CAPCA

ADVISER

DECEMBER 2021 | VOL. XXIV, NO. 6

California Association of
Pest Control Advisers

www.capca.com

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YIELD INCREASE[1]

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[1]Source: BRANDT Field Trials 2016-2018

Cover Photo: Luis Espino (See page 56)

2021 CAPCA Photo Contests
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CAPCA
AT THE CENTER OF PLANT HEALTH

Jet-Ag® 5% Accelerates Your Fungicide Program

Works for Soil-Borne & Foliar Diseases

JET-AG® 5%

More effective disease control vs. competition
One label for multiple uses
Ease of use via stable formula, short contact time & no additional rinse

TANK MIX WITH

REGALIA® BIOFUNGICIDE

Promotes plant immunity & prevents disease

Broad-spectrum mode of action protects against multiple pathogens, including powdery mildew & fire blight

Enhances plant health & overall stress tolerance to increase yield & crop quality

ROTATE

STARGUS® BIOFUNGICIDE

Increases marketable yield from a reduction of disease incidence & severity

Broad-spectrum fungicidal activity against downy mildew & *botrytis*

Four-hour re-entry interval & zero-day preharvest interval allow flexible labor scheduling

Marrone® Bio Innovations

Learn more at MarroneBio.com

OMRI LISTED For Organic Use | MRL Exempt | 0-Day PHI | 4-Hour REI

From the Editor

Thank you for attending CAPCA Conference, Plan G

These past two years has been riddled with ever changing rules and restrictions for meeting in person, especially large meetings like the CAPCA Conference. As an organization that thrives in the in-person meeting space, CAPCA has worked diligently to adapt to these evolving circumstances. The staff planned and replanned the Conference elements so many times as things started to open up in the spring with restrictions that impacted meal events, transition timing between events and overall numbers in the exhibit hall to ongoing mask mandates still in place. If you were among the nearly 1,000 attendees in person in Reno, I want to extend my gratitude on behalf of the CAPCA Staff, Conference Committee and Board for your attendance, sponsorship or exhibit at a very unique event.

While local to Nevada restrictions required us to adjust our program in significant ways as we planned the event back in March, I was encouraged by the feedback of attendees who had more time to network and connect with colleagues, friends, and new customers in the pared-down program. While it wasn't the usual, if you were among the nearly 1,000 attendees who participated in the CAPCA Conference CE online, thank you for choosing the new CAPCA platform as your trusted online CE platform. We have content in the works to launch in 2022, including some great hours to gift back to CAPCA members only. If you are still looking for hours, CAPCA extended the online Conference registration and access through year's end.

We are hopeful to return to much more business as usual in our program in 2022. Make sure you save the dates of October 9 – 11, 2022 at the Disneyland Resort. We hope to bring back some popular new elements, like the Crop Roundtable, and sprinkle in the magic as only Disney can do!

Ruthann Anderson, Editor
ruthann@capca.com

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.

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CAPCA's Priorities in 2022:

Getting back to strategic focus

Patrick Dosier, CAPCA Chair

First, I want to thank everyone who attended CAPCA Conference in October. I understand that it did not quite feel like things were normal, but it was a giant step in the right direction. I also want to thank CAPCA's Vice Chair, Paul Crout, for handling my duties during the Annual Meeting and Luncheon. I regret that I was unable to attend, as I experienced a serious medical issue the week leading up to Conference.

During the luncheon, Paul spoke to the priorities which the Executive Committee and State Board have set for the organization in 2022. In addition to the specific initiatives listed below, the general themes are to narrowly focus on activities which add value to our Members, and to reframe our perspective away from crisis management mode. This is the new normal and we can return our gaze to the horizon.

Chapters Take the Lead

Many of the best things that CAPCA does happen at the Chapter level - localized CE, scholarship fundraisers, advocacy, and networking come to mind. There are several Chapters which consistently organize these types of activities. We believe that these active Chapters deserve more recognition at the Statewide level.

On the other side of the spectrum, there are some Chapters which are practically dormant. It is long past due that the leadership of these Chapters be held accountable. Each region of our State deserves the programming and opportunity that CAPCA events provide.

Beginning on November 1, 2021, the State Office will begin to track Chapter activity and reporting it on a published Chapter Leadership Board. Your Chapter officers will be given the scoring matrix, so it will be transparent which activities are recognized and to what extent. The Chapter Leadership Board will continue to be updated and published until October 10, 2022. The Chapter which is in the lead at that time will be recognized at our next Conference as the 2022 CAPCA Chapter of the Year!

We hope that this builds pride within our active Chapters, stirs friendly competition between Chapters, and provides an aspirational roadmap to our dormant Chapters. The State Board offers each Chapter a Resource Budget and an Online CE dividend, so any Chapter can take the lead!

Agriculture Wins in 2024

As our keynote speaker, Josh Walters, discussed at Conference, agriculture can moderate the State Legislature towards more Ag friendly representatives. This does not refer to the political party of the lawmakers, but rather how sensible they are when balancing the interests of commercial agriculture against environmental extremists.

This is an audacious goal in many ways. The massive urban population of our State creates a structural reason why agriculture is a low priority. The environmental activist groups are insanely well resourced and organized. Admittedly, our State has an eye watering list of higher priorities: homelessness, wildfires, port congestion, housing prices, and unfunded liabilities. There is not a singular thing which CAPCA can do, alone or in an Ag coalition, which will turn the tide towards an Ag friendly legislature. It will be a concerted effort, over many years, with CAPCA Members engaging all the way from Sacramento back to their home district.

Now, this is not just an open-ended goal of "doing better advocacy and doing more advocacy." There is an endpoint when we will monitor the success of our efforts. We are targeting the 2024 election specifically. Recently, some State Board members have communicated skepticism whether our advocacy efforts are worthwhile. This is a valid concern. The outcomes of the 2024 election will be our reality check.

CAPCA.com Delivers Value to Members

My hat goes off to the CAPCA staff for launching the new Member Portal ahead of Conference. Behind the scenes, we found all the surprises and gotcha moments entailed in modern software projects. The staff did an excellent job of recovering and delivering a great product. Well done!

In case you have not recently visited CAPCA.com, you can now enter the Member Portal. This one-stop-shop has all the things Members need: curated news, online CE, job postings, a downloadable version of your up-to-date Official CE Certification, and so much more. Go check it out!

CAPCA will continue to invest in the development of these online resources in 2022. CAPCA.com will be your go-to resource for all things Members need to get and maintain their licenses and to engage with CAPCA.

The Executive Committee has challenged CAPCA Staff to scrutinize any activities which fall outside of these three initiatives, or our core activities such as Conference. We are a small organization and we succeed when we focus our efforts on where they matter the most. ■

47 Annual CAPCA Conference & Agri-Expo

CAPCA wishes to thank the nearly 1,000 PCAs and guests who attended the 47th Annual CAPCA Conference & Agri-Expo, held at the Grand Sierra Resort in Reno.

CAPCA is proud to represent Pest Control Advisers and we extend our gratitude to all who participated in celebrating and making our 47th conference a success.

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

CAPCA looks forward to seeing everyone next year at the 48th Annual Conference & Agri-Expo, October 9-11, 2022, at the Disneyland Resort in Anaheim, California.

Mark your calendar today!

CRAZE HERBICIDE

Advertorial

Weed control in perennial crops (TNV) is an important agronomic practice a grower must implement throughout the year to grow a high-quality crop with maximum yields. Weeds not only compete for sunlight, water, and nutrients, but they can also interfere with irrigation and harvest and may harbor damaging insects and diseases that can transfer to the crop.

Over the years, growers have relied heavily on a rotation of postemergence herbicides such as glyphosate, paraquat, and glufosinate to manage troublesome weeds, and they have been successful with this strategy until certain weeds have started to develop resistance to these herbicides. Weeds that have developed resistance to post-emergence herbicides in California orchards and vineyards include marestail, fleabane, annual bluegrass, palmer amaranth, junglerice, and Italian ryegrass. There are weeds that may not be resistant but may be tolerant to herbicides making them very difficult to control such as stinging nettle, lambsquarters, malva, knotweed, filaree, henbit, panicle willowherb, primrose, and yellow nutsedge. These difficult-to-control weeds have caused growers to adopt a different strategy requiring the incorporation of preemergence herbicides into the weed control program. In the past, growers made use of old chemistry like oryzalin, oxyfluorfen, pendimethalin, simazine, and trifluralin. But in recent years, new and improved herbicides that provide longer residual and a broader spectrum of control such as indaziflam, rimsulfuron, and flumioxazin have entered the market making preemergence weed control more efficacious. Even with the introduction of these newer herbicides, weeds continue to be problematic, and growers need new tools to help them manage troublesome weeds.

CRAZE™ Herbicide from Nichino America is a new broad spectrum and long-lasting preemergence herbicide. The active ingredient in CRAZE is orthosulfamuron, an HRAC Group 2 Herbicide. This herbicide, an ALS inhibitor, works by inhibiting the enzyme responsible for the production of branched chain amino acids (valine, leucine, and isoleucine) essential for plant growth. CRAZE has demonstrated broad spectrum and long residual control of many broadleaf weeds including marestail and fleabane and strong suppression of grasses and yellow nutsedge. Unlike other preemergence herbicides which only demonstrate preemergence efficacy, CRAZE provides excellent pre- and postemergence control of many broadleaf weeds. CRAZE has proven to provide excellent control of weeds known to be resistant to postemergence herbicides making it an essential tool to manage herbicide resistance. CRAZE is registered for use in all tree nut crops (including almond, walnut, pistachio, pecans, and hazelnuts), grapes, and nonbearing stone fruit crops. CRAZE has demonstrated excellent crop safety and compatibility with other pre- and postemergence herbicides. CRAZE alone will provide excellent control of some of the most difficult weeds including marestail, fleabane, malva, henbit, stinging nettle, filaree, panicle willowherb, knotweed, primrose, and lambsquarters. In combination with other preemergence herbicides, CRAZE offers excellent residual control of a variety of grass weeds. One of the features that separates CRAZE from other Group 2 herbicides is its strong preemergence and postemergence suppression of yellow nutsedge and solanaceous weed species. CRAZE is an excellent tankmix partner with standard herbicides as it offers a different mode of action and strengthens the control spectrum, especially on troublesome weeds like fleabane and marestail. CRAZE is now registered for use in California.

Efficacy of Craze on Fleabane in Almond

Untreated

4.5 Months After Treatment
Craze @ 8.6 oz/A

NICHINO AMERICA

47 Annual CAPCA Conference & Agri-Expo

Hit Almond Disease Where It Hurts

A one-two BASF fungicide punch keeps disease away

Once disease hits an almond orchard, it's a jab to farmers' bottom line. BASF fungicides offer almond farmers a knockout combination. Merivon® and Cevya® fungicides offer premium protection from troublesome almond diseases so farmers have a fighting chance.

