses.

An application of Velpar is typically made between December and February. Within that window, there is a high germination rate of fleabane occurring. So Velpar provides a pre-emergent barrier and prevents new germination. What I'm telling you is what I have observed from research trials leading to my recommendation."

"In fact, when a PCA or a grower asks for fleabane control recommendations, I routinely suggest Velpar as one of the few tools that are effective."

— Mick Canevari, University of California Cooperative Extension Advisor Emeritus

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Evaluation of automated and mechanical cultivators to control within-row weeds in processing tomatoes

Amber Vinchesi-Vahl, Ph.D., UCCE Vegetable Crops Advisor, Colusa, Sutter and Yuba counties

Conventional processing tomato weed management in California often includes pre-plant herbicides (trifluralin and/or s-metolachlor), followed by cultivation, and hand hoeing. Rimsulfuron herbicide can also be used in conventional systems and can be applied either pre or post transplanting. Post-plant applications of rimsulfuron can selectively remove nightshades if applied when the weeds are very young, no more than 2 true leaves, however, long plant-back restrictions may limit its use. Therefore, the use of hand crews is often needed to remove weeds that emerge in the plant row, where standard cultivation equipment is ineffective.

Automated weeders, or robotic weeders, use cameras and computers to distinguish crops from weeds. They are equipped with either spray nozzles or cultivators to remove weeds within the crop row. Commercially available for about 10 years, these complex machines are very expensive but have shown promising results in transplanted crops in Salinas, CA and Yuma, AZ. Gaining popularity in the Central Valley is the finger weeder, a relatively simple and low-priced mechanical cultivator designed to remove weeds within the crop row. The mechanism was developed by K.U.L.T.-Kress in Germany. The system uses interlocking rubber fingers (Figure 1) to remove small weeds in the plant row once transplants are established. Finger weeders can also be adapted to and added to existing cultivators and modified for individual grower needs.

While both robotic cultivators and finger weeders have been used and evaluated in many vegetable crops, there has been little research evaluating these tools in processing tomatoes and how well they may complement or replace a traditional herbicide program.

The main objective of this project was to evaluate crop safety, weed control, time, and costs associated with using mechanical cultivators as part of a conventional weed management program in processing tomatoes. This work is supported by the California Tomato Research Institute, with assistance from grower cooperators.

Fig. 1. Close-up of the finger weeder mechanism

Fig. 2. Robovator, automated weeder

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Methods

This project was conducted in 2020 and 2021 in both Colusa and Merced counties. UCCE Vegetable Crops Advisor, Scott Stoddard, led project efforts in Merced County. Only the Colusa site data will be presented here. The Colusa County field site was located just north of Colusa, CA and the same site was used both years. The field was transplanted to double row tomatoes, on 60" beds. Plot size was 5 beds by 250 ft length, except for Control (Treatment 4) which was 5 beds by 100 ft length to minimize impact. Each treatment was replicated three times. The following treatments were evaluated:

1). Rimsulfuron at 2oz/A (grower standard)
2). Automated cultivator (1 bed/pass)
3). Finger weeder mechanical cultivator (5 beds/pass)
4). Control: no in-row cultivation.

The entire field, including trial plots, received a pre-plant application of s-metolachlor/trifluralin, standard cultivation to remove weeds outside of plant row, and s-metolachlor/trifluralin lay-by. Operations were the same for 2021. Plant stands were assessed before and after cultivator passes. Weeds were counted before treatment, 2 weeks, and 4 weeks after treatment in the center bed of each plot. Crews hand-weeded one month before harvest in 2020 and seven weeks before scheduled harvest in 2021. Weeds were counted before and after hand-weeding passes. Cultivators and hand-weeding crews were timed as they moved through the field. Ten feet from the center bed of each plot was harvested by hand and sorted for red, green and culled fruit. Steve Fennimore, UCCE Weed Specialist, provided the Robovator, made by F. Poulsen Engineering ApS in Denmark (Figure 2). The finger weeder was a 2020 purchase by the grower cooperator (Figure 3). The main weeds present in the field included bindweed, lambsquarters, pigweed, puncturevine and thorn apple (Figure 4).

Results

Weed control results are shown in Figure 5. In 2020, the Robovator and finger weeder did an excellent job of weed control on all plots. In 2020, the Robovator worked very well and we saw very little crop injury, 0-4% (Figure 6). However in 2021, due to heavy winds in early May, the young tomato plants were not upright, and the robotic weeder had difficulty distinguishing where the stem of the plant was compared to the top of the plant. These plots suffered 10-20% crop loss, which also occured at the Merced site in 2020 (Figure 7). In 2020, the robotic weeder provided up to 85% control two weeks and four weeks on average and 59% and 13% after two and four weeks in 2021. The

Fig. 3. Finger weeder, mechanical weeder

Fig. 4. Clockwise from top left: thorn apple, lambsquarters, pigweed, puncturevine

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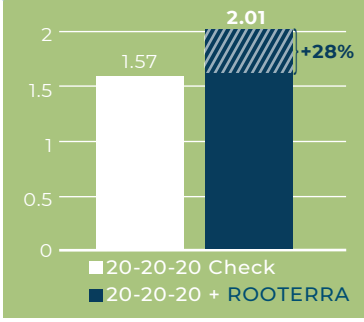
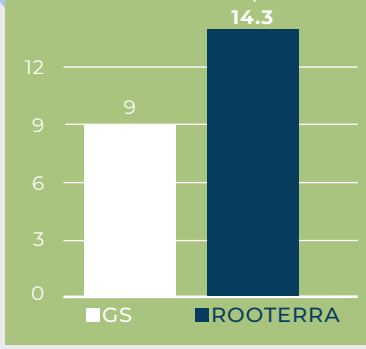
1. Nonpareil **ALMONDS**
root dry weight (lbs)



Data from a two-year research trial using ROOTERRA added to the grower's standard 20-20-20 application on newly planted nonpareil almonds in CA showed a significant increase in top growth, root mass, and trunk diameter each year. This resulted in 3.4-10.7% more root growth and 11-28% more top growth(1.).

A study in Washington in a newly planted high-density Cosmic Crisp apple orchard showed similar results. One year later, the untreated trees averaged nine branches per tree. The ROOTERRA-treated trees averaged 14 branches per tree(2.).

2. **APPLES**
# of branches per tree



Wine grapes in Soledad, CA showed a 39.5% increase in the number of bunches and a 20% increase in the number of shoots one year after treating transplants with ROOTERRA. (3.).

Rapid establishment provides benefits down the road with permanent crops- improved drought resistance, increased yields, uniform growth, less susceptibility to insects or disease, increased yields and better quality.

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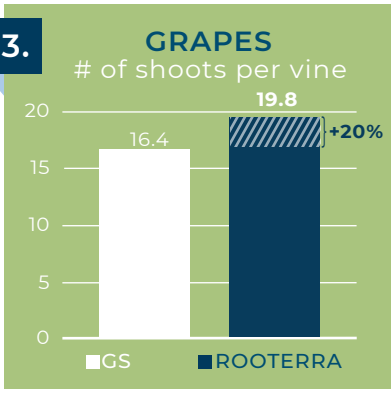
3. **GRAPES**
# of shoots per vine



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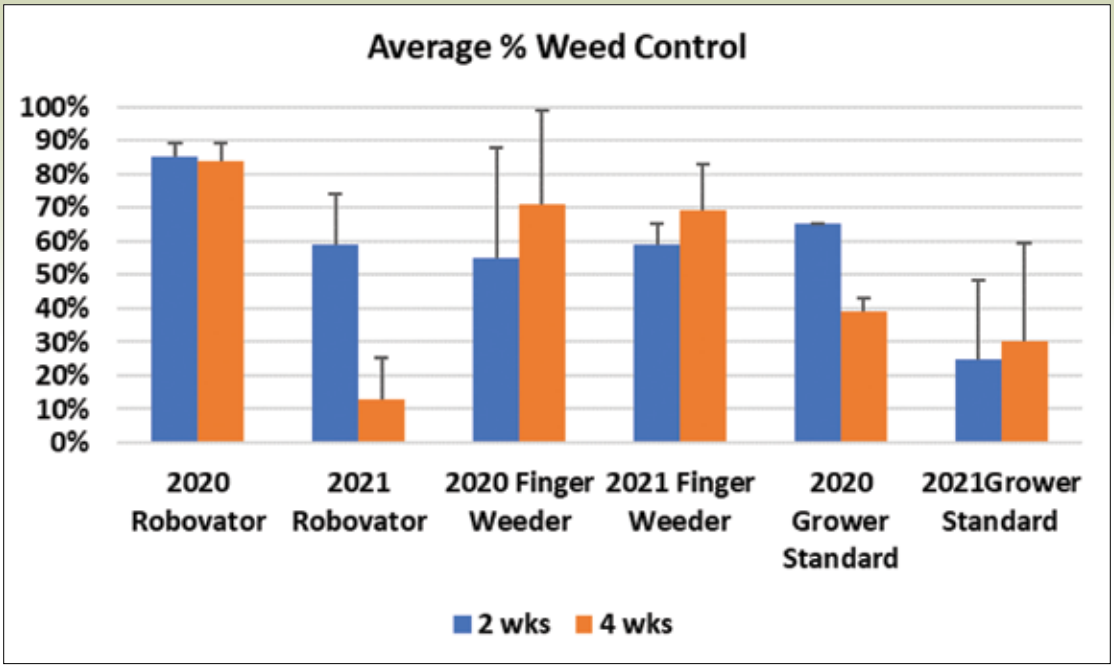

Fig. 5. Average percent control + SE for each treatment two weeks and four weeks post-treatment at the Colusa field site

Fig. 6. Robovator in action, 2020

finger weeder provided 71% control on average four weeks post-treatment in 2020. It is worth noting that by plot, the finger weeder provided over 90% control post-treatment in two of the plots. The third plot showed poor control due to heavy bindweed pressure, therefore bringing the average down. The finger weeder also provided excellent control at the Merced site in 2020. There was no significant difference between the cultivator treatments and the grower standard (rimsulfuron) for weed control in 2020. Unfortunately, in 2021, weed control was not as successful among the treatments compared to 2020, especially for long-term benefits. The finger weeder provided an average of 59% control two weeks after treatment and 69% control four weeks after treatment. The grower standard herbicide treatment of rimsulfuron provided 25% and 30% control on average at two and four weeks after application.

In general, hand weeding provided 60-100% control per plot between 2020 and 2021. Hand weeding times and costs were not significantly different between the grower standard

ORO AGRI

ADVERTORIAL

Changes To Bring Big Benefits to California Agriculture in 2022

There is no doubt the past year had a negative impact on many of the people and companies involved in California agriculture. We at Oro Agri feel very fortunate to have been able to carry out several initiatives during this time that, moving forward, will support California agriculture by funding university and industry research, providing growers with new low toxicity/low environmental impact biorational and certified organic products, and bolstering the efforts of our distributor, retailer and PCA customers.