Hit disease with a left and right hook

Disease management is key to top-performing almond orchards. Using the best combination of fungicides at the right time provides the best protection and helps boost bottom lines. Skimping, delaying or choosing a fungicide with less-than-ideal performance can be costly in the long-run. Merivon fungicide, FRAC groups 7 and 11, provides long-lasting disease control, especially during the critical bloom period.

A Merivon fungicide application at full bloom can protect almond trees from brown rot blossom blight and green fruit rot, also known as jacket rot. Both diseases infect flowers and ultimately impact nut development. Additionally, green fruit rot can spread from the flower petals to the leaves, creating discoloration and furthering disease and nut damage.

As the growing season progresses and nut development begins, diseases like Alternaria, scab, rust, shot hole, and anthracnose will come swinging. Once approved by CADPR, Cevya fungicide, a FRAC group 3, will provide long-lasting residual control for extended crop protection under varied weather conditions.

Cevya fungicide also has a highly favorable regulatory profile and is the first DMI to receive the Reduced Risk classification by the EPA. This means Cevya fungicide will help growers access export markets worldwide while also delivering dependable crop protection even as other DMI fungicide registrations are being withdrawn.

During hull split, almond farmers can come back with a knockout punch of Merivon fungicide to control Alternaria and hull rot. Use of a BASF Plant Health fungicide, like Merivon fungicide, keeps trees healthy through the final nut development stage.

Merivon and Cevya fungicides for the win

Tag-team almond disease with Merivon and Cevya fungicides for season-long disease control. As part of an Integrated Pest Management (IPM) program, almond growers have the ability to use fungicides in different FRAC groups while still getting the disease control they want and need for a successful growing season.

Take on almond disease challenges with Cevya and Merivon fungicides. To learn more, contact your local BASF representative or visit the *FutureOfFungicideIsHere.com* or *Agriculture.Basf.Us.*

Cevya® Fungicide

Merivon® Xemium® Brand Fungicide

BASF

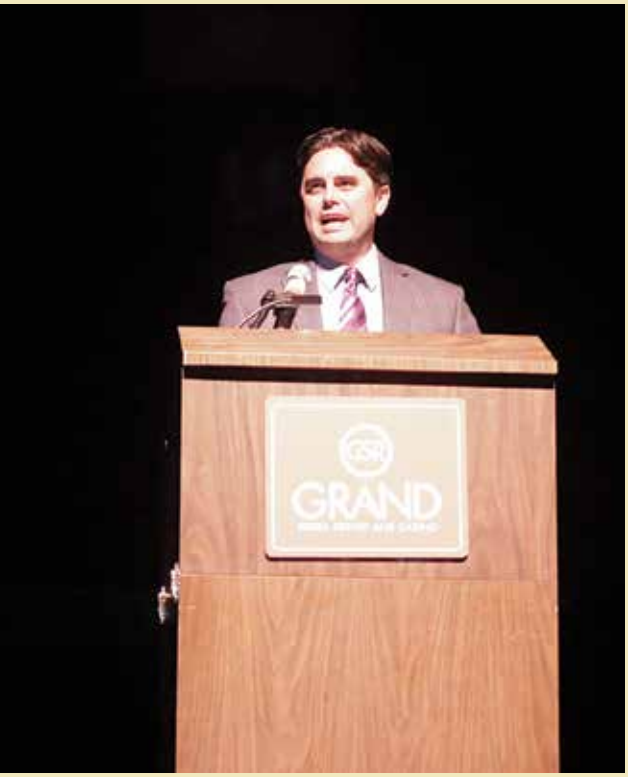
We create chemistry

CAPCA CONFERENCE 2021

A Very Special Thank You to

Corteva Agriscience

for the donation of t-shirt sales of $1,767 to the Stanley W. Strew Educational Fund for scholarships!



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THE can-am COMMANDER

There were many exhibitors at this year's CAPCA Conference. But only one giving you the chance to win the ultimate SXS. Simply scan the QR code on this page to enter your name in our giveaway.

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NO PURCHASE NECESSARY. A PURCHASE WILL NOT INCREASE YOUR CHANCES OF WINNING. Open only to legal residents of the contiguous 48 United States, who are at least 25 years of age in their state of primary residence at the time of entry and have been employed for a minimum of 3 years (full or part time) as an Independent Ag retailer employee with title of (or equivalent to) Location manager, Salesperson, and/or certified pest control advisor or certified independent crop consultant at the time of entry and at the time of the random drawing. Void in AK & HI & where prohibited by law. Entry Period: 12:00:00 a.m. CT on 10/01/2021 - 11:59:59 p.m. CT on 06/01/2022. LIMIT 1 ENTRY PER PERSON PER DAY with a maximum of 8 entries per person. Prize: 2021 Can-Am SSV COMMANDER XT 1000R TB 21. ARV: $19,000. Odds of winning depend on the number of eligible entries received. Subject to the Official Rules available at www.atticussignup.com/SXSgiveaway. Sponsor: Atticus, LLC, Cary, North Carolina 27513. This Promotion is not open to the general public.

CAPCA CONFERENCE 2021

Annual CAPCA Conference & Agri-Expo

2021-2022 CAPCA Executive Board
(L-R) Rick Harrison (Ex Officio), Paul Crout (Vice Chair), Jennifer De Jong (Secretary), Matt Bristow (Treasurer)
Not pictured: Patrick Dosier (Chair)

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/

NEED CE HOURS AFTER RENO?

It's not too late to attend the CAPCA 47th Annual Conference virtually!

Options for Participation:

FULL ONLINE PROGRAM
(Online Continuing Education Access)

14.0 DPR Hours (4.5 Laws & 9.5 Other)
17.0 CCA Hours (12.0 PM, 1.5 CM, 1.5 SW, 2.0 NM)

Pre-recorded & on-demand
Access available now through the end of 2021!

LABEL UPDATE-ONLY
(Online Continuing Education Access)

4.0 DPR Hours Laws
4.5 CCA Hours (4.0 PM & 0.5 SW)

Pre-recorded & on-demand
Access available now through the end of 2021!

Register at https://capca.com/conference/

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AVIV® ADVANCED MICROBIAL FUNGICIDE

A powerful *Bacillus* strain optimized for bioavailability, with remarkable control of bacterial and fungal disease.

Seican™

Natural, effective and fast acting mite and insect control at low concentrations on an extensive range of crops.

TIMOREX ACT®

FRAC 46

Natural broad spectrum fungal and bacterial disease control in many crops, with eight mechanisms of activity.

INSECTICIDES

HARVANTA® 50SL INSECTICIDE

IRAC 28

Broad-spectrum control of key insect pests in cucurbits, brassicas, potatoes, strawberries, leafy & fruiting vegetables.

VERDEPRYN® 100SL INSECTICIDE

IRAC 28

Broad-spectrum control of key insect pests in grapes, berries, citrus, tree nuts, pome fruit and stone fruit.

FUNGICIDES

KENJA® 400SC FUNGICIDE

FRAC 7

Outstanding Gray Mold control in strawberries, plus activity on Powdery Mildew and Anthracnose.

PROLIVO® 300SC FUNGICIDE

FRAC 50

Excellent control of Powdery Mildew in grapes, cucurbits & fruiting vegetables.

RANMAN® 400SC FUNGICIDE

FRAC 21

Outstanding protection against Downy Mildew and oomycetes in a wide range of crops—with no resistance issues.

FERVENT® 475SC FUNGICIDE

FRAC 3 FRAC 7

Preventative and curative disease control in grapes and almonds.

HERBICIDE

MISSION® HERBICIDE

HRAC B2

Quick and safe pre-emergence control and long-lasting residual control of difficult weeds in grapes, nuts and more.

Summit Agro USA™

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THE PRODUCTS FROM SUMMIT AGRO USA ARE EXCLUSIVELY AVAILABLE FROM HELENA AGRI-ENTERPRISES AND TENKOZ MEMBER COMPANIES.

THANK YOU 2021 CONFERENCE SPONSORS

DECEMBER 7-9, 2021
THE CONFERENCE IS FREE TO ATTEND.

REGISTRATION IS NOW OPEN AT ALMONDS.COM/CONFERENCE

Rooted IN SUCCESS 2021

the almond conference

We're baaaack! The Almond Conference returns to Sacramento, December 7-9, 2021, in person at the newly renovated SAFE Credit Union Convention Center.

We are bringing back everything you love about The Almond Conference—the trade show, educational sessions, keynote speakers and networking events—in the upgraded venue. It promises to be The Almond Conference to remember!

This year's theme, Rooted in Success, focuses on the foundation of our industry's growth—strategic market development, innovative research, and accelerated adoption of industry best practices—in keeping with our vision to *make life better by what we grow* and *how we grow.*

Mark your calendars now and make plans to join us for The Almond Conference 2021!

VISIT ALMONDS.COM/CONFERENCE TO REGISTER, BOOK YOUR HOTEL AND STAY UP-TO-DATE ON THE LATEST INFORMATION.

california almonds®
Almond Board of California

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SQM North America
Summit Agro USA
Suntton International Inc
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Syngenta
Tiger-Sul Products, LLC
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Trece, Inc.
True Organic Products Inc.,
UPL
Valent U.S.A. LLC
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Vestaron
Vive Crop Protection
Westbridge Agricultural Products
Western Milling
Western Region Certified Crop Advisers
Yara

acadian®
ORGANIC

FUNDAMENTALLY BETTER

ACADIAN® ORGANIC DELIVERS FUNDAMENTAL VALUE TO YOUR PROGRAM WITH:

- Improved plant vigor
- Enhanced root growth
- Resistance to environmental stress
- Higher yields

When you're looking to build your nutritional program **– ask for Acadian® Organic.**

Derived exclusively from the marine plant *Ascophyllum nodosum*, Acadian® Organic brings you the best in crop nutritional products. Acadian® Organic is produced using proprietary technologies that liberate the valuable, organic compounds and carefully formulated to provide a consistent product for your nutritional program with every drop. Acadian® Organic offers tremendous ROI benefits to any commercially grown horticultural product, especially to wine and table grapes, tree nuts, stone fruit, leafy greens, and strawberries.

HOW DO YOU USE ACADIAN® ORGANIC?

Acadian® Organic is a water-soluble liquid that is suitable for use in foliar, soil-applied, irrigation, side-dressed, ground rig or aerial applications. Working synergistically with your existing nutritional program, Acadian® Organic can be tank-mixed with most commonly used insecticides, fungicides, herbicides, and other agricultural inputs. Applications will depend on the crop, soil, timing and the additional materials in the tank mix.

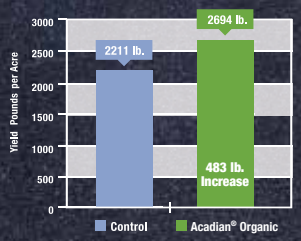
WHY ARE FREQUENT APPLICATIONS OF ACADIAN® ORGANIC BETTER FOR ALMONDS, PISTACHIOS AND GRAPES?