$100,000 Gift Completed Fundraising for New Fresno State Viticulture Greenhouse

Oro Agri made a $100,000 gift to Fresno State to complete the funding for its new viticulture greenhouse. The greenhouse will allow students, faculty, and staff to grow and graft vines for the University Agricultural Laboratory and to work on research projects for the California viticulture industry. Half of the facility will be dedicated to research involving nematodes and other plant pathogens. The $250,000, 30′ x 30′ greenhouse is scheduled to be completed during the fall of 2021.

Oro Agri Joined A Leading Global Family of Biorational Companies

In January 2020, Oro Agri was purchased by the Rovensa Group, a family of companies committed to being the global leader in biorational crop protection and nutrition.

In 2022, California growers will start benefitting from the robust product portfolio of the Rovensa Group companies. The first new products available to growers are from an Oro Agri sister company **Idai Nature (www.idainature.com)** will include:

- **Magma®** – **The Invisible Sulfur:** A colorless liquid sulfur that is 100% assimilated into plants leaving no visible residue.
- **Troya®** – **The Hidden Copper:** An OMRI-listed copper sulfate complexed with gluconate.
- **Fort-Soil®** – **The Soil Rejuvenator:** A soil rejuvenator formulated with prebiotic molecules, organic matter rhizogenic substances and 8% calcium.
- **Virtus®** – **The Plant Architect:** A non-hormonal biostimulant to strengthen plants' vascular cell walls.
- **Cinnaction®** – **The Natural Acaracide & Fungicide:** An OMRI-listed combination of two different cinnamon oils for quick knockdown of powdery mildew and mites.
- **Garland®** – **The Strongest Garlic Insecticide and Repellant:** An OMRI-listed, 100% pure liquid formulation of garlic oil with highly effective repellency and contact activity against thrips, mites, aphids and white flies.
- **Thymic®** – **The Broad-Spectrum 3-in-1:** An OMRI-listed, 100% natural red thyme essential oil bactericide, fungicide, and insecticide.

Strengthened Customer Support

As Oro Agri continues to grow so does our commitment to providing excellent sales and technical support to our commercial and grower customers. In 2022, two additional California-dedicated Area Managers will be on the job in the South Valley and Central Coast, for a total of five AM's statewide, to help our customers grow with confidence by using Oro Agri products.

Please visit **oroagriusa.com** for more information or to contact your local Oro Agri area manager.

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GROW WITH CONFIDENCE

Treatment		2020			2021		
		Hand hoe hours/A	Cost $/A	Significance	Hand hoe hours/A	Cost $/A	Significance
1	Rimsulfuron 2oz/A (grower standard)	0:31	$41.88	b	1:29	$120.18	b
2	Robovator	0:37	$49.98	b	1:03	$85.08	b
3	Finger weeder	0:42	$56.70	b	1:29	$120.18	b
4	No cultivation	1:49	$147.18	a	2:39	$214.68	a

Table 1. Estimated time for 6 people to hoe 1 acre in Colusa field. Costs calculated based on $13.50/hour. Means in the same column with the same letter are not significantly different from one another, LSD 0.05.

(rimsulfuron), finger weeder or robotic weeder treatments in both years and all treatments decreased time and costs compared to the control plots (Table 1). Weed pressure increased in 2021 leading to higher weed counts, longer hand weeding times and associated costs compared to 2020.

Summary

Field variation and weed species influenced weed pressure and control. There was poor bindweed control from cultivators and hand-weeding crews, which was expected based on the biology of bindweed. Both in-row cultivators provided long-term control in 2020, especially a month after the cultivator pass. The finger weeder was able to cover five beds per field pass and moved quickly through the field compared to the Robovator. All treatments reduced hand weeding time and costs compared to the control in both years at the Colusa site.

The finger weeder is gaining popularity in the Sacramento Valley and provides an option for in-row mechanical cultivation without the expense of an automated weeder. Timing is key when using either type of in-row cultivator. The size of the tomato plant and the size of emerging weeds needs to be just right to avoid crop injury while also removing young weeds. In the first year of this study, the automated weeder provided excellent weed control at the Colusa site, but this was not the case for the second year. When working correctly, automated weeders provide accurate and precise weed control, though issues can arise when conditions are not as favorable.

Many thanks to the California Tomato Research Institute, Scott Stoddard, Steve Fennimore, and our grower cooperators for working with us on this project.

Fig. 7. Robovator crop loss, 2021

Post-harvest fertigation:

KEY TO ROOT DEVELOPMENT AND NUTRIENT STORAGE

Content provided by SQM North America

Studies corroborate it. When it comes to trees and vines, post-harvest fertigation is fundamental to ensure next season's crop success.

Why post-harvest?

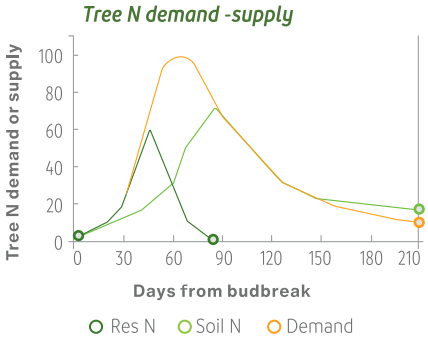
Fertigating at this stage is good for the roots. Studies show that after the fruits have been collected, roots become the sink for carbohydrates to fuel their growth and access to readily available essential macro and micronutrients -such as nitrate and potassium- that can boost their development.

Nutrient storage is another reason. After heavy fruit and nut load, the tree's nutrient reserves are significantly reduced. Post-harvest fertigation will assure that the tree can reload nutrient reserves to be well prepared to support next season's early development.

Tree crops grown in cooler climates with low temperatures during dormancy stage in winter, will face low soil temperature in early springtime, therefore limited root activity, even if ambient temperature is mild. In these conditions, tree crops and grape vines mainly rely on stored nutrients in the stem and roots.

In the case of many fruit tree and nut crops, post-harvest fertigation could also reduce the "on-off" years incidence, where one year of heavy fruit load is followed by a year of low fruit yield.

This phenomenon may be related to depleted nutrient stocks in the tree after heavy fruit load and nutrient export with harvested fruits from the orchard, rendering the tree crops unable to support a consecutive year of abundant fruit yield.



Source: Lailiang Cheng, Cornell University

At the early bloom and fruit initiation stage, the tree fully depends on nutrient reserves, stored in the tree itself. The most important nutrients that are needed to top-up at this period are nitrogen (N) and potassium (K). Up to 30% of the total annual application of N & K nutrient should be applied at this period. It is important to select readily available nutrient sources, such as potassium nitrate, which will provide immediately available N in the form of nitrate, while tree crops need to be replenished with K, as significant amounts of K are exported with the harvested fruits from the orchard.

In the case of almonds, nitrogen can be applied any time after hullsplit up until a few weeks postharvest. In earlier harvested varieties and 'Nonpareil', nitrogen can be applied shortly after harvest with the first post-harvest irrigation. With later varieties, such as 'Monterey' or 'Fritz,' the application can be made post-hullsplit prior to harvest.

Post-harvest potassium applications may be a reasonable strategy if you are on a soil that is able to hold the potassium. In sandy soils, potassium can be leached out of the root zone, which may create a situation of deficiency in the following year.

In the case of grapes, the period after harvest before leaf fall is one of the best times of the season for the uptake of nitrogen and potassium which the vine needs along with carbohydrates to provide for the period of rapid shoot growth in the spring after bud break. Replacing minerals is important as they are transported off-site in the crop and not recycled back into the soil like leaves or canes.

Studies show that post-harvest fertigation is key on root development.

There are two main stages of root growth. In a rhizotron study in Chile in 1993 with two table grape varieties (Flame Seedless, Moscatel) it was shown that the first (and larger) peak root growth stage takes place from bud break to petal fall/fruit initiation. The second (and smaller) peak root growth stage takes place after fruit harvest until leaf fall (post-harvest). Root development is linked to the competition for carbohydrates between roots and developing fruits. Developing fruits are stronger sinks for carbohydrates produced in the leaf than roots. Therefore, root growth and development are suppressed during fruit development growth stages. Once the fruits have been harvested, roots become the stronger sink for carbohydrates to fuel their growth. Access to readily available essential macro- and micronutrients, applied with fertigation during post-harvest, is equally essential to support root development. The recommended dose rate of nutrients in fertigation is to be decided for by plant-soil-water diagnostics.

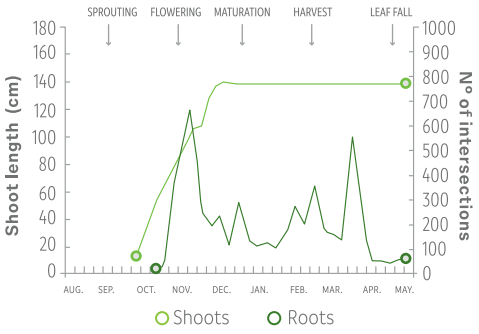


Fig.28. Growth cycle of shoots and roots on the vine cv. Flame seedless.

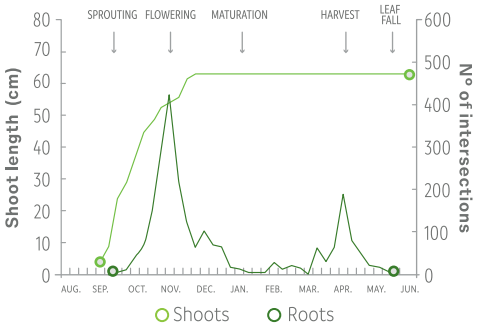


Fig 29. Growth cycle of shoots and roots in vine cv. Pink Muscat
Source: Libro Azul. SQM's fertigation manual. Third edition 2002. Page 84-85

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Refining tadpole shrimp management in rice: stages of rice seedling development susceptible to tadpole shrimp injury

Luis Espino, UCCE, Butte & Glenn Counties

Tadpole shrimp (TPS) (figure 1) is an important pest of rice in California. This aquatic crustacean develops in rice fields soon after flooding. Small TPS feed on diatoms, algae, and organic matter. As they grow larger, they feed on rice seedlings, killing them (figure 2). Large TPS dig in the soil, most likely searching for food, mudding the water and potentially dislodging established seedlings. Muddy water can slow the growth of rice seedlings and makes monitoring for weeds and other pests difficult.

Typically, growers and PCAs monitor for TPS frequently during seedling development. Current management guidelines state that once seedlings emerge through the water they are no longer susceptible to TPS injury. When TPS are detected, application of an insecticide may be needed to avoid injury to seedlings. The study presented here was conducted in 2021 to improve management guidelines by determining at which specific stage rice seedlings are no longer susceptible to TPS injury.