Acadian® Organic improves the bioavailability and transport of nutrients within the plant. This promotes abiotic stress tolerance along with improved plant nutrition, leading to increased overall yield and quality at harvest.

The complex mix of compounds present in Acadian® Organic produces a wide variety of beneficial plant responses.

BETTER YIELDS FOR ALMONDS

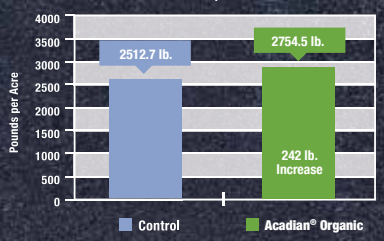
(TOTAL OF 2 YEARS)



Trials on the same trees over two consecutive years demonstrate that Acadian® Organic significantly improves yield of almonds.

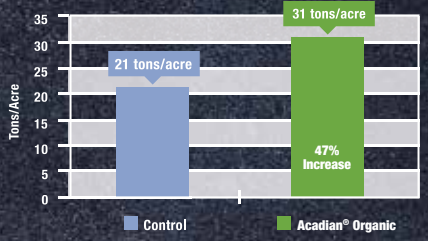
BETTER YIELDS FOR PISTACHIOS

Edible Split Inshell



Acadian® Organic treated pistachios consistently yield higher and produced more pounds of marketable nuts.

BETTER YIELDS FOR TABLE GRAPES



Acadian® Organic increased yield of table grapes by an average of 47% over Control.

Acadian Plant Health
Sustainably Empowering Plants.

acadian-usa.com

CAPCA ANNUAL AWARDS

DAVID DRUCKER

2021 MEMBER OF THE YEAR

2021 AWARI

CAPCA Member of the Year is an annual award bestowed upon a member and licensed PCA who excels in their contribution to the profession through CAPCA activities and leadership, above and beyond the norm. The 2021 recipient of the CAPCA Member of the Year Award is David Drucker.

Nominating Chapters San Diego and SoCal wrote David has always expressed the honor of being a PCA and is a constant advocate for the value and needs of the Pest Control Adviser.

David is a graduate of Cal Poly San Luis Obispo with a degree in Ag Science. In addition to his PCA license, David also holds a QAL and is a Certified Crop Advisor, allowing him to offer expertise in soil, water, fertility, and pest management decisions.

David began his career as a PCA in Northern California, joining the North Coast Chapter of CAPCA, where he became involved in Chapter and State affairs. David participated in the Plant Doctor program, and in the mid-nineties, volunteered to be a part of the new CAPCA Ambassador training program, acting as a media spokesperson to represent the interests of CAPCA and Agriculture.

When David moved to Southern California, he joined the San Diego Chapter and continued involvement at both Chapter and State levels. He has been instrumental in the success of the CAPCA Spring Summit, helping to arrange the various destinations for the Continuing Education tours, is involved in numerous committees, and is currently the State Director for San Diego, his local chapter.

Currently, David works for Nutrien Ag Solutions in Southern California, consulting in fruit and vegetable production as well as the ornamental horticulture industry.

Outside of CAPCA, David has been involved with the San Diego Farm Bureau, Ag in The Classroom, has held a seat on the Escondido and San Marcos High School Ag Advisory Committees and has volunteered for the Make-A-Wish Foundation.

David is committed to raising the professionalism of the PCA and is most deserving of recognition through his volunteerism and leadership as the 2021 CAPCA Member of the Year.

D WINNERS

PAUL SQUIRES

OUTSTANDING CONTRIBUTION TO AGRICULTURE AWARD

CAPCA's Outstanding Contribution to Agriculture Award is given to those individuals, companies or organizations that have made a meaningful difference in support of California Agriculture. The 2021 recipient of the Outstanding Contribution to Agriculture Award is Paul Squires.

Nominated by NorCal and Sutter Buttes Chapters who wrote, "With confidence we can say that anyone who knows Paul would agree that he is deserving of this award. He is outstanding in every aspect of his life, especially his profession."

Paul has been a crop consultant since 1994, starting out as a retail PCA before going independent in 2002, when he founded Squires Ag Consulting, Inc. He has served as an expert witness since 2014, including testimony in depositions and court proceedings as well as providing written opinions to magistrates in multiple jurisdictions within California. Paul is part of the Ag Leadership Class 37. He is a board member of the Natomas Basin Conservancy, Sutter Buttes CAPCA State Director, and is partners in a conservation easement property, which is managed for wildlife in Colusa, California.

As if he does not already have enough on his plate, Paul makes time to be a mentor to upcoming PCAs, always available for questions and willing to give someone a shot. Paul has many professional accomplishments and is highly regarded among his peers in the agricultural industry. Paul has earned a level of respect not many people in any industry will experience, due to his integrity, experience, and effectiveness in his work. But we think if you asked him what his greatest accomplishments are, he would say his children. Paul is a very active father in his children's lives. Paul has shown his children what it means to take pride and honor in one's everyday life. Paul continues to set an example to them and everyone around him on what it looks like to work hard, earn respect, and be successful. Paul even makes time in his busy schedule to coach his son's baseball team and has been doing so for several years.

It is with much honor and respect that CAPCA recognizes Paul Squires as our 2021 Outstanding Contribution to Agriculture Award recipient.

2022 CAPCA Spring Summit

February 1-2, 2022

Marriott Resort in Napa, California

Spring Summit Registration Open

Early rate through 1/14/22

Pre-Registration Ends 1/25/22

Company Opportunities

Label Update | Exhibits | Sponsorships | Product Profile (new!)

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

48

Annual CAPCA Conference & Agri-Expo

October 9-11, 2022

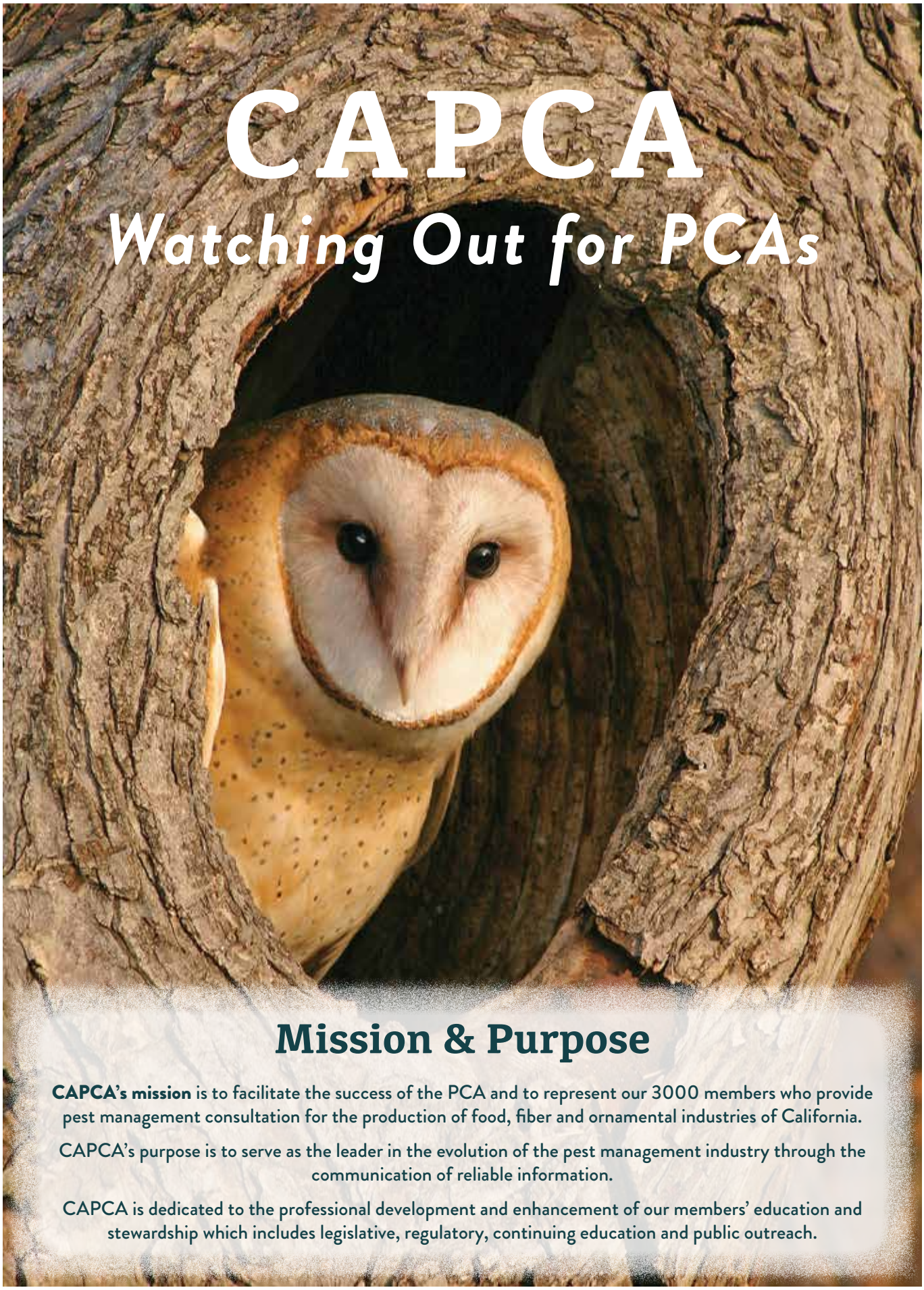
Disneyland Resort Hotel

Label Update, Sponsorship and Exhibitors Applications Being Accepted

https://capca.com/conference/

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

Attendee Registration opens Spring 2022



CAPCA

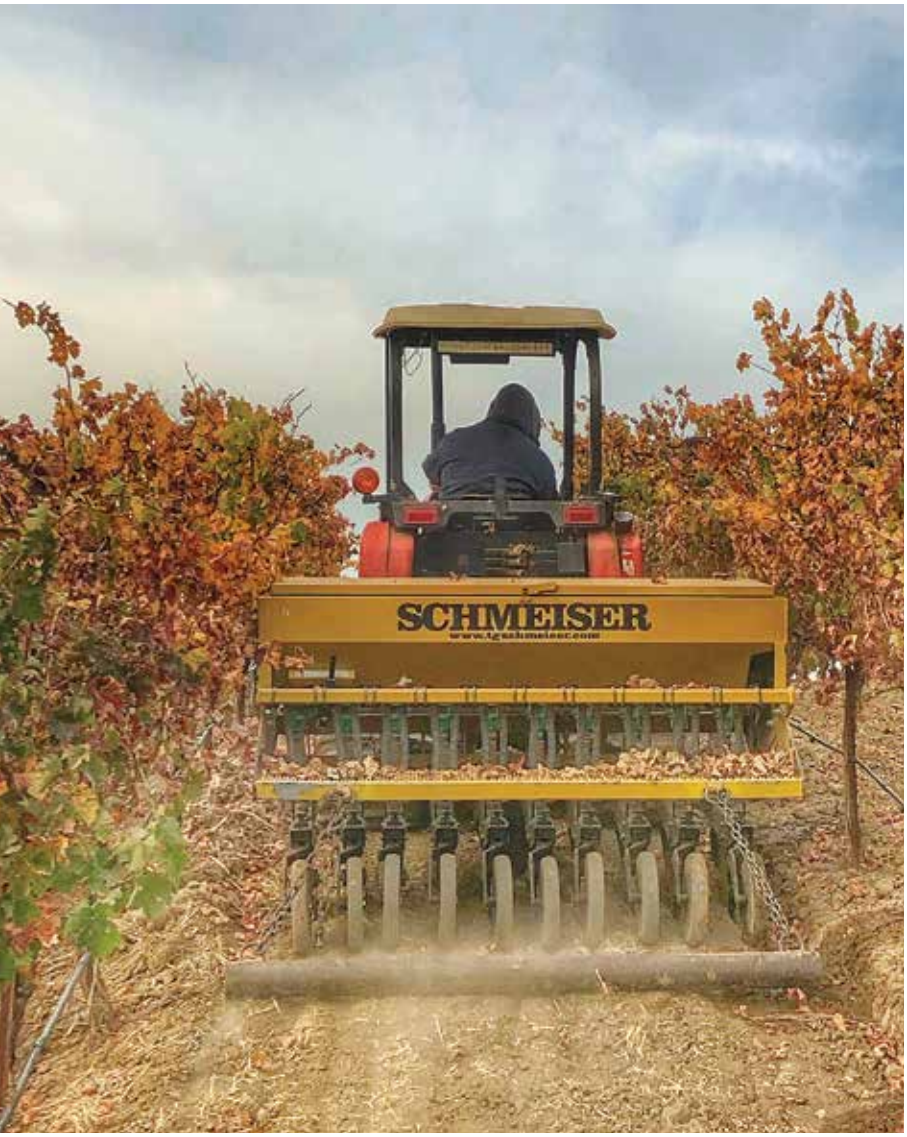
Watching Out for PCAs

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.



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

*See pg 28 | **See pg 30

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

PROTASSIUM+®

ADVERTORIAL

EXPLORING THE BENEFITS OF SOP AS A HIGH-QUALITY K SOURCE

Sulfate of potash (SOP), also known as potassium sulfate (K_2SO_4), is considered an excellent potassium (K) source. SOP contains both potassium and sulfur—two key nutrients for thriving crops—and is delivered with a low salt index.

The Importance of Potassium

An essential macronutrient, potassium is involved in more than 60 enzymatic systems in plants and plays a vital role in ensuring healthy crops and optimal yields. The harvested portion of high-yielding crops can remove a large amount of potassium, which needs replenishment for future crop health and growth.

The Role of Sulfur

All crops require a sufficient supply of sulfur. Sulfur is classified as a secondary macronutrient, necessary for protein synthesis and enzymatic functioning. Protein synthesis is directly related to foliage and grain yield at harvest. SOP provides oxidized sulfur in the form of sulfate (SO_4^{-2}), which is the only form of sulfur that is available for plant uptake.

Avoid the Burn

A low salt index minimizes adding to the salinity of soil water, and supports healthy crop development and soil systems including germination, seedling vigor, root and shoot growth, and nutrient balance.

The low salt index per unit of K_2O enables the application of more seed- and plant-safe potassium.

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

Table 1

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

An Eco-Friendly Choice

Once the nitrogen (N) needs of the plant have been satisfied, it is critical to discontinue applications of nitrogen, including potassium sources containing nitrogen. Over-application of nitrogen can result in poor produce quality and low yields. Additionally, unused nitrate may leave the root zone and potentially create environmental concerns. SOP does not contain nitrate.

Cost Considerations

SOP production occurs by extracting potassium and sulfate through either salt lake evaporation or chemical methods. Naturally sourced SOP typically offers a better cost benefit per unit of potassium provided compared with other low-chloride potassium fertilizers (Table 2).

Table 2

Potassium Fertilizers	Concentration K_2O	Lbs K_2O Per Ton
Potassium sulfate (SOP)	50%	1000
Potassium nitrate (NOP)	46%	920
Potassium sulfate-magnesia (SOP-M)	22%	440
Potassium thiosulfate (KTS)	25%	500

To calculate the cost per unit K_2O, divide your cost /ton by the lbs K_2O/ton.

As an added bonus, naturally sourced SOP is pH-neutral, which means using this as a readily plant-available sulfur source will not have the acidifying affects that elemental sulfur and products containing elemental sulfur will have on your soil. No offsetting limestone applications are needed to neutralize the sulfur nutrition from naturally sourced SOP.

Protassium+®

Protassium+ (0-0-50 17S) is a high-quality SOP that delivers 50% potassium and 17% sulfur and and has the lowest salt index per unit of K_2O of all major potassium sources. When compared with other low Cl^- potassium fertilizers, Protassium+ offers a better cost value per unit of K_2O. Nearly 90% of Protassium+ is sustainably produced through a natural solar evaporation process from the Great Salt Lake of Utah in the United States, and the remainder is produced through two unique processes—ion exchange and glaserite methods—at Big Quill Lake in Saskatchewan, Canada. In each of these processes, the water and natural elements remaining after the extraction process are returned to the lakes for future reuse. Organic forms of Protassium+ are CDFA and OMRI certified.

To learn more, visit ProtassiumPlus.com/Compare

Compass Minerals

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.).

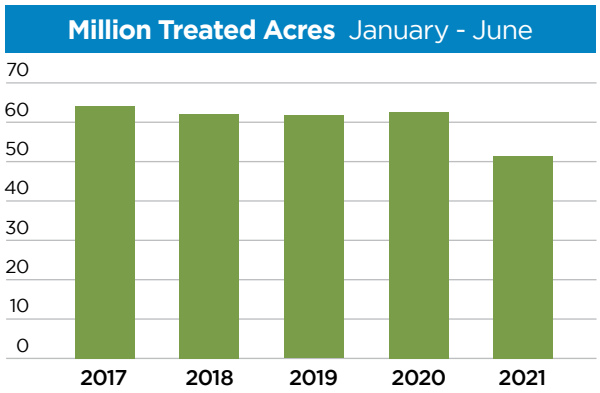
Online entry form is available at:
https://capca.com/2021-photo-contest/

PURE Intel+ Market Report

Pesticide applications to California farms have dropped dramatically from last year as farmers confront severe challenges with drought, labor, transportation and commodity prices.

By **Bob West**, Business Director of Data Products for Meister Media Worldwide

A combination of factors combined to significantly reduce the amount of pesticides being applied on farms throughout California in the first half of 2021. According to Meister Media's PURE Intel+ platform, the number of treated acres dropped from 62.5 million for the first six months of 2020 to 51.4 million for the first half of 2021, which represents an 18% drop that is considerably lower than the figures for the three previous years (see chart).



Note: A treated acre is defined as 1 acre of crop that is treated by any single restricted use pesticide. A tank mix of three restricted use products applied to 1 acre would produce three treated acres.

This drop is occurring across the entire state and among farms growing nearly every crop as all farmers grapple with a range of challenges, which has forced many of them to change their planting plans, their chemical programs, or both. Here are the projected number of treated acres for the first six months of 2021 for California's top 10 counties (in terms of full-year treated acres in 2020):

Imperial, Monterey, Santa Barbara and Ventura are the only counties that we project may end up with equal or slightly greater treated acres in 2021.

County	2021 Treated Acres	2021 vs. 2020
Fresno	8,252,542	-24%
Kern	5,727,105	-22%
Tulare	4,673,501	-9%
Imperial	2,244,361	1%
Merced	2,573,159	-20%
San Joaquin	2,996,946	-18%
Madera	3,021,888	-14%
Stanislaus	2,382,115	-21%
Kings	2,684,147	-25%
Monterey	3,075,371	-1%
TOTAL	37,631,134	-18%

Almonds and grapes account for the largest drops in the number of treated acres, but the PURE Intel+ data shows a drop for every crop group other than cole vegetables. The most significant drops from 2020 are in cotton (57%), tree nuts (23%), grapes (21%), grains/cereals (18%) and fruiting vegetables (16%).

Slightly more than 60% of annual pesticide applications in the state occur in the first six months of the year, so we project a full-year figure of 82 million to 88 million treated acres for 2021. This would represent a year-over-year decline of 14 to 20 million acres or roughly 17%.

"The water situation is dire for some growers in some parts of the state, but those growers largely knew they'd be facing cuts this year," notes Dave Eddy, Editor of Meister Media's *American Fruit Grower*® and *Western Fruit Grower*® magazine. "Most fruit and nut growers have enough water to produce excellent crops this year. However, there has already been some land taken out of production in preparation for what many see as coming water shortages.

"Meanwhile, the lack of labor has mostly been a problem for fruit growers of hand-picked crops, such as stone fruits, and the coming heavy harvest season could be problematic," he adds.

"In addition to water and labor, transportation is another issue," adds Carol Miller, Editor of Meister Media's *American Vegetable Grower*® magazine. "There's simply not enough drivers. That may drive some lower-value crop production out of California." ■

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/

ADVERTORIAL

PRIORITIZE SUSTAINABILITY AND PESTICIDE WASTE REDUCTION WITH CONCENTRATED FORMULATIONS

The managing, recycling, and disposal of pesticide containers continues to be a costly factor for growers across California due to the time and money lost, especially with larger acre producers. Since the Department of Toxic Substances Control (DTSC) and other agencies regulate the disposal of pesticide containers by requiring precautions such as triple rinsing to prevent hazardous waste, PCAs and pest control dealers should be mindful of how growers approach their processes – and the products available to reduce waste and foster more sustainable practices.

Current California regulations require users of agricultural and structural use products to triple-rinse containers and participate in a pesticide container recycling program to enhance efforts to divert containers from landfills, and industry professionals should be mindful of how they can further advance sustainability efforts. According to the California Department of Pesticide Regulation (DPR), the estimated recycling rate is only 54% based on a three-year rolling average from 2017-2019, which could be impacted by factors such as California products resold into other states, weather, container sizes, crop changes, and unused inventory.

Many counties across the state offer recycling programs for agricultural container recycling to support sustainability by taking the triple-rinsed containers and melting them into reusable pellets, which can be used in other projects, such as the creation of speed bumps, pallets, and more. Pest Control Advisors can be ideal catalysts for encouraging proper container management and sustainability practices for growers across California by recommending easy-to-use products with higher concentrations in larger pack sizes.

NEW ABACUS® V6: SUPERCHARGED PERFORMANCE & LOW VOC FORMULATION FOR LESS WASTE

Since spider mite and other pest pressure is an ongoing challenge for specialty crop growers in California, Rotam recently introduced an innovative EC Abamectin formulation that supports sustainable pest management practices and packs a powerful performance. Abacus® V6 is a low VOC liquid insecticide/miticide with 6% abamectin EC that is flexible and compatible for resistance management programs. It also provides a reduction in waste/container disposal thanks to the 3x higher concentration of abamectin in each container compared to other current 2% formulations so growers can use less product and waste less, resulting in more dead mites per gallon.