Small levee plots (12x20 ft) were established in a field with a history of high TPS population. Insecticide treated and untreated plots were seeded 2, 3, 4, 5 and 8 days after the flood was started, simulating different seeding times in commercial fields, using a seeding rate of 180 lbs of seed per acre. Rice seedling stage in treated plots (no TPS present) and seedling injury in untreated plots (TPS present) were determined every other day until the rice emerged through the water. Seedling stages were classified as S0 (no structures emerged), S1 (coleoptile emerged), S2 (coleoptile and radicle emerged), S3 (prophyll or spike emerged), V1 (first leaf collar visible) or V2 (second leaf collar visible) (figure 3). During the first 30 days of the study, TPS density and size were evaluated and floating seedlings collected. Three weeks after seeding, plant stand was measured in all plots.

The density of TPS in the study area was high, averaging 12 TPS/ft^2 9 days after flood. In fields with TPS problems, it is not unusual to see populations of this size. Later, TPS density decreased due to natural mortality. A month after the flood was started, the TPS density was down to 2 TPS/ft^2, and a week later the TPS were gone.

Figure 1. Tadpole shrimp next to rice seed. The length of the shell is measured along the dorsal line that can be seen behind the eyes.

GROWING EFFICIENCY AND PROFITABILITY WITH IRRIGATION CHEMISTRY

Pests, diseases and limited access to irrigation water: Three challenges nearly every vineyard producer encounters. Over time, this trifecta can have a profound and expensive impact on an operation from reduced yield and grape quality to, in extreme cases, vineyard removal.

For Napa producer, Frank D'Ambrosio, this was the exact situation he faced. Season after season, D'Ambrosio Vineyards attempted to maintain a block of petit verdot limited by disease, phylloxera and nematodes, but to no avail. As part of a final effort to revive the underperforming section before removing it altogether, D'Ambrosio and Daniel Robledo, his viticulture consultant, initiated a trial on this block with an Irrigation Water Optimizer (IWO) from Precision Laboratories.

"The IWO is a water surfactant that helps the soil retain and expand water like a sphere around the root system. This also makes any nutrients applied through irrigation available to the plants much more easily," Robledo said.

Water and soil interactions depend on many different variables, such as soil type, particle size, porosity and organic matter. When those variables are insufficient, the availability of water is reduced and plant establishment, yield and crop quality can be hindered. This is where IWOs even the balance.

Daniel Robledo, PCA | Viticulturist

IWOs, a category of irrigation chemistry, help maximize plant health and the environment around the plant. Treating water with IWOs reduces surface tension, moving water into and throughout the root zone and decreasing runoff. By holding water in the root zone, IWOs not only optimize water usage, they also make soil-applied chemistries and nutrients more available to the plant. These efficiencies lead to better plant health, yield, crop quality and ROI.

ENHANCING THE VINEYARD AND THE BOTTOM LINE

Throughout the 2018 season, three applications of the IWO were made to the struggling petit verdot block. As the season progressed, D'Ambrosio and Robledo began to see significant improvement in the once unproductive block.

"When we started the trial, we had phylloxera and nematodes we were treating with a drip-applied insecticide," Robledo said. "The blocks that were treated with the IWO [in combination with the insecticide] now have zero phylloxera, and the nematode numbers dropped dramatically from 2018 to 2019. [It] is a powerful tool."

In addition to reduced pest populations, the trial yielded a 21% increase in wine grape weight, a 16% increase in production and a $6,300 per acre increase in ROI. Worth noting is that these enhancements in the vineyard and on the balance sheet were achieved even though irrigation of the block was reduced to three hours, twice a week.

"Five years ago, that vineyard had all kinds of problems," D'Ambrosio said. "Now, it's looking good."

"We're proud to provide a lineup of IWOs that help growers like D'Ambrosio Vineyards create a more ideal environment for the root systems of their plants for healthier, more productive crops and a more fruitful bottom line," said Dr. Rob Osburn, technical and commercial product manager. "At Precision Laboratories, we're always looking for new ways to improve producer profitability. IWOs are a great example of that commitment in action."

When TPS hatch, they are very small and translucent; it is almost impossible to notice their presence with the naked eye. Tadpole shrimp grow fast and can go unnoticed until they reach a size that can injure rice. In this study, tadpole shrimp were first observed 7 days after flood when their shell size was 4 mm (1/8th of an inch) long. No significant injury was observed in any of the plots up to that point. One day later, when TPS shell size was between 5 and 6 mm long (1/4th of an inch), injury was noticed in plots seeded 4 days after flood. This injury occurred when seedlings were between the S2 and S3 stages and resulted in a 25% stand reduction (figure 4). At this time, very little injury was observed in plots seeded 2 and 3 days after flood. In these plots, most seedlings were at the V1 seedling stage already.

Tadpole shrimp severely reduced the stand in plots seeded 5 and 8 days after flood (figure 4). In these plots, TPS injury reached its maximum when seedlings were at the S2 or S3 and S1 stages, respectively, and TPS shell size was between 6 and 7 mm long (1/3rd of an inch). **These results suggest that the seedling stages S1, S2, and S3 can be injured by TPS, but once seedlings reach the V1 stage, they are less likely to be injured.**

There was no difference in the number of floating seedlings between treated and untreated plots seeded 2, 3, 4 or 5 days after flood. In these plots, windy conditions during the period of seedling growth resulted in a large number of floating seedlings (more than 800 per plot). In untreated plots seeded 8 days after flood, TPS killed 99% of the seedlings before they could grow any structures, preventing any seedlings from floating. In plots where TPS were present, the roots of floating seedlings were consumed after they had been dislodged by wind, giving the impression that TPS had injured them. **These results indicate that uprooting of seedlings by TPS may not be a serious threat to stand once seedlings are established.** Further evidence of this is that in untreated plots seeded 2 and 3 days after flood, the stand was dense (more than 50 plants/ft^2, figure 4). These plots were exposed to large TPS for almost 30 days, but since seedlings were already well established (V1 stage) when TPS showed up, the stand was not reduced.

In this study, rice stand was significantly reduced when TPS of shell size larger than 5 mm were present and seedlings were at the S1, S2 or S3 stages. These results show that treatments to avoid TPS injury would be needed only if seedlings had not reached the V1 stage. This study will be conducted again next year to confirm these observations and provide more solid TPS management recommendations to growers and PCAs.

Figure 2. Tadpole shrimp injury to rice seed. In this picture, the coleoptile has been consumed. This seed will not continue to germinate.

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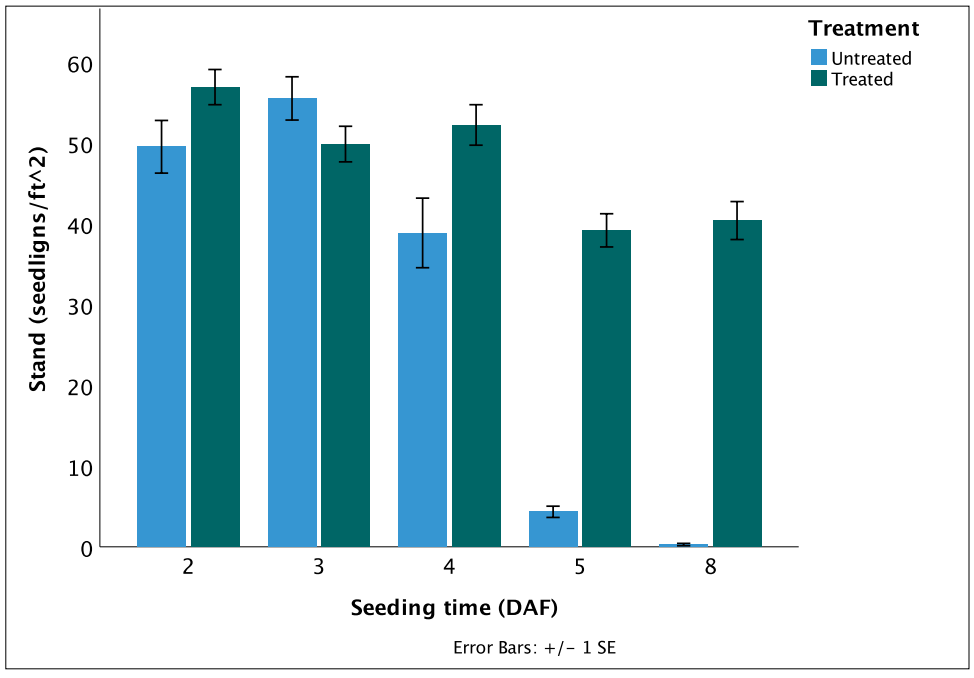
Figure 3. Rice seedling stages. Seedling on the left is at the V1 stage, when the collar of the first true leaf is visible. The next two seedlings are at the S3 stage, when the phropyll or spike is emerged, with the first of the two showing the first leaf starting to emerge. The three seedlings arranged in a line are finishing the S2 stage, when the coleoptile and radicle have emerged. As the spike starts to emerge, the coleoptile starts to turn green. The last seed to the right is considered at the S0 stage, when no structures have emerged.

Figure 4. Rice stand (plants/ft^2) three weeks after seeding in insecticide treated and untreated plots seeded 2, 3, 4, 5, or 8 days after the flood was started (DAF). ■



GROWING OUR WORLD FROM THE GROUND UP

At Nutrien we are proud to be growing our local communities through engagement, volunteerism, education, collaboration and positive impacts. Nutrien's Grow Our Community program is a way for employees to give back to their communities by volunteering or by making donations.

In support of employees and the communities where we operate, Nutrien has committed to match personal employee contributions to eligible organizations of the employee's choice, dollar for dollar up to $5,000 per employee.

Make-A-Wish Support

In June of 2021, Nutrien Ag Solutions focused on raising funds for local Make-A-Wish organizations. The average wish costs about $7,600 per child and as a result of COVID, many wishes have been left unfulfilled. Thanks to the generous contributions made by employees and their friends or family members, we were able to raise $220,000. These contributions can make at least 28 children's wishes come true.

Volunteer Opportunities

Nutrien recognizes that employees can make a meaningful and memorable difference in communities through volunteering. Grow Our Community includes the Employee Volunteer Program in which eligible employees can spend one day per year volunteering, during work hours, for a charity or non-profit. Employees volunteering outside of work hours may earn up to $500 per year to donate to the charity of their choice.

Youth Education Programs

Our employees participate in youth education programs that focus on sustainable agriculture and environmental stewardship. Nutrien's education outreach programs include Seed Survivor for third and fourth grades, Caring for our Watersheds for grades seventh through 12th and Farmers 2050 or Global Hero games (both available in App stores).

Community Grants

We also offer grants to community groups in California. In 2021 we have supported the Community Foundation of San Benito County, Central Coast YMCA and The Art of Life Cancer Foundation in Fresno. In years past, we have also supported communities impacted by wildfires.