Abacus® V6 Features:

- Flexible and compatible for resistance management programs
- Provides consistent, excellent control of spider mite and other key pests
- Controls damaging pests targeting specialty crops with minimal impact on beneficials
- Tested for phytotoxicity with a wide margin across specialty crops

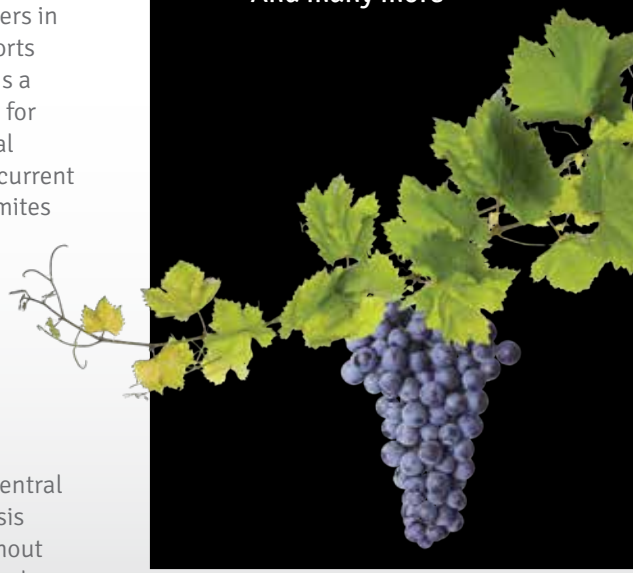
Abamectin-based miticides work primarily through ingestion to break down the insect's central nervous system, which disrupts neural and neuromuscular transmissions, causing paralysis and death of mite populations. Specialty growers can benefit from enhanced potency without increased toxicity with higher concentrated formulations that provide power, performance, less waste, and minimal impact on beneficials.

KEY CROPS

- Almonds
- Apples
- Fruiting vegetable crops
- Grapes
- Leafy vegetables
- Tree nuts
- And many more

KEY PESTS CONTROLLED

- Carmine spider mite
- Citrus thrips
- Leafminers
- Pacific spider mite
- Strawberry spider mite
- Two-spotted spider mite
- And many more



ABACUS® V6

MITICIDE/INSECTICIDE with ABAMECTIN

SPECIAL TERMS AND CONDITIONS
This article is not intended as a substitute for the product label for the product(s) referenced herein. Always read and follow label directions and precautions for use. Product(s) referenced herein may not be registered in all states. Confirm your state's registration status with a Rotam representative.

RotamNorthAmerica.com
866–927–6826

ROTAM

Results of the 2021 Sausage Making Process

George Soares, Kahn, Soares & Conway

It takes more than COVID to slow the work of the California State Legislature. While public access to the legislative process was substantially altered and legislators were inconvenienced as well, the business of governance did not seem to skip a beat in 2021.

Clear evidence of this was the introduction of 2,800 pieces of legislation and various resolutions with over 800 becoming law and dozens more hanging around for further consideration in early 2022. Also, the new year will be akin to groundhog day with thousands more proposals surfacing—some will repeat prior vetoed legislation; others will correct errors in law that inadvertently made it through the process; still others are designed to continue laws that would otherwise sunset out of existence; and then, of course, there will be legislation to address the issues affecting the needs and challenges of 40 million California residents—all of which are reviewed by CAPCA when introduced and amended to determine which, if any, will impact PCA's and the larger agricultural community.

Following is a sampling of such legislation that was in play in 2021:

*AB 391 would have appropriated $5 million from the State General Fund to the Department of Food and Agriculture to partner with other government entities to incentivize pollinator habitat conservation programs. AB 391 was held by the Legislature for further consideration in 2022.

*AB 567 would have prohibited the use of neonicotinoids on seed even though existing law already requires the Department of Pesticide Regulation (DPR) to adopt control measures to protect pollinator health. The legislation was not successful but in accordance with the rules of the Legislature, remains alive to be considered again in January, 2022.

*Assembly Concurrent Resolution 60 (Fong) proclaims the month of April of each year as BeeWhere Month. The Resolution was adopted unanimously by the Legislature (Senate: 39-0 and Assembly 74-0) and signed by the Governor in May, 2021.

*SB 489 would have added a second public member to the Agricultural Pest Control Advisory Committee within (DPR). It failed passage but can be reconsidered in January, 2022.

*SB 751 would have stated the intent of the Legislature is to enact subsequent legislation to promote environmental justice by ensuring that disadvantaged communities do not continue to be overburdened with unfair shares pf pollution. The legislation failed passage but can be acted on again in 2022.

The State Budget also involves the legislative process which begins early January each year with the Governor sending his proposed budget to both the Senate and Assembly where it is assigned to budget subcommittee's for initial evaluation. This is followed by the Governor forwarding an updated budget to the Legislature in May (commonly referred to as the "May Revise") which is a more informed document reflective on tax income to the State during the first third of the year.

All of this is followed by the Legislature reviewing and revising the Governor's May Revise budget, as it thinks appropriate, and ultimately adopting its own version of the state budget which pursuant to state law must be delivered to the Governor by June 15. In turn, the Governor may delete provisions objected to and must sign the "Budget Bill" into law prior to July 1.

This is the typical process—at least the one taught in school—but those associated with the process know all too well that there is an exception to most every rule guiding the process, meaning there is nothing typical when government makes its brand of sausage.

Continued

SOIL FUMIGATION PROVING VITAL FOR ORCHARD LONGEVITY

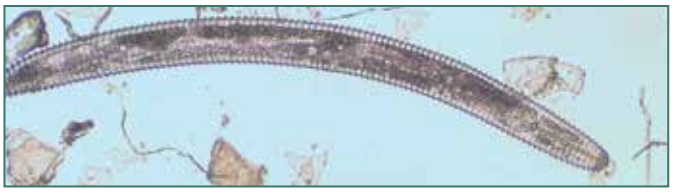
Plant parasitic nematodes are destructive pests that cause considerable damage to plant roots, disrupting the uptake of water and nutrients, resulting in reduced crop yield. Plant-parasitic nematodes are microscopic roundworms that feed on plant tissues. For pre-plant control, especially with regards to almond replants, soil fumigation (Telone II with strip Chloropicrin) is a vital management tool for growers. Soil fumigation helps to suppress a broad spectrum of soilborne pests including root rot, prunus replant disorder, and plant parasitic nematodes offering crop protection, rapid seedling establishment, soil health, earlier and larger yields, and most importantly increases orchard longevity. Fumigation promotes healthy soil for the grower's long-term investment.

Non-Treated vs. Treated

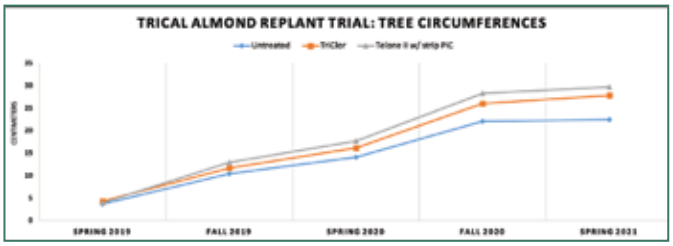
- Plant parasitic nematodes such as root knot, root lesion, and ring can cause substantial damage to an orchard. Roughly 35% of plant parasitic nematodes affect almond and stone fruit acreage. Nematode pressure can significantly affect growth and yield in replanted orchards.
- Fumigation promotes healthy soils leading to a flourishing root system **which enhances canopy growth and overall tree vigor.**
- By monitoring tree circumference through the seasons, a significant increase in tree growth was found among Telone II with Chloropicrin treated compared to untreated. Fumigant treatments of Telone II and TriClor demonstrate larger tree canopies compared to untreated control.

Modesto Almond Trial Trees

TriCal and TriCal Diagnostics work together to help growers with their integrated pest management decisions, pre-plant measures, fumigation and post plant treatments. TriCal Diagnostics offers disease and plant problem identification services for growers, field personnel, and pest control advisors, while conducting problem-solving in the field and lab specialized research projects. Our primary goal is providing growers support for their management decisions and helping diagnose plant/nematode issues.



Ring Nematode



Graph: TriCal Almond Replant Trial (Modesto, Ca) — Tree Growth Through The Seasons

For more information:

TriCal.com

TriCalDiagnostics.com

The following supports the reality:
The Legislature passed the 2021-2022 State Budget Bill on June 14 and amendments to the Budget Bill on June 28, and then passed subsequent Budget Bills (referred to as "Juniors") on July 8 and 14 and September 9. As if that doesn't make heads spin, several Budget "Trailer" Bills needed to implement specific budget provisions were passed during this same time frame.

After all this atypical activity, the State Budget settled out at approximately $262.5 billion: $196.4 billion from the State General Fund; $61.2 billion from special funds; and $4.9 billion from bond funds.

A few particulars follow:
*$90 million over the next 2 years to DPR to replace a tiered mill tax on the sale of pesticides that was proposed by the Governor in the State Budget but was rejected by the Legislature.

*$10 million to DPR to study approaches to the mill tax that would cause growers to transition to more benign pesticides.

*Authorizes an increase in pesticide registration fees to support development and implementation of an electronic registration system. ■

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.

DPR Electronic Subscription Lists

DPR's web site includes a subscription page for their electronic mailing lists.

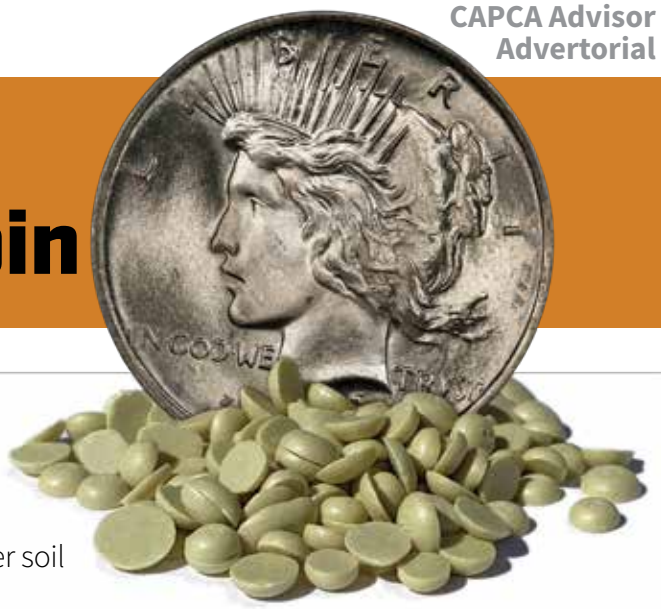
You can sign up to receive free, automatic delivery of:

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

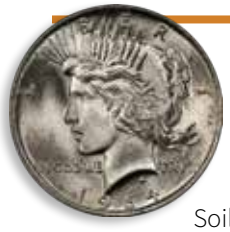
Subscribe at:
http://www.cdpr.ca.gov/docs/dept/listserv/listdesc.htm

California Department of Pesticide Regulation

The Two Sides of the Sulphur Bentonite Coin



Sulphur is an amazing macronutrient. It is an extremely valuable nutrient for the plant, but it also can accelerate availability of some micronutrients. **Crop nutrition** is one side of the sulphur bentonite coin, but **soil health** is the flip-side of that same coin. Soil pH can be lowered with the application of sulphur bentonite, creating a healthier soil and reducing nutrient deficiencies for crops.