Other Support

Nutrien focuses on building genuine connections with the communities which our business operates in. Our employees participate in communities as members of advisory panels, Chambers of Commerce, 4-H and FFA boards and other civic or charitable organizations.

We will continue to strive to meaningfully contribute to our local communities by Growing Our World from The Ground Up.

Nutrien Ag Solutions®

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Managing vertebrate pests for safe urban food growing

Rob Bennaton, Bay Area Urban Ag & Food Systems Advisor; Alda Pires, Urban Ag & Food Safety, Assoc. Specialist in CE; & Roger Baldwin, CE Specialist, Dept. of Wildlife, Fish and Conservation Biology, UC Davis

In urban areas, where city farms and community gardens are often near other land uses, those adjacent spaces can harbor vertebrate pests, affecting the safety of growers and PCAs while creating food safety risks for those consuming them. At this time of year in California, city farms and gardens are lush with ripe fruits, tasty leafy greens, and chunky underground root crops dense with nutrients, sometimes picked too late or forgotten. At the same time, as growers transition cultivation from summer to fall crops, compost piles can get taller, and folks occasionally forget a fruit or two on the vine. Sometimes growers go on vacation before the school year starts, and other times they might just forget to turn that warming compost pile at their site. Coupled conditions where nearby land uses exist together, like infrequently picked up garbage waste and infrequently turned piles can become the perfect places for vertebrate pests like rats, mice, voles, moles and ground squirrels.

When thinking about crops' food safety risks, think about managing against potential rodents because controlling them prevents unsafe foodborne and zoonotic illnesses. Salmonella, Leptospira, rat bite fever, plus produce safety concerns like urban soil particles carrying heavy metals like lead, can come from rodents carrying diseases and contaminants affecting humans, poultry, livestock and pets. While many lump them together as rodents, rats and mice have different behavior patterns growers can learn to prevent their population growth. While each has different habitats, rats such as Norway and roof rats, for example, are cautious, opportunistic and have a larger geographic range they cover. Ultimately, identifying your specific vertebrate pests correctly is the most important first step in controlling their populations in urban farm or community garden sites.

Food source availability, and consistent access to food over time, including spilled feed in chicken coops, and unharvested produce in gardens sited near trash compactors, present perfect conditions for rodents to thrive, and may attract insects and bird pests as well. Controlled management of rats and mice leads to disease prevention through urban farm site sanitation, sound land management, even in built environments and reduced populations. Reducing rodents in urban food growing sites is hard because so many are near food sources, along rail lines/transit corridors where trash is often dumped, where residents may leave open food sources, or in between buildings where populations may already reside.

Rat Damage on Kale, Transplant Starts in an Urban Farm. Photo: Matthew Linzner, Love Cultivating Schoolyards, East Oakland

Eliminating food, water, burrowing opportunities and closing access to spaces where they can hide and reproduce helps deter population growth, but sometimes baited traps may still be the best solution. Feed chickens, rabbits and other urban farm animals only the amounts of food they will consume at one time or retrieve uneaten foods to prevent their being spilled and eaten by rodents. Keep garden trash and debris neat, and contained as much as possible with tight, clean lids, and reduce vegetation which can be habitat by pruning trees, shrubs and hedges where possible.

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MVR's corporate headquarters are based in Corcoran, CA which is centrally located in its core marketplace. Close to port facilities of Oakland and Long Beach as well as along the BNSF railway, MVR currently has 162,000 square feet of warehousing for storing raw materials and finished products that are sold into crop nutrients, animal feed, and industrial use markets. With strategic supply chain partnerships spanning NA, EMEA, and South America, MVR's raw material network is recognized world-wide.

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Minimize or seal cracks or openings in compost bins, animal cages and build raised planter boxes with galvanized steel mesh underneath. This prevents rats and mice from having family-litters under your food growing beds where they have abundant food sources as plants' roots and are with little risk of predator- or human-disturbance. Access to water and food supplies can be through entry into barns, greenhouses, high tunnels, and cold frames, where they may be in warmer temperatures as the seasons turn towards winter colds. Once found, place traps or bait stations every 25-50 feet around the perimeter of farm or garden structures, and along routes in crevices where they may migrate less visibly.

In addition to prior mentioned Salmonella, rat bite fever and Leptospira, ground squirrels can also carry the plague, and can damage food producing and ornamental plants. They may sometimes chew on irrigation lines for water, and their burrowed holes can damage gardens spaces and structures while also causing trip hazards to growers. The management against ground squirrels, rats, mice, voles and moles is best done by traps and bait stations depending on population size, the time of year and methods preferred by land managers.

Proper urban farm site planning for design and use that prevent food plus water access and blocking ways rodents may gain entry is among the best control measures in early stages. Consistent management against vertebrate pests when site conditions allow regular re-entry for accessing nearby food sources or migratory routes, will help when populations are low. Remember, when one rodent is seen, there may be more, so visit the University of California's Integrated Pest Management website (http://ipm.ucanr.edu/PMG/menu.house.html#STING) to get up to date, science-based information to control vertebrate pests and prevent the food borne illnesses they can carry in urban farms and community gardens. ■

Rodent-caused Crop Damage. Photo: Steve Moros, Bancroft Community Garden, Berkeley, CA

Additional resources on urban farm start up production, food safety, legal basics or marketing and business development can be found at https://ucanr.edu/sites/UrbanAg/Urban_Ag_Workshops/.

What Control Options are Available?

	Habitat Modification	Baiting	Burrow Fumigation	Trapping	Exclusion	Repellent	Frightening	Shooting
Ground Squirrel	X	X	X	X				X
Pocket Gopher	X	X	X	X	X			
Voles	X	X	?	?	X	?		
Rats & Mice	X	X	?	X	X			

Credit: Roger Baldwin

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– Joe Coelho,
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"This is our second year using CIDETRAK® NOW MESO™ in our almonds and pistachios, and I'm very satisfied with the results. We applied CIDETRAK on roughly 800 acres of Almonds and 2,000 acres of pistachios. It gives me peace of mind knowing that this product is on 24/7 and continually releases pheromone season long."

READ MORE go to: *trece.com/maricopa-orchards*

– Kevin Davies,
Tehama Angus Ranch

"We are on year 2 with having CIDETRAK® NOW MESO™ in our orchard, and we are extremely pleased with the results. We're treating 500 acres of almonds and have seen a major reduction in NOW injury of up to 80%."

READ MORE go to: *trece.com/tehama-angus-ranch*

– Brad Higbee,
Field R&D Mgr, Trécé, Inc

"When it comes to orchard monitoring and the selection of traps and lures, it's all about the objectives that you set for your management program and what control measure that you are willing to take."

READ MORE go to: *trece.com/brads-ipm-program*

– Steve Gruenwald, *PCA*
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"I like the simplicity of the MESO dispenser system, with no batteries or other hardware that needs to be serviced. The dispensers are easy to hang, and work through the season and into the fall on all flights."

READ MORE go to: *trece.com/growers-choice*

– Allan Crum,
Farmers International

"Last year, we sustained an average of 2.5% NOW injury on our almonds. This year in 2020, NOW injury on average was reduced to just below 1%. The product performed as expected and I am very pleased with the results."

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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.

Helping Growers Manage Risks from Wildfires

Every year, wildfires have a devastating financial impact on fruit, vegetable and other crops in the western United States. California and surrounding states are currently experiencing severe drought conditions, heightening the risk of damage for the 2021 and future growing seasons. To help growers monitor for potential damage, UPL partnered with 6th Grain to create Crop S.A.F.E. (Smoke and Fire Events), an online platform for growers and other food channel decision-makers to manage risk from smoke hazards during the fire season.

WHAT IS CROP S.A.F.E.?

Using advanced Earth observation data captured from the National Oceanic and Atmospheric Administration (NOAA), Crop S.A.F.E. provides satellite information and intelligence to help growers and the food value chain anticipate the effects of atmospheric conditions on the crop. The platform delivers critical live updates and data on a variety of factors that affect crop production, including smoke taint, temperature history, daily ozone and particulate data, air quality, wind direction.

Crop S.A.F.E. uses Aerosol Optical Depth (AOD) from NOAA to estimate the intensity of smoke exposure accumulated over a period of time, which provides growers with critical insights. In grape production, for example, wildfire smoke reduces the amount of sunlight reaching the vineyard, increasing the stress level on the crop and quality of the fruit. Wildfires can also cause smoke taint in grapes, altering the flavor and reducing the marketability of the crop.

By merging information on field management with satellite observations of weather, crop extent and crop health, growers will have timely, comprehensive and accurate information to improve decision-making and increase productivity.

INFORMING CROP MANAGEMENT DECISIONS

The Crop S.A.F.E. system can also provide regional intelligence for growers by exposing smoke impacts in other areas and states. Although it may be widely reported when a fire occurs, knowing how many days a particular vineyard or area has been exposed to smoke throughout the year is a critical part of knowing the quality of that vineyard's wines in the coming year. This can be an essential decision-making tool for growers as they market their crop.

This tool also helps keep workers such as agronomists, farm laborers, soil testers and others working in fields safe. By knowing potential exposure to smoke and avoiding high-smoke areas when the weather or conditions are poor, workers will reduce their risk of breathing difficulties.

INDUSTRY INNOVATION WITH OPENAG

UPL approaches the industry in a new way, providing innovative strategies and advanced products to create local solutions that help growers protect and nurture their crops. Through strategic partnerships and OpenCollaboration initiatives, UPL is working to bring enhanced value to all stakeholders and make improvements in agriculture and the entire food chain. Crop S.A.F.E is an example of UPL partnering with industry leaders to reduce the pressure on growers and bring groundbreaking solutions to the industry.

"Through our OpenAg purpose, UPL is committed to collaborating with innovative partners to overcome some of the most pressing challenges in agriculture to help secure a sustainable food supply for all," says Stefano Matozzo, Business Excellence Lead, UPL. "Our partnership with 6th Grain provides immediate and direct support to growers and their crop advisors via an interactive platform to help manage risk and enable more informed crop management decisions to help overcome effects of wildfires."

Want to learn more about Crop S.A.F.E.? Visit the Crop S.A.F.E. website at UPLcropsafe.com, or go to upl-ltd.com/us to view more UPL solutions.

UPL OpenAg™

CDFA has recently issued a Pest Detection Advisory for Black Fig Fly (BFF)

Background

The black fig fly, *Silba adipata*, a fig pest common in the Mediterranean and Middle East regions, has been detected in Los Angeles, Orange, Santa Barbara, and Ventura counties. Adult flies are 3.5-4.5 mm in length and feed primarily on exudates from figs or fig-tree sap exuded from an injured plant.

The only known host for this species is edible fig (*Ficus carica*). There are reportedly 4-6 generations per year. Since *Silba adipata* can cause major fruit drop, there could be a major economic impact to California's fig industry. The most effective known attractants are hexanol and ammonium sulfate solution, which have been tested elsewhere in McPhail traps. Fig sap is also reported to be attractive.