Heads, You Win!

Soil pH Directly Influences Availability of Plant Nutrients.

Soil amendments are materials added to soil to improve its characteristics that are more conducive to root growth and enhanced nutrient uptake. Changing soil pH is a function of a soil amendment.

Multiple research reports have supported the conclusion that **soil pH directly influences availability of plant nutrients** from the soil. Optimum nutrient uptake by most plants occurs between soil pH range of 6.0 – 7.0.

Availability of **phosphorus and micronutrients are limited if soil pH remains above 7.5**. Whereas plant nutrient deficiencies under these conditions can be managed temporarily by foliar nutrient application; a longer-term solution would be to reduce soil pH. **Soil pH may be lowered** with the application of sulphur bentonite, such as **Tiger 90CR Sulphur**. When **Tiger 90CR Sulphur** is soil-applied and goes through an oxidation process, sulphuric acid and hydrogen (H^+) ions are released; the soil becomes acidified and the **soil pH is lowered**. Since sulphur oxidation is a biological process, this activity will vary among soil types and environmental conditions.

The sulphur (S) oxidation process is the conversion of elemental S to sulphate (SO_4). The chemical reaction is biologically driven as shown in following reaction equations:

$$S + O_2 + H_2O \xrightarrow{BACTERIA} H_2SO_4 \text{ (sulphuric acid)}$$

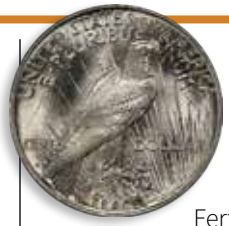
$$CaCO_3 + H_2SO_4 \xrightarrow{BACTERIA} CaSO_4 \text{ (gypsum)} + H_2CO_3$$

$$CaSO_4 \longrightarrow Ca^{+2} + SO_4^{-2}$$

$$H_2CO_3 \longrightarrow H_2O + CO_2$$

Amount of **ELEMENTAL SULPHUR** Required to Decrease Soil pH (incorporated 6" deep)			
Application rate based on soil texture[1]			
	Sand	Silt Loam	Clay
Desired change in pH	**lbs. S/ac**		
8.5 to 6.5	370	730	1460
8.0 to 6.5	340	670	1340
7.5 to 6.5	300	600	1200
7.0 to 6.5	180	360	720
8.5 to 5.5	830	1669	3310
8.0 to 5.5	800	1600	3190
7.5 to 5.5	760	1530	3050
7.0 to 5.5	640	1290	2580

[1] *Assumptions – cation exchange capacity of the sandy, silt loam, and clay soils are 5, 10, and 15 meq/100 g, respectively; soils are not calcareous. Source: Robert Mullen & et al. 2012. Soil Acidification: How to Lower Soil pH. Fact Sheet AGF-507-07. Ohio State University Extension.*



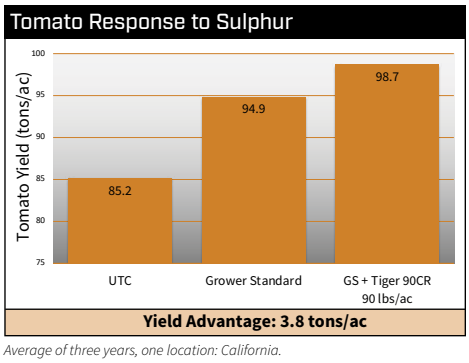
Tails, You Win Again!

Sulphur Enhances Plant Nutrient Utilization Efficiency.

Fertilizer applications that coincide with plant nutrient uptake will enhance nutrient use efficiency and potential crop response. Research reports have demonstrated that **some plant nutrients influence the uptake of other plant nutrients**. The fact that nitrogen (N) and sulphur (S) are primary components of proteins indicates that the availability of both nutrients is highly interactive.

Sulphur influences nitrogen use efficiency, yield, and seed quality. As shown in the chart below, the last comparison received **Tiger 90CR** with full rate of N, but 20% less P and K, returned significantly greater results.

Sulphur deficiency results in crop yield reductions and impairs grain quality. It is often overlooked as a contributor to influencing environmental quality. In situations **where sulphur is deficient nitrogen utilization is reduced** such that nitrogen loss through leaching and volatilization may increase (Schnug, 1991). Generally, each pound of sulphur deficiency causes 15 pounds of nitrogen to be released into the environment.



Average of three years, one location: California.

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TIGER 90CR SULPHUR




CAPCA brings big value to membership benefits

Crystelle Turlo, Chief Operations Director

Without a doubt, 2020 and 2021 came with some incredible challenges. However, at CAPCA we are proud that we're able to ensure our Membership continued to not only receive the great benefits that they were used to getting, but we also worked harder to provide bigger and more valuable benefits than ever before.

In the Spring of 2020, from May to August, CAPCA anticipated a shortage of quality CE and created on-demand CE that members could take advantage of at any time that their schedule would allow. In just a few months, members were offered a whopping 7 hours of FREE continuing education – a $70-$90 value.

At the end of summer, members were asking for additional CE. We responded to the request by offering affordable monthly subscription packages for only $30. We consistently provided more options in continuing education and kept the courses on-demand to give our members flexibility to take courses when they could.

As our members began to take more online CE, CAPCA pivoted to meet our members needs again. We updated and simplified the Member experience at CAPCA.com. In 2020 we made it easy for members to see their continuing education hours online and in 2021 members were able to print their Official CE cert from their CAPCA.com dashboard. We are now excited we have updated our members' access to online CE directly from their member dashboard too.

We were disappointed that we had to skip an in-person Conference in 2020. But for 2021, we re-imagined Conference to ensure not only our attendee's safety, but we also provided deep discounts to our members. Early registration gave members a $150 discount on the Reno event and $50 off the Online program. Members continued to receive a discount during regular Conference registration as well.

In the summer of 2021, CAPCA rolled out the "CE Hours Reported" initiative. This was in response to the large number of members that were concerned that they were not seeing all the hours they took online on their Official CE certificate. This was due to some sponsors not reporting all CE hours. CAPCA's response has been to create a "stamp" that would be easily recognizable for our members. We hope that when you see the "CE Hours Reported" stamp you can rest assured that those hours will be reported in a timely manner and be on your Official CE cert for your peace of mind.

As we move into the new year, we want to thank every single one of our members for their continued support for CAPCA. We have endlessly worked to meet our member's needs in the last two years and will continue to provide a variety of benefits that are truly robust and full of value. ■

CE HOURS REPORTED™

Photo: J. McNutt

LOOK FOR THE MARK

CE HOURS REPORTED™

The **"CE Hours Reported"** mark was created in an effort to help CAPCA members register for education with confidence that their completed CE hours will be reported and appear on their official print out in a timely manner. Your hours and timely renewal are important to CAPCA, you will start to see this mark appear for meetings whose sponsors have committed to report your attendance within 7 business days of the meeting/online CE completion. We hope this allows you to register with assurance that your Official Cert will include all your CE hours when you are ready to renew.

DO YOU HOST DPR CE MEETINGS?

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

GET STARTED

Please contact Joyce Basan if you are interested in participating in the worthwhile endeavor to service the license holders you seek to reach, while promoting your company as a reliable CE sponsor to the pest management industry.

joyce@capca.com

(916) 928-1625 ext. 2




Monterey County Ag Commissioner Henry Gonzales

By CAPCA Staff

Henry Gonzales is Monterey County's Agricultural Commissioner/Sealer of Weights and Measures, and has served in the position for just over three and a half years. Prior to his current appointment, he served ten years as the Agricultural Commissioner for Ventura County. A native of the Salinas area, Henry was born into a migrant farmworker family. Gonzales recalls starting as a farmworker at age 14, thinning lettuce with the infamous short-handled hoe branded *El Cortito*, Spanish for "The short one." In 1984, he began his career with the Agricultural Commissioner's system in Monterey County as an Agricultural Aide, advancing to Agricultural Inspector, Deputy Agricultural Commissioner and Chief Deputy Agricultural Commissioner over the next twenty-plus years. In total, he has 37 years of service with the agricultural commissioner's system. He holds an Executive Master of Public Administration degree from Golden Gate University, San Francisco, and Bachelor of Science degree from California State University, Fresno.

Describing his role, Gonzales says "The role of the Agricultural Commissioner in Monterey County is founded on the premise of protecting the health and safety of agricultural employees, community members, protecting environmental resources, as well as protecting and promoting the agricultural sector in Monterey County." This includes plant protection: his office enforces state, national, international and local quarantines established to curtail the spread of invasive species, and in cases when such species do enter the area, includes pest detection monitoring and species eradication in coordination with state and federal partners. His office is also responsible for conducting pesticide use regulation enforcement – such as restricted material permitting, application monitoring inspections, and illness and complaint investigations. They register pest control businesses, pest control advisers, and farm labor contractors, as well as outreach to the industry and community regarding pesticide use and regulations. Gonzales says those roles have expanded over the years, "In 2020, at the onset of the COVID-19 pandemic, I partnered with local elected officials and agricultural industry organizations to develop a one of a kind 'Advisory for Agricultural Worker Protection during COVDI-19.' We distributed single use masks, bottles of hand sanitizer, and N95 respirators for the protection of agricultural employees from COVID-19, and smoke from the wildfires that were affecting the area at the time."

Some of the agricultural challenges in the county that Gonzales identified are drought, pests, and labor concerns. But he says, "For me, the lack of understanding by the public - including decision makers - of all that it takes to produce the bounty of fresh fruits, vegetables, and healthy animal proteins is of great concern. The lack of understanding can, and I believe has, led the public to pressure decision makers to create additional regulatory burdens that unnecessarily impact agriculture. Of particular concern are self-proclaimed anti-pesticide groups that earn a living by creating alarm about pesticides by using farmworkers and school children to illicit sympathy and concern. They focus on the possibility of harm from pesticides and never mention all the decades of work by the United States Environmental Protection Agency, California Environmental Protection Agency, California Department of Pesticide Regulation (DPR), local agricultural commissioners and staff to develop and implement mitigations to ensure pesticides can be used while protecting farmworkers, school children, crops, and the environment. They ignore all the education, training, and experience that farmers, pest control businesses, pest control advisers, and pesticide applicators employ in the performance of plant protection activities to produce the crops we all depend on for life."