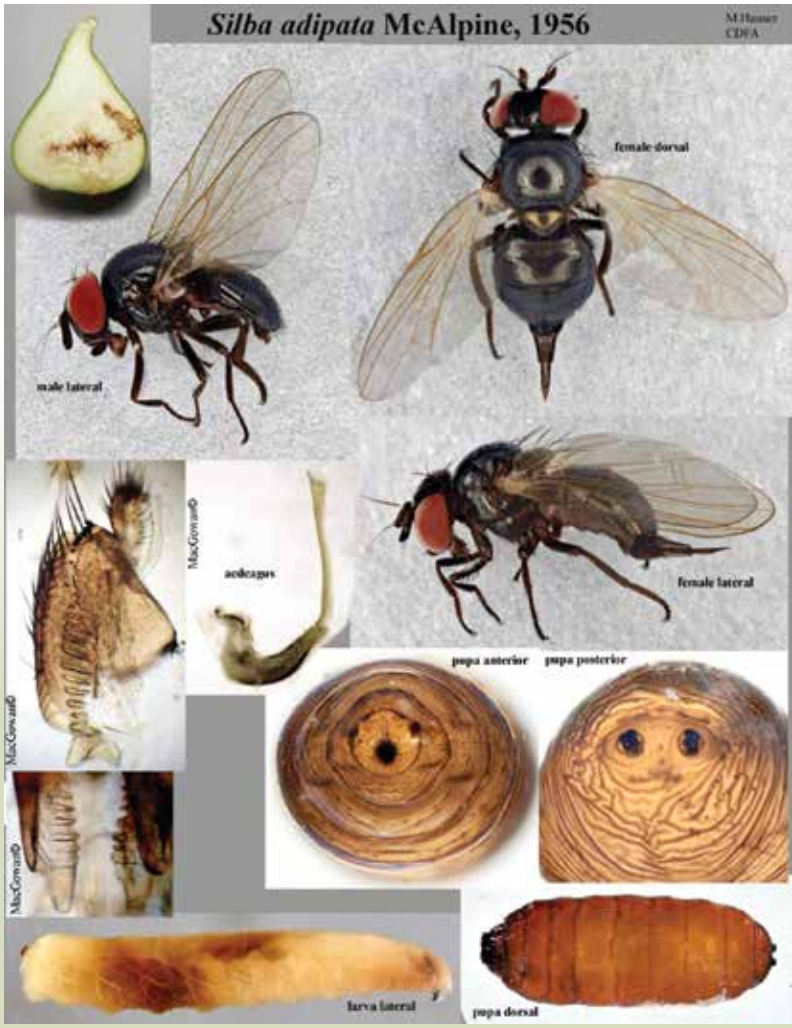
Damage occurs after the adult female lays eggs in the fruit, which hatch into larvae that tunnel through the flesh of the fruit making it unfit for consumption. Infested figs may change color and will often prematurely drop from the tree before ripening. Dropped figs may have larval emergence holes (approximately 1 mm in diameter) - and larvae may be present inside the fruit. The presence of larvae in dropped fruit that is still in relatively good condition is an indication that the fruit drop is a result of an infestation and any larvae found should be submitted to the Plant Pest Diagnostics Center as potential black fig fly.

CDFA is working with the counties to determine the extent of the infestations. Possible infestations should be reported to the pest hotline at 1-800-491-1899.

For information on the pest risk assessment and rating of black fig fly in California, please visit: https://blogs.cdfa.ca.gov/Section3162/wp-content/uploads/2021/07/Silba-adipata.pdf

If you have any questions regarding this advisory, please contact Sandeep Sahota by email at sandeep.sahota@cdfa.ca.gov. ■

Summary - 2021 Black Fig Fly Detections			
County	Adults Detected	Date of Last Adult Detected	Larval Properties
Los Angeles	2	06/29/21	3
Orange	0	-	3
Santa Barbara	1	06/29/21	7
Ventura	0	-	1



Black fly life stages

Black fly damage

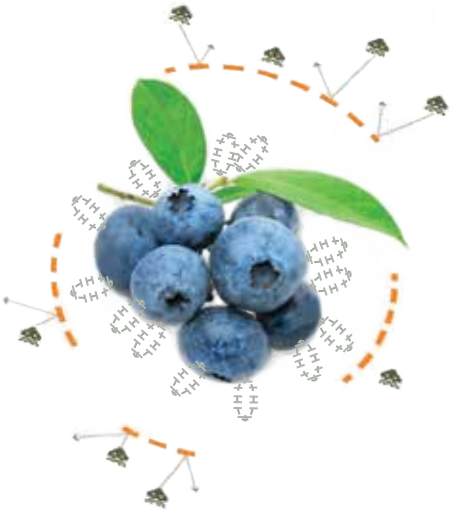
Botector®

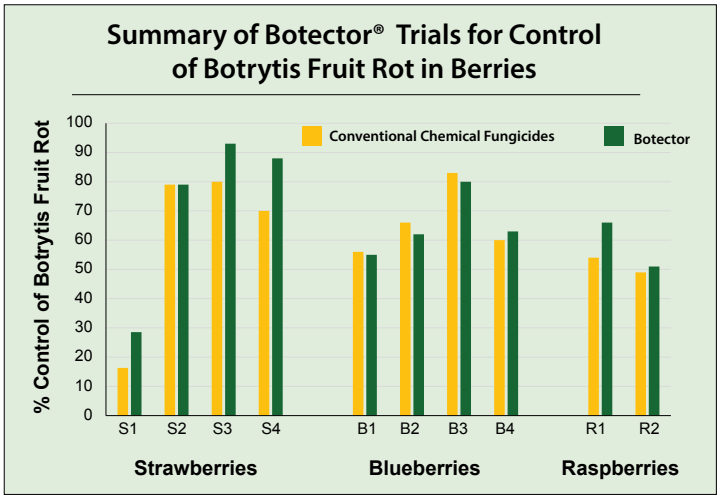
BIOFUNGICIDE

Stop disease before it gets started!

Beneficial microorganisms in Botector® out-compete fungal pathogens for space and nutrients, creating a protective barrier between the plant and potential diseases.

- Efficacy is comparable to conventional fungicides
- No development of pathogen resistance
- Ideal for use in IPM programs
- No pre-harvest interval or MRL restrictions
- Safe for bees and beneficial insects
- Approved for certified organic farming





Botector® prevents botrytis in grapes, berries and tomatoes, anthracnose, phomopsis and rhizopus rots in berries, blossom blight and brown rot in stone fruit and almonds, and post-harvest rots in pome fruit.

FOR ORGANIC PRODUCTION

REGISTERED MATERIAL For Use In Organic Agriculture Washington State Dept. of Agriculture

Westbridge®

When you want consistent performance and reliable service, think Westbridge Agricultural Products: (800) 876-2767 • www.westbridge.com

Is enough copper too much?

A chelated ion solution

Patrick Simmsgeiger, President, Diversified Waterscapes, Inc.

Chelated copper algaecides are used for the control of Algae and Harmful Algal Blooms(HABs) in aquatic environments, and present an advantage in price and outcome compared to the standard use of non-chelated copper compounds. Further, within the chelated copper market there is a further advantage in chemical quality, with added benefits available beyond single-bond chelated products.

Most aquatic environments are mineral-rich in limestone, chalk and gypsum. The copper-sulfate molecule is attacked by these minerals, forming a chemical bond. This bond creates an insoluble precipitate of copper-carbonate (Cu2CO3). The now heavier copper molecule sinks quickly to the bottom of the water feature, where it builds up to ever-higher concentration levels. This diminishes the usefulness of the initial amount of copper-sulfate on the target species. Historically, applicators simply tossed more copper-sulfate at the problem until the objective is accomplished.

Chelated coppers do not combine easily with the minerals present because a portion of the ions are already bonded. Chelated copper algaecides deliver a better value by remaining within the water column, because they stay suspended longer. A lower amount of copper is needed for the same outcome accomplished by over-dosing with non-chelated copper. The fortunate side-result is less copper precipitate at the lowest layer of the water feature. There is an associated labor savings when using less gallons of chemicals, and the overall use of product represents a cost-savings.

When using a double-chelated copper-sulfate, there are even less carbonate ions available, so the benefits are higher, representing the finest in algicide technology. One might ask, “How does the algae bond with the copper if most of the ions are unavailable?” Rather than consuming the compound, the presence of copper is sufficient to discourage the reproductive cycle of algae/HABs. There is a lower incidence of copper exhaustion, while realizing the desired level of kill-off. Because a lower copper-sulfate concentration is used, when applied properly, the result is an even better value when the job is complete, as well as over long-term

use. Less copper within the water feature is less toxic, easier to apply, and reduces plating on associated equipment. Further, because each gallon represents a finer focus of copper-sulfate, which last longer, applicators find this allows for easier distribution, and a better control toward the 1 ppm standard for potable water environments. There is no foaming, and no interaction with other chemical treatments, due to the pH of the product.

Chelated copper algaecides have lower toxicity since less copper is used, and they precipitate copper at a much slower rate. The user has more control with these lower copper concentrations. In real-world usage, chelated-copper is targeted on the problem species at a higher ratio, subsequently decreasing available copper which

YOU CAN'T HAVE ENOUGH HEALTHY ROOTS!

Plant Food systems

ADVERTORIAL

A TREE'S ROOTS ARE THE FOUNDATION TO SUCCESSFUL PRODUCTION. They provide stabilization, nutrients, water, and oxygen. Without these attributes plant systems simply could not function. So why as a crop protection industry do we focus so much on the crop destructors within the branches of a tree rather than the crop constructors at the foundation? As agronomists we need to focus on crop production before we start to worry about crop protection.

A tree's root system faces various obstacles to maintaining an effective gateway for production inputs. A crop advisor once asked the question, "Why does an almond grower have to wait for his trees to blow over to realize he has *Phytophthora,* when in fact every tree in the orchard is probably infected in some degree?" To build upon that a noted pathologist offered, "And what root hair isn't in a constant battle with *Pythium?"* To what degree are your orchards infected?

K-PHITE 7LP Systemic Fungicide/Bactericide is the only linear polymer phosphite registered in California for the control of both *Phytophthora and Pythium,* and also *Fusarium* and *Rhizoctonia* as well. All four of these pathogens comprise the compendium referred to "Root Rot." In the absence or control of these pathogens the tree is able to respond in what is referred to as a "Root Flush," a period of accelerated root growth making the overall plant more efficient and capable of translocating greater water and nutrients, resulting in superior yields. The problem with these pathogens is that they are ever-present in the soil profile. **A "yield driven" agronomist should recommend K-PHITE 7LP three times throughout the year for continued control of "Root Rot;" early leaf, late spring and early fall to ensure a healthy, vibrant and responsive root system.** With the systemic flexibility that **K-PHITE 7LP** provides, treatments may be applied as foliar or chemigation with equivalent results. For the response you want, use a reliable, responsible and registered product. Maximize your root health; use the one and only **K-PHITE 7LP** on every tree.

KPHITE® 7LP
SYSTEMIC FUNGICIDE BACTERICIDE

PLANT FOOD SYSTEMS, INC.—ZELLWOOD, FL., the nation's premier acidulator of potassium hydroxide offers California an advancement in the manufacturing of potassium phosphite, **K-PHITE 7LP Systemic Fungicide Bactericide.** Registered on Almonds, Avocados, Citrus, Grapes, Pistachios, and Walnuts along with many other crops, **K-PHITE 7LP** exhibits multiple efficacies that include *Alternaria, Botryosphaeria, Botrytis cinerea, Powdery Mildew, Downey Mildew, Sclerotinia, Pseudomonas and Xanthamonas.*






For more information including research results and scientific publications, contact;
Mark Brady, Western Marketing Manager, Plant Food Systems, Inc.
(559) 731-1267 mbrady@plantfoodsystems.com

K-PHITE® 7LP is a registered trademark of Plant Food Systems

Plant Food systems

would interrupt the life-cycle of non-target organisms, and reducing overall lake copper build-up. And again, double-chelated copper-sulfate is even more efficient than its single ion cousin.

Chelated coppers maintain potency in high alkalinity waters, and are also effective in colder temperatures. Performance is consistent when targeting a range of algae species with different growth characteristics, in different water chemistries, and have more effective control over a wide variety of aquatic features.

A lake treated with chelated copper can be used right after application for sporting and economic activities like swimming, fishing, watering livestock, and irrigating turf. Non-chelated copper is not algal specific and in high concentrations can be toxic to aquatic life, especially when higher levels are used to compensate for a higher precipitate rate. Non-Chelated copper products also combine with hydrogen ions in aqueous solution to form sulphuric acid (H_2SO_4), which is highly corrosive.

Technology presents better tools, and chelated copper is a prime example of this. Taken one step further, the availability of a double-chelated copper product gives peace of mind to the Site Manager, who will not find out 20 years later that a toxic soup has taken over, making a thick sludge. This hazmat mess, with all the excess copper that has precipitated over the years, can cost a fortune for each pond to clean, not to mention the environmental permits needed for special muck removal.

Make sure your Aquatic Expert is using a non-toxic, highly controllable, and cost-efficient compound to address harmful algae/HABs, and not over-dosing with some concoction they might be mixing up in the back yard. It has happened that a contractor has padded their bottom line, instead of buying a California-Registered, EPA-approved chelated copper product, from a licensed distributor. The State can be unforgiving to an Owner when it comes to poor records, high toxicity levels (LCR, 1991), and improper use of chemicals.

Once the issues are understood and addressed, Property Managers can be confident in the use of a chelated copper product. With some retraining, overall copper concentration can be reduced, the algae will be kept to a healthy minimum, and long-term toxicity will be minimized. The results and savings will speak for themselves, while the cost is equivalent to the older products. ■

The scientific explanation.

A broad-spectrum contact pesticide

PREV-AM delivers quick and effective knockdown of insects, diseases and mites. There are no restrictions on the number of applications throughout the season due to its multiple modes of action.

Multiple modes of action:

Suffocation
PREV-AM is easily drawn into an insect's spiracles, moving into the trachea and quickly suffocating the insect.

Coating Disruption
The disruption of waxy coatings on insects' wings makes them unable to fly, feed or mate.

Desiccation - Insects
By drying the waxy connection of a soft body insect's exoskeleton, body fluids leak out – causing death.

Desiccation - Diseases
PREV-AM penetrates the hydrophobic coating of fungal mycelia, destroying the living tissue.

See PREV-AM's multiple modes of action video.
www.PREV-AMworks.com

A valuable resistance management tool

PREV-AM's physical modes of action make resistance development highly unlikely. PREV-AM can replace application(s) of a susceptible pesticide or be added as an additional application in the spray rotation.

Benefits of PREV-AM include:

- No residual activity
- Quick knockdown
- Multiple modes of action for broad use
- 3-in-1 insecticide, fungicide and miticide
- No pre-harvest interval

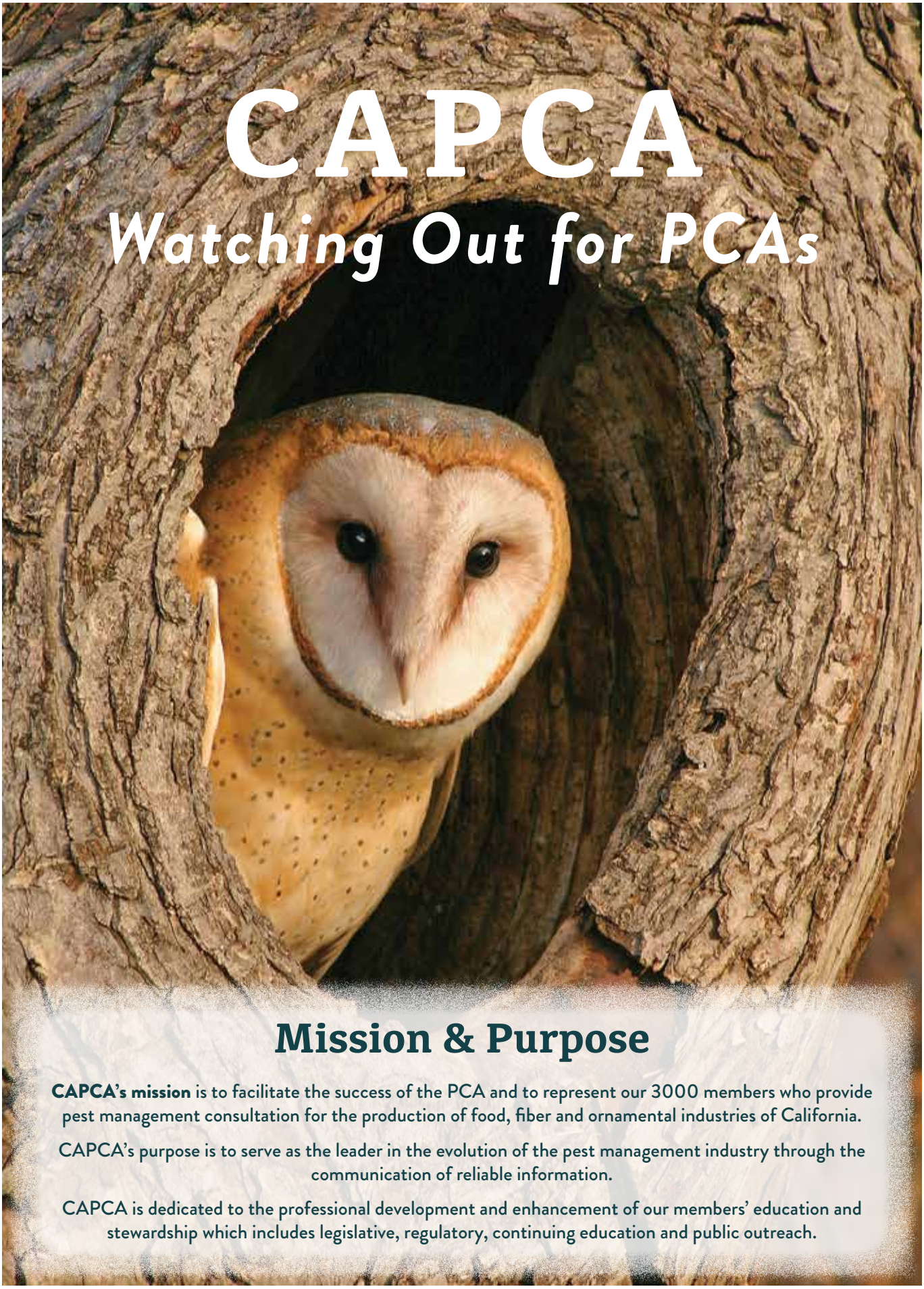
Learn more at oroagriusa.com

Proof of Performance:

Better pest control.

PREV-AM

ORO AGRI
GROW WITH CONFIDENCE



CAPCA

Watching Out for PCAs

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.

An Organic Herbicide you can Trust

SUPPRESS® HERBICIDE EC

Weed management is an ever-present problem in agriculture and there are few effective and economical options available for use on organic food crops. SUPPRESS Herbicide EC is a powerful force against weeds as they compete for water and nutrients and provide refuge to enemies such as harmful microbes and insect pests.

SUPPRESS® Herbicide EC is a non-volatile, emulsifiable concentrate for post-emergent, non-selective weed control.

SUPPRESS® Herbicide EC, the market leader in organic herbicides, was the first effective herbicide to be approved for use on all certified organic food crops. With over 10 years of grower-proven efficacy and university field testing, SUPPRESS Herbicide's patented and proprietary formulation consistently provides fast and effective burndown on a wide variety of unwanted grasses and weeds. Independent laboratory testing ensures that SUPPRESS is free of pesticide residues and meets certified organic product standards.

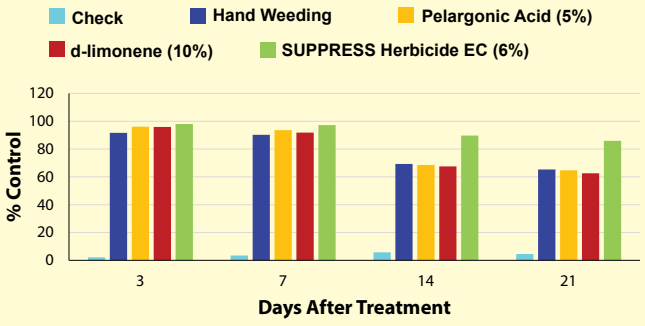
Apply SUPPRESS when weeds are small and easier to kill. This will save time and money, and help reduce seed build-up in the soil and minimize next year's weed problems.

How it Works

The active ingredients in SUPPRESS, naturally-occurring fatty acids, disrupt the plant's waxy cuticle and cell walls causing weeds to dehydrate and die within hours. SUPPRESS™ Herbicide EC is non-volatile; therefore vapor damage will not occur to non-target plantings. It is low-foaming, easy-to-use, and is rainfast in 3 hours. SUPPRESS has no MRLs or pre-harvest interval so it can be safely applied up to the day of harvest.

SUPPRESS offers flexibility in use. It is effective as a stand-alone herbicide for certified organic growers and is also a great tank-mix partner to enhance conventional herbicide efficacy. SUPPRESS is an excellent IPM tool to rotate with conventional herbicides to minimize resistance.