Those crops in Monterey County primarily include fruits and vegetables, with leaf and head lettuces being perennially in the top three, value-wise. Discussing production and top pest pressures, Gonzales says, "In 2020, strawberries became the highest producing crop at almost $1 billion. The Mediterranean-type climate which allows the production of over 80 fruit and vegetable crops that each generate over $1 million, also provides for the incidence of many fungi, bacterial and virus diseases, as well as many insect and arachnid pests, not to mention the many weeds and squirrels. Plant protection is a major activity. Monterey County has many of the same pests as other fruit and vegetable producing areas of the state. We work diligently to control downy mildew (*Bremia lactucae*), verticillium wilt

(*Verticillium dahliae*), two-spotted spider mite (*Tetranychus urticae*), botrytis bunch rot (*Botrytis cinerea*), and many more." One recent issue Gonzales notes is the incidence of Impatiens necrotic spot virus (INSV) together with Pythium wilt (*Pythium uncinulatum*). "This has resulted in significant losses to lettuce crops. With western flower thrips as the primary vector, and many common weeds serving as hosts, this plant-pest-host complex is not easily controlled with the limited number of vector control materials. In Monterey County, we have partnered with growers, University of California Cooperative Extension Advisors, the Grower-Shipper Association of Central California, and others to monitor and suppress the populations of thrips and weed hosts."

Asked about the relationship between his office, the Industry, CAPCA and local PCAs, Gonzales responded: "As a whole, we have a good working relationship with the Industry, CAPCA, and local PCAs. However, we know there is some individual unhappiness when we issue civil penalties or refer cases to the District Attorney. We are also unhappy when violations occur, as we work hard to educate the Industry to avoid such problems." One of the local issues Gonzales highlights as relevant to CAPCA members is the targeting of 1,3 Dichlorpropene by anti-pesticide advocates: "In October 2021, DPR issued a risk management directive to guide the development and adoption of mitigation measures to address acute, non-occupational exposures to bystanders from 1,3 Dichlorpropene. The directive seeks to address the possibility of offsite movement due to volatilization that may subsequently result in acute, non-occupational bystander exposure, and to address a gap in regulatory requirements. The new mitigations will most likely, as almost all mitigations do, have cost factors that increase the cost of use, and limit the use itself."

Another issue of interest to CAPCA and its members is the Project – a communications network designed to provide parents, students, teachers, other school employees, and the community information about fumigant use within a quarter of a mile of schools within the Project. Started in response to anti-pesticide advocates' pressure for a notification system where agricultural commissioners post online notices of intent (NOI) to apply restricted use pesticides. Advocates said that they wanted notifications to be posted on a website so parents and teachers can go to the website, see what is being applied, and then take precautions to protect children, such as closing windows and keeping the children indoors.

Commissioner Gonzales (on the right) distributing N95 respirators, single-use masks, and bottles of hand sanitizer

Gonzales reports, "In 2016, the Monterey County Agricultural Commissioner's Office launched the Pesticide Notification Near Schools (Project) as a good-faith effort to address the concerns of local notification advocates. A team of professionals was hired to conduct the community outreach, build the website, and provide advice and guidance over the Project. This included an English and Spanish language website, https://farmingsafelynearschools.com designed to convey the fumigant information including regulations, health facts, a "Your Farm Neighbor" map featuring participating Project school locations, and the farms within a quarter of a mile of the schools. The website also included a survey and a notification signup. The notification signup provided the opportunity for people to receive notification each time a farmer planned to apply a fumigant within a quarter of a mile of the school of interest."

In analysis of the program Gonzales notes that there was substantial interest in the Project from outside the area: "Analytics of the website found that of 4,778 website users less than half (2,117) were even from California. There were more users from San Francisco than from Salinas. [There were] some positive outcomes that can be replicated and enhanced for the benefit of all. Nevertheless, I have reservations about a system that would provide notifications beyond a quarter of a mile of the application site. For instance, during the life of the project there were 21 notifications and three attempts to stop those applications that were legal and conducted with the review and oversight of our office. One of the attempts to stop an application included a permit issuance challenge, which we upheld after an extensive review. That permit review was appealed to the Director of DPR, who also upheld our issuance of the permit. These permit issuance challenges delayed the application by a month. Modern plant protection using precision applications of pesticides usually requires quick and decisive action when the pest incidence reaches the economic threshold."

In conclusion, Gonzales says: "Although, advocates say they want notifications to be posted on a website for the protection of children, our Project found that notification advocates used the notifications to attempt to stop legal applications. This, even though regular communication and collaboration was maintained with notification advocates throughout the Project. DPR is now using $10 million to develop a statewide notification system. What a public notification system will look like is unknown at this point, but opportunities to review and opine are on the horizon."

With normal pest pressures in addition to navigating special interests, a significant challenge for Gonzales and his staff is having sufficient resources to meet all their responsibilities. "We balance what we are mandated to do with the activities we see as important and necessary to achieve a greater outcome for agriculture. For instance, it would be great if I had the resources to conduct the research and outreach to counter the misinformation spread by anti-pesticide groups."

But there are success stories as well. Gonzales is proud to have been part of getting the first shipment of California strawberries into China: "It is perhaps a small accomplishment if you consider the amount of strawberries sent," he says, "but being a key participant in the successful phytosanitary certification was momentous. The signing of the agreement between the United States Department of Agriculture and the Ministry of Agriculture and Rural Affairs of the People's Republic of China took years of negotiations and study by both countries. The signing of the phytosanitary certificate was a final step in the process." ■

A COMMON QUESTION GONZALES' OFFICE GETS IS:

"Do all employees in a crew need to be taken to medical care if only a few complain of illness symptoms?"

Answer: *"If there is a reasonable suspicion that crew members have been exposed to a pesticide that may lead to an illness, then yes, all must be taken to medical care." He says, "The apprehension to take everyone to receive medical care is understandable considering the cost. However, there are other considerations such as the fact that if 5 or more individuals complain of symptoms, then the exposure episode is classified as a "Priority Investigation" and must be referred to the District Attorney, City Attorney, or Circuit Prosecutor. These public attorneys have much greater prosecutorial authority than agricultural commissioners."*

ADVERTORIAL

Extend Almond Bloom for Increased Nut Set

Each year between February and early March, California almond orchards burst with beautiful flowers as almond buds begin to bloom — and time is of the essence to set a good crop.

The longer the bloom, and if weather cooperates, the better your chances for each of those almond blooms to become pollinated, and the better your chances for a strong nut set and yield potential.

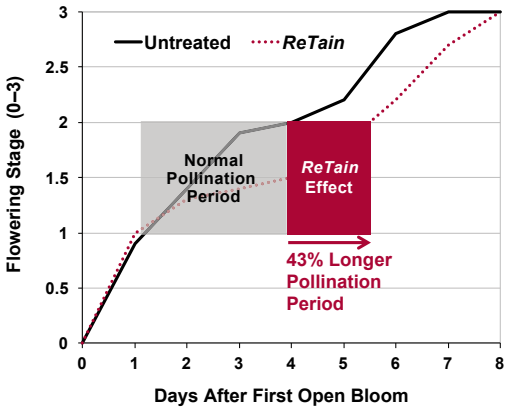
"Keeping the almond bloom viable longer is important for pollination — especially if wind, cloudy days or rain interfere with bees foraging," said Kevin Forney, Valent PGR product development manager. "By keeping the flower alive longer, growers can help ensure the success of their investment."

Keep Flowers Alive Longer

There's never been a way to keep almond flowers viable longer. Until now. ReTain® Plant Growth Regulator for California extends the viability of almond bloom, allowing more opportunity for nut set, thus ensuring optimum crop load potential.

ReTain works by reducing the blooms' production of ethylene, a naturally occurring plant hormone, thus delaying flower and stigmatic senescence. This results in flowers being viable longer, which allows more time for pollination to occur.

"*ReTain* is a proven technology with established use patterns for fruit and nut set in California cherries and walnuts," Forney said. "*ReTain* offers an innovative use for increasing nut set in almonds to ultimately provide growers with an enhanced crop load potential."

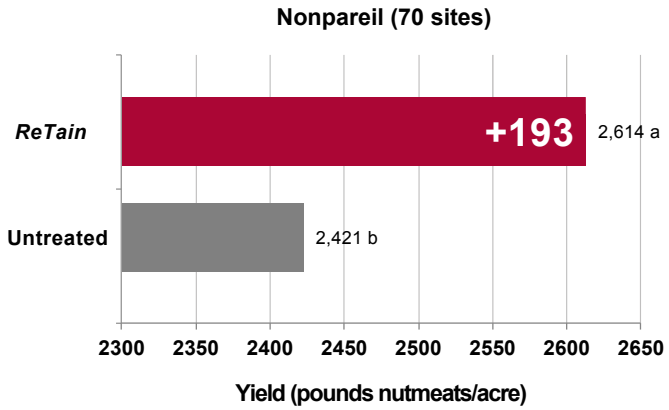


Extend the Pollination Period

Field studies have demonstrated that *ReTain* extends the life of an almond bloom for a 43% longer pollination period over the untreated check.

Boost Nut Set for Optimized Yield Potential

In 70 commercially applied research trials over five years, *ReTain* increased Nonpareil almond yields by an average of 193 pounds of nutmeats per acre over the untreated check.



Apply from 30 to 60% Bloom

ReTain can be applied from 10% bloom to petal fall, but best results have been demonstrated when applied from 30 to 60% bloom. *ReTain* is easy to use, with only one water-soluble pouch needed per acre.

"To capitalize on a longer almond bloom and, most importantly, increased nut set, growers can rely on *ReTain*," Forney said.

To learn more, visit valent.com/ReTainCA or contact your PCA.

ReTain®
PLANT GROWTH REGULATOR FOR CALIFORNIA




California Department of Pesticide Regulation invites public to provide input on development of statewide pesticide notification system

SACRAMENTO – The public was invited in early November to provide input into the development of a statewide system by the California Department of Pesticide Regulation (DPR) that will notify the public in advance of pesticide applications occurring near where people live, work or play.

The 2021-22 state budget allocated $10 million to DPR to begin the development of the tool, which will advance environmental justice and further protect public health by providing transparent and equitable access to information on the application of pesticides. This will, in turn, provide an opportunity for people to make their own decisions about any additional precautions they may want to take to protect their health.

"Our goal is to increase transparency and provide equitable access to information about pesticide applications," said DPR Acting Director, Julie Henderson. "This will provide an opportunity for the public to make their own decisions about additional health precautions they want to take to protect themselves and their families. We believe this is also an opportunity to strengthen the engagement between DPR, County Agricultural Commissioners and the communities we serve."

The input gathered through the webinar series in early November, in addition to focus group discussions conducted in August 2021 with community members, regulatory agencies, growers, and regulated industries, will inform DPR's design and development of the system.