Provides Fast and Effective Burndown



2017 Grower Trial: Weed Composition: Nettle (Urtica urens): 29%; Field bindweed (Convolvulus arvensis): 18%; Johnson grass (Sorghum halepense): 15%; Pigweed (Chenopodium album): 13%; Ryegrass (Lolium multiflorum): 12%; Common sowthistle (Sonchus oleraceus): 9%; Bull mallow (Malva nicaensis): 3%; Coniza bonariensis: 1%

MADE IN THE USA

OMRI LISTED

Induced Resistance in Agricultural Systems

Barry J. Jacobsen, Emeritus Professor of Plant Pathology, Montana State University;
Scott Ockey, Field Development Manager-Western US, Certis Biologicals

As an increased number of chemical and biological products become available stating the ability to induce plants immune systems, we felt it important to provide background to help growers make informed decisions regarding the use of these products in their individual cropping systems. Plants have been perpetually locked in an arms race with their enemies, including fungi, bacteria, viruses, and arthropods and have developed complex defense mechanisms to ensure their survival. Plants have evolved to fight the damaging impacts of these organisms and in turn, these organisms have continuously evolved to overcome the plants defenses. We are now seeing products become available that activate this innate genetic ability of plants to fight against pest attack through a process known as Induced Resistance (IR). This resistance is different than specific gene resistance that breeders typically use to develop resistant varieties. IR is a broad, basic, innate resistance that is triggered by pathogen or insect attack, injury, and chemical stimuli. We will discuss the basic terminology used when discussing IR, offer a current overview of the IR process and finally, discuss considerations when looking at currently available products.

Until recently, researchers have separated IR into two categories: foliar/stem induction was categorized as Systemic Acquired Resistance (SAR) based on induction via Salicylic Acid pathway and root induction categorized as Induced Systemic Resistance (ISR) based on induction of the Jasmonic Acid /ethylene signaling pathways. We are seeing now that although these are the most characterized pathways, it is now clear that there is significant "crosstalk" between these resistance induction pathways and in most cases, both pathways are activated. Induction of these pathways is typically associated with the production of reactive oxygen species (ROX) and with the plants' detection of pathogen/ microbe-associated molecular patterns (PAMPs/RAMPS) **Table 1.** Induced resistance is the activation of these innate genetic defenses, ranging from plants self-killing infected cells (hypersensitive response) to the production of more than 30 characterized biochemical products that interfere with plant pathogen infection and colonization and herbivore feeding. Some of the products are called PR (Pathogenesis Related) proteins **(Table. 2)** which include chitinases and β-glucanases that can attack

Table 1.

Protein Associated Molecular Patterns (PAMP's)	
PAMP's	**Association**
Lipopolysaccharide	Gram negative bacterial cell wall constituent
Peptidoglycan	1° found in gram positive bacterial cell walls and to a lesser degree in gram negative bacterial cell walls
Lipoteichoic acids	Gram positive bacterial cell walls
Mannose-rich glycans	Common microbial glycoprotein, rare in humans
Flagellin	Bacterial flagella
Pilin	Bacterial pili
Bacterial and viral nucleic acid	Bacterial and viral genomes contain a high frequency of unmethylated cytosine-guanine dinucleotide sequences. Mammalian DNA has low frequency of cytosine-guanine dinucleotides and most are methylated.
Double-stranded DNA	Certain virus families
Lipoteichoic acids, glycolipids and zymosan	Yeast

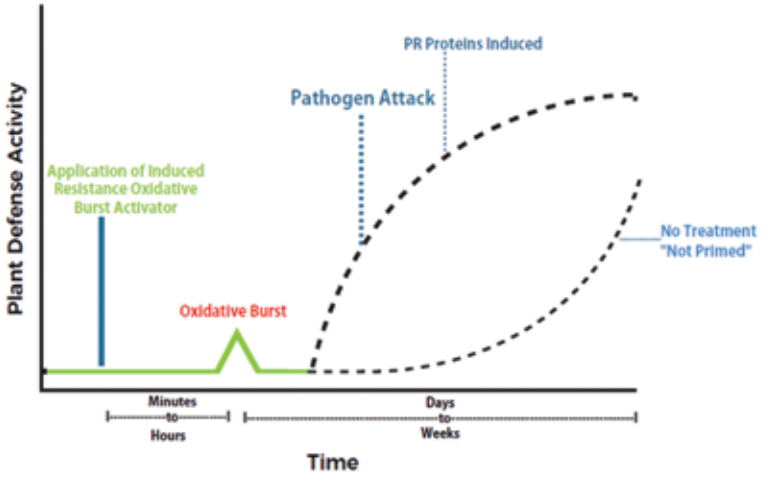
Table 2.

Pathogenesis Related Proteins (PR-Proteins)		
Fam.	**Type Member**	**Properties/Target**
1	PR-1	Anti-Oomycete
2	B-1,3-glucanase	Endoclucanase
3	Chitinase	Endochitinase
4	Chitinase	Endochitinase
5	Thaumatin-like	Fungal membrane disruption
6	Proteinase-inhibitor	Inhibits pathogen proteinases
7	Endoproteinase	Inhibits pathogen proteinases
8	Chitinase	Endochitinase
9	Peroxidase	Lignification
10	Ribonuclease-like	Digests RNA
11	Chitinase	Endochitinase
12	Defensin	Plasma membrane disruption
13	Thionin	Plasma membrane disruption
14	Lipid Transfer Protein	Plasma membrane disruption

fungal cell walls. Other PR proteins include peroxidases, proteinase inhibitors, ribonucleases, ribosome inhibiting proteins, thionins, lectins, defensins, etc. Production of other antimicrobial products such as phenolics and phytoalexins occurs after the production of PR proteins. These and other proteins are often called stress (drought, heat, etc.) proteins. Most of these PR proteins are exported from plant cells into the intercellular spaces, whereas specific or major gene resistance is typically expressed within plant cells.

In most cases, the resistance induced is systemic, although there are examples of more localized protection. The exact systemic signaling messenger(s) are unclear at this time. The important point is that plants have complex defense mechanisms, plant tissues can respond to stimuli such as pathogen infection remote from the original infection site (e.g., systemically) and it is a race between the attacking plant pest and how fast the plant employs these defenses to determine how much pest damage occurs. If the plant defense mechanisms are induced before a pest attack, it is likely pest damage will be significantly reduced **(Fig. 1)**. This is the purpose of using IR products. It is important to understand that IR is not absolute resistance, there can be some infection and damage but, in most cases, the damage will be below the economic threshold. When conditions are optimal for pathogen infection and inoculum pressure is very high, IR can be overcome. It is important to understand the timing of induction from application and the length of time where effective disease control occurs for each product. These factors and the susceptibility of the cultivar should be considered in research trials.

Figure 1.

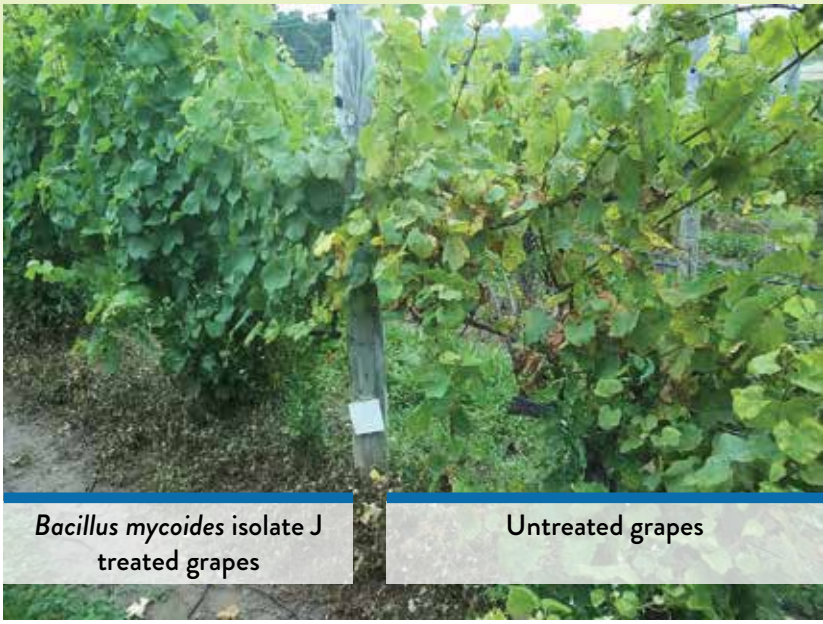


It is also known that whether the induction of resistance is by a synthetic chemical, a microbe(s), fermentation or

Table 3.

Examples of different types of activator products used in crop protection

Type	Active Agent	FRAC Code
Synthetic	Acibenzolar-S-Methyl	P01
	Phosphorous acid	P07
Botanical	Laminarin (kelp extracts)	P04
	Reyonutria sachalinensis extract	P05
Microbial	*Bacillus mycoides*	P06
	Yeast cell wall extract	P06



other natural products **(Table 3)**, every product induces resistance for various periods of time (hours to weeks), affects different plant parts more strongly, induces some plant species more than others, are most effective in reducing specific pathogens and are affected positively or negatively by general plant health and other products applied in combination or separately. For these reasons, reading and understanding the product label is important to achieving desired results. No product that works by IR will control all plant pathogens or reduce all insect damage or reduce all virus vector transmission. For example, one well characterized IR inducer will control potato virus Y, cucumber mosaic, and Tobacco mosaic but not potato virus X. Another factor that should be clearly understood is that some products cause phytotoxicity (due to overstimulation?) in some plant species. In contrast, others have been shown to have no phytotoxic effects on a broad range of plant pests. It is important to separate these effects from what some have called induced resistance yield drag. We know of no proof that IR results in any loss in plant productivity and in many situations, we have observed increased productivity, perhaps from reduced damage from the control of undetected plant pests such as root rot pathogens.

Where do these IR products fit? The answer is complex. However, our experience is that they fit best in an integrated plant health and pest management program. For example, using IR products with cultivars with partial disease resistance can equal the best disease control achieved with an optimal synthetic chemical spray program on very susceptible cultivars. In organic systems they can be amongst the most powerful tools available to control some diseases and pests. In production systems where synthetic chemicals are used, they can be used to reduce overall chemical use by using them in alternate sprays and to reduce development of pest resistance to pesticides. This latter point is particularly important today as new synthetic pesticides are ever more specific in their mode of action and hence more susceptible to pathogens and pests developing resistance. Because IR products have broad and multiple modes of action, they can be used to slow the development of pesticide resistance, much like using mixtures or alternate sprays with chemicals having different modes of action.

Successful incorporation of IR products into a production system requires understanding the pests involved, likely pest pressure, knowledge of pest susceptibility of the specific crop plant or cultivar to specific pests, what other crop protection/crop health products will be used and understanding the product label. ■

ADVERTORIAL

LIFEGARD®

BIOLOGICAL PLANT ACTIVATOR

Activate the natural defenses in your crops! The first in a new class of biological disease control solutions (FRAC P06)

Made in California

Certis Biologicals' ISO manufacturing facility at Wasco, California, has been producing Bacillus-based products for over half a century. It's important to Certis Biologicals that we provide products to growers that are of the highest quality and we strive to ensure those standards throughout our manufacturing facility. It's why we are consistently investing in new equipment and new processes at our Wasco facility. Today at Wasco, we manufacture LifeGard® WG, LifeGard® LC (*Bacillus mycoides isolate J*) Double Nickel® (*Bacillus amyloliquefaciens* D747), Deliver® and Javelin® WG (*Bacillus thuringiensis kurstaki*) and Agree® WG (*Bacillus thuringiensis aizawai*) among other products for use in agriculture around the world. Our manufacturing expertise and attention to detail ensures that growers receive products containing the consistent quality that they've grown to rely upon.

Primed and Ready

The active ingredient of LifeGard® WG is a naturally occurring bacterium *Bacillus mycoides isolate J* (BmJ). Instead of the traditional approach of attacking disease directly, the naturally occurring ingenious mode of action triggers the plant's built-in immune system. When triggered by application, plants "switch on" resistance genes, causing a cascade of plant metabolic responses that limit infection and disease development. LifeGard's activation of a plant's immune response is known as induced resistance, or IR. it is a highly effective mode of action for limiting infection and the development of bacterial and fungal diseases.

1. APPLICATION

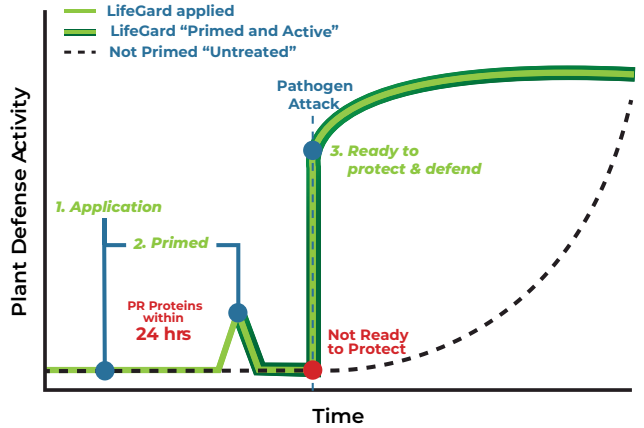
LifeGard is applied early, ideally the first spray of your disease management program as a preventative application before disease occurs.

2. ACTIVATION

BmJ bacterium lands on the plants, induction or "activation" initiates. LifeGard spores trigger the SAR process by directly activating the NPR1 proteins within **3 hrs**. PR proteins spread throughout the plant within **24 hrs**.

3. DEFENSE & ATTACK

The plant responds with a cascade of metabolites that resist infection and the development of disease. Once the plant's natural immune response activates, it remains primed and resistant to disease for **up to 18 days**



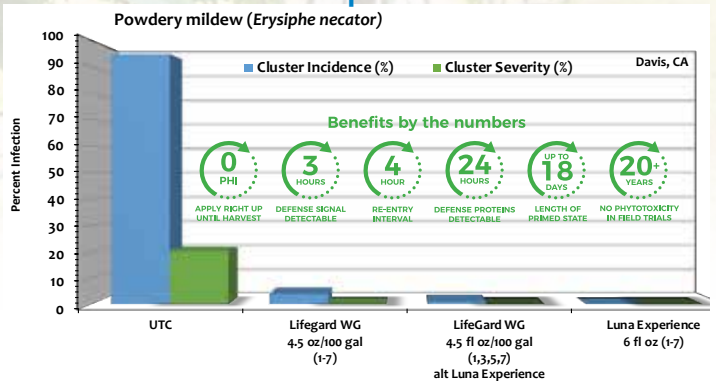
Primed to Perform

In trial data spanning nearly a decade, LifeGard has proven efficacious in the treatment of a number of diseases including:

- **Grapes & Berries:** Powdery mildew, Downy mildew
- **Tomatoes & Peppers :** Bacterial spot, Bacterial speck, Botrytis, Early blight
- **Legumes:** White mold
- **Potatoes:** Early blight, PVY, White mold
- **Table beets:** Cercospora leaf spot
- **Pome fruits:** Fire blight, Flyspeck/Sooty blotch, Powdery mildew
- **Cucurbits:** Powdery mildew
- **Almonds & Carrots:** *Alternaria*

LifeGard on Raspberry

LifeGard on Grapes



- Variety: Chenin-blanc, 4 yrs. old
- Treatments: 7 applications from April 30th – July 20th on 14 day intervals
- University of California - Davis

Powdery Mildew (*Erysiphe necator*)

Untreated Control

LifeGard® WG
4.5oz/100 gal
(1-7)

- V Variety: Chardonnay, 31 yr. old
- Treatments: 1 = Jun 3rd; 2 = Jun 15th; 3 = Jun 27th; 4 = Jul 11th; 5 = Jul 26th; 6 = Aug 9th; 7 = Aug 22nd
- Induce surfactant 0.125% used with LifeGard
- Geneva, NY - Cornell University

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NOTE: Some of the following job opportunities are abbreviated postings. To view the complete posting, please log into your membership access on our website at https://capca.com/my-account/

Formulation Chemist – Fresno, CA

Wilbur-Ellis Company

Description: Formulation Chemist (preferably with Ag background). This Adjuvant and Crop Protection Formulation Chemist will direct lab activities for the development, registration, and manufacture of new branded Adjuvant and Crop Protection products and formulations. This role will partner with sales, marketing, environmental, health, safety, and security (EHSS), regulatory, operations, and manufacturing teams to identify business needs.

Duties, Qualifications & Requirements: Proven ability to lead, plan and execute research projects on difficult problems with cross-functional teams. Demonstrated record of achievement for formulation research and development on adjuvants and crop protection products. In-depth formulation development experience, preferably in adjuvants, biologicals, and crop protection. Strong understanding of formulation and application technologies based on practical use of physical-chemical properties and analytical methods. Proven track record of generating new innovation and application of cutting-edge technology.

Apply: To apply, visit www.wilburellis.com/careers. Search for "Chemist" to apply online.

Territory Account Manager - USA Southwest

Rotam North America

Description: Rotam North America is looking for a new team member to serve in the role of Territory Account Manager – Southwest. Your responsibilities will include key account sales and involvement in the planning and execution of strategies to grow important agricultural markets in California and Arizona. Manage Your Own Business with Accountability for Sales and Profitability.

Duties, Qualifications & Requirements: Work in One of the World's Most Productive and Influential Agricultural Environments; Ideally would live in the San Joaquin Valley with required travel throughout the U.S. Southwest. Have you got • A bachelor's degree (or equivalent) in agriculture-related sciences? • Proven performance in agricultural sales and business development? • Proven track record of sales success in critical agricultural markets? • A PCA License or the ability and desire to obtain one? • A desire to join a team with high ideals and ambitions?

Apply: If you've got the skills, desire, and experience for this opportunity, send your resume to: careerus@rotam.

Agricultural Sales Representative - Hughson, CA

Wilbur-Ellis

Description: The Sales Representative is responsible for managing existing and attracting new customers within the sales territory, assist branch customers with proper product selection and use-based agronomic needs, and maintain and develop profitable customer relationships.

Duties, Qualifications & Requirements: Ability to work independently with minimum supervision; Willingness to travel; Experience in the retail agronomy industry; Bachelor's degree or higher in Agriculture or Business-related field is preferred; PCA required.

Apply: Apply online at https://bit.ly/3BE5fvJ

Photo: M. O'Neal

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Greg Musson: gmusson@garbennett.com | (559) 908-9884

Tyler Bennett: tbennett@garbennett.com | (559) 289-0003

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JAMIE OLIVEIRA, PCA

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KELLY HAIR, PCA | CCA

"I moved to GAR Bennett because the corporate structure of the company I was at was not a good fit for me. I was looking for a better work environment. Since moving, I haven't looked back."

MIKE DOW, PCA

"I was attracted to GAR Bennett because Greg Musson, the CEO, is a phone call away and I don't have to go through the corporate hierarchy to take care of my growers."

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- Precision Silage Management (PSM)
- Gopher Management

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- Flood irrigation installs
- Deep well development and repairs
- Booster pump installs
- System automation and communication
- Project planning and design
- Dairy services

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- Food Safety Programs (**GLOBAL**G.A.P. and Primus GFS)
- Helping growers receive certification and advance in Good Agricultural Practices
- Worker Safety including DPR Program and Cal/OSHA Program

SCAN FOR MORE INFORMATION

CAPCA 2022 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 the CAPCA website and in each issue of the *Adviser*	✔	✔	✔	✔	✔	✔
Subscription(s) to *Adviser* Magazine	1	1	1	1	2	2
Job Opportunities Posting in *Adviser*		1	2	3	Unlimited	Unlimited
½ Page *Adviser* Ad (October issue excluded)		1		1		
One-Page Ad in *Adviser*					1	3
Adviser Advertorial*			1	1**	1**	1**
Discount on *Adviser* Ad Placement			10%	15%	15%	15%
Complimentary Mailing Labels			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
Comp. Mailing List for Exhibitors	✔	✔	✔	✔	✔	✔
CAPCA Online CE Host or Collaboration Discount			$250	$500	$500	$750
Spring Summit Complimentary Registration***	1	1	1	1	2	2
Spring Summit Table-top Exhibitor Discount***	$50	$50	$100	$250	$250	$250

* October issue fills quickly, first come, first served

** October issue guaranteed if booked by March 31, 2022

*** Pending the availability of hosting in-person events in 2022. CAPCA reserves the right to limit benefits and/or adjust to online programming value due to unknown gathering and spacing restrictions.

There is a limited window to sign up for 2022 Sustaining Membership:

Sept. 1, 2021 to Mar. 31, 2022

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

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CAPCA Chapter In-Person CE is Back!

San Diego Chapter

Wednesday, Sept. 22, 2021
Escondido, CA
San Diego CAPCA CE Seminar
CA Center for the Arts, 340 N. Escondido Blvd., Escondido, CA
Early Registration by 9/12/21:
$80 Members | $85 Non Members
Regular Registration after 9/12/21:
$85 Members | $90 Non-Members
Onsite Registration $90

Visit https://capca.com/events/ for more information.

Tulare-Kings Chapter

Wednesday, Sept. 22, 2021
Tulare, CA
5.0 CE Hours (2.0 Laws & 3.0 Other)
Tulare-Kings CAPCA CE Seminar
International Agri-Center
4500 Laspina St, Tulare, CA

CE HOURS REPORTED™

Kern County Chapter

Tuesday, Oct. 12, 2021
Bakersfield, CA
6.0 CE Hours (1.0 Laws & 5.0 Other)
Kern Co CAPCA Label Update
Hodel's Country Dining
5917 Knudsen Dr., Bakersfield CA

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