DPR and the state's 56 County Agricultural Commissioners' work together to ensure compliance with pesticide laws and regulations, including operating strict enforcement programs, monitoring the use of restricted materials and fumigants, and penalizing illegal pesticide use. DPR's current regulatory structure provides a strong and enforceable framework for the safe application of pesticides.

"The development of this system will build on DPR and California's existing regulatory framework, providing the public with the opportunity to receive a real-time notification about pesticide applications occurring nearby," said Henderson.

The development of this statewide system will include additional public workshops to collect input on the tool's scope and design, development of a platform that is usable and accessible, and a formal regulatory process. The tool is anticipated to launch in 2023-24.

To learn more about the development of the tool visit https://www.cdpr.ca.gov/docs/pesticide_notification_network/

The current comment period ended November 19, 2021. CAPCA worked to engage members and industry stakeholders in providing individual comments in addition to CAPCA's.

CAPCA will be reaching out to chapters individually with counties that are planning pilot projects for 2022. The next round of public meetings with comment period is expected in Spring 2022. If this is an issue you want to be more involved in, please contact ruthann@capca.com to join the Advocacy Committee. ■

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CAPCA

Newsom administration takes steps to further restrict the use of 1,3-D

Brad Hooker, Agri-Pulse

After years of discussion, the Newsom administration is taking steps to protect bystanders in California—particularly children—by restricting the use of the fumigant 1,3-Dichloropropene (1,3-D), known as Telone. California Department of Pesticide Regulation (DPR) Acting Director Julie Henderson recently directed staff to add more control measures for the applications.

1,3-D targets nematodes, insects and disease in the soil and is applied to fruit and nut trees, strawberries, grapes, carrots and other commodities. It is usually used as a pre-plant treatment, either injected into the soil or through drip-irrigation.

Staff will draft regulatory language for measures aimed at mitigating the effects of acute risks to non-occupational bystanders. This includes limiting the 72-hour exposure to 55 parts per billion or less. They will assess how to integrate this with existing mitigation measures addressing cancer risks.

In 2019, DPR researchers offered a suite of options for further controls. At the extreme end was a buffer zone extending up to 3,500 feet from application sites and lasting five days. The current DPR requirements for protecting bystanders include a 100-foot buffer zone. Other options included limiting applications to 40 acres, tarping the ground for 14 days following each application or applying only when a soil moisture content of at least 70% is present.

This drew a litany of responses from farm groups as well as pesticide manufacturers.

Jim Baxter, a now-retired regulatory affairs manager at Dow AgroSciences, said the current threshold of 110 ppb was already well below what U.S. EPA data would determine is safe, at 2,500 ppb. He compared it to the nation setting a 70-mph speed limit, while California sticks to 3 mph. The economic benefit of 1,3-D, Baxter estimated, was about $234 million per year in California, along with nearly 3,000 jobs spread across rural communities.

Based on the 2019 recommendations, applicators will likely need to use tarps to meet the new threshold targets.

DPR launched a pilot project in 2020 to consider the best practices for reducing emissions by 60%. This could include local and regional control measures as well.

Henderson reasons in her letter that recent spikes in air monitor readings for 1,3-D could result in acute health effects in children. Several stakeholders have been critical over the years of DPR's interpretation of those spikes and worried about the agency incorporating monitoring as regulatory tool, since it is specific to certain areas of the state.

At the opposite end, the Office of Environmental Health Hazard Assessment, which resides within the California Environmental Protection Agency alongside DPR, noted air modeling generated by DPR staff underestimated what was actually detected by air monitoring. The California Air Resources Board agreed and called for DPR to focus on exposures over 24 hours rather than 72.

Robert Dow, a pest control advisor, echoed the concerns of several PCAs last year about a single spike in 1,3-D emissions in 2018, which DPR said had exceeded the threshold by just 1 part per billion, triggering more regulations.

"One accident doesn't necessitate having more restrictions added onto farmers, when they're already dealing with a mountain of them," said Dow.

In April this year, the California Department of Food and Agriculture submitted an economic impact analysis for the mitigation scenarios DPR was testing in its pilot program. It found that injecting the fumigant deeper into the soil would increase treatment costs, ranging from an additional $10 to as much as $240 per acre. Deeper injection would not work well with all fields, requiring costlier methods to come into compliance.

"The cost of irrigation water will significantly influence the cost of application methods requiring high soil moisture," according to a CDFA letter to DPR.

DPR responded that "CDFA's comments generally do not pertain" to the overriding effort to protect human health. ■

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

Don't Miss Your Benefits!

For Sustaining Membership sign-up, visit
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CAPCA




Double Take:

Lessons learned from the Recall and a look at redistricting

Joshua C. Walters, Esq.

(Sacramento) – Over the course of the last year, two simultaneously occurring events have cast long shadows over California's political landscape: the gubernatorial recall and the decennial redistricting process. While even the most casual observer of California politics could not have avoided the Governor's recall, most Californians could be forgiven for being completely unaware of the ongoing redistricting process, which will fundamentally alter elections for the next decade.

Reforming the Recall

At the turn of the 20th century, powerful railroad interests had a lock on California's political institutions. In response to rampant corruption, voters added Article II to the state's constitution, creating a process by which Californians could remove recalcitrant elected officials from office.

Since then, recall efforts have not been uncommon in California; they have been initiated against every California Governor since 1960. Most fail to qualify for the ballot. Only two gubernatorial recalls have ever gone to the voters; only one was successful: the recall of Governor Gray Davis in 2003.

In fact, since its inception, 179 recall attempts have been initiated against state elected officials in California. 11 have qualified, and voters ousted the elected in question a mere six times.

This time around, over 60% of Californians rejected the offer to remove Governor Newsom in the middle of his term. However, close observers of the recall election will remember a not-so-long-ago time when Governor Newsom's landslide victory was not always as predictable as it seemed when results rolled in on election night.

For much of the early stages of the recall, "traditional thinking" among pundits was the overwhelming number of Democrats in California would provide an impenetrable shield for the Governor. Then, in late summer, as the Delta variant fueled a summer surge in the pandemic and the largest wildfires in California history blanketed the state in smoke, a series of polls showed the race was tightening and the Governor's approval ratings slipping.

Many political operatives thought the Governor might be in trouble. Talk about a Democratic "enthusiasm gap" echoed throughout conversations of Sacramento insiders and political strategists.

However, just as polls showed Californians potentially souring on the Governor, outspoken radio host and conservative provocateur Larry Elder entered the fray and shot to the front of the cadre of Republican hopefuls seeking to replace Newsom, providing a contrast for voters – and the Governor – to focus on in the final stages leading up to Election Day.

Larry Elder became the focal point for the Governor's $71 million war chest, which dwarfed spending by his opponents. Simultaneously, early returns from voters who had mailed their ballots in before Election Day indicated the so-called "enthusiasm gap" among Democrats had eroded.

When all was said and done on election night, Governor Newsom's landslide victory was abundantly clear to everyone.

While there are many lessons learned from this recall election, the one that stands out most is that the efficacy of the recall process in general is in doubt. If political trends in California continue along the same trajectory as now, it is not clear that the recall process as it currently stands can serve as an effective check for voters to exercise on future governors.

Even before the results were in, California Democrats – many of whom had complained recall elections have been weaponized by a Republican party otherwise unable to win statewide office – were contemplating potential reforms to the process. The Senate and Assembly committees on elections and the Little Hoover Commission have already committed to holding hearings on the matter in the coming months.

It is important to note that any reform to the recall process would require amending California's constitution and would accordingly need to be approved by voters. While it is still too early to predict how the upcoming hearings will

go, or which reforms will garner enough votes among legislators to ultimately be put before the voters, one idea has emerged as a reasonable change with the potential to restore meaningful accountability to the recall process: remove the second question on the recall ballot – which asks voters who they want to replace the Governor in the event the Governor is recalled – and let the Lieutenant Governor fill the vacancy if the Governor is removed.

Now, Republicans may balk at that proposal as California's Lieutenant Governor is certain to be a Democrat. But they would be wise to reconsider. Recall elections are meant to be the lever inside the "Break Glass in Case of Emergency" case. Right now, that lever has been disconnected.

When the question alone was, "should we recall the Governor," the polls showed voters seriously considered making a change.

Remember, it wasn't until a real contrast to Governor Newsom arose that the momentum in the recall began to shift back in the Governor's favor. Indeed, the Governor made his entire campaign about stopping "The Republicans" and preventing the likes of Larry Elder from inflicting his right-wing brand of conservatism on the state. For voters, the campaign became less about Governor Newsom's vulnerabilities and more about Democrats protecting their values.

In the end, had the recall qualified and voters were not asked a second question (who should replace the Governor), it is not clear Governor Newsom would have achieved the same results.

In order to restore the recall as a reasonable tool for voters to hold elected officials accountable, reform is necessary. The recall was meant to be a shield to protect voters from corruption and graft. It was not meant to be a sword for the minority party to wield in their quest to regain power. California voters need an emergency kill switch, and it appears the best way to reconnect that switch is by refocusing the recall on the essential question: Should the Governor be removed from office? If the answer is yes, then we should hand the reins to the Lieutenant Governor and let the voters express their will during the next election.

Continued

Redrawing the Lines

With the recall no longer sucking the oxygen out of every political conversation in the state, the decennial ritual of redistricting is looming larger, with incumbents and prospective candidates eagerly waiting to see where the lines will be drawn leading into the 2022 midterm elections.

For the uninitiated, redistricting is the process of redrawing district boundaries (e.g. Congress, State Senate, State Assembly, etc.) using updated data collected by the Census Bureau every ten years so that each district has the same number of people. In the political context, redistricting sets the chess board from which winners and losers of legislative races will be determined for the next decade.

Historically, in California – and in much of the country – this process was handled by the Legislature, with elected officials drawing the districts which they would hope to continue to represent. However, in 2008, a Republican-funded effort to wrest that authority from the Democratically controlled Legislature and place it with an independent citizen redistricting commission successfully passed. Republicans had hoped to secure additional seats in the State Legislature by removing the partisan Democratic majority from the process of line drawing, but the move had the unintended consequence of resulting in even more Democratic districts throughout the state.

In 2010, Democrats led a highly coordinated effort to influence the commission to create new, more liberal districts in places that were once conservative strongholds. Those efforts went largely unopposed by Republican operatives. The results speak for themselves.

Under the last district lines drawn by legislators, 43/120 legislators were Republicans, representing 36% of total legislators. In 2012, following the first election on new lines drawn by the independent commission, the Republican caucus shrank to 35/120, representing 29% of total state legislators. Today, Republicans hold just 29/120 seats, representing less than 25% of the delegation.

In just one redistricting cycle, Republicans lost 14 seats, a monumental deficit for a minority party struggling to maintain relevance in California. Democrats now hold super majorities in both houses of the Legislature. In the State Senate, their majority has grown to three-quarters of the chamber.

For Republicans, success on policy making in this environment is not possible. Looking ahead, the importance of engaging in the redistricting process cannot be overstated.

The 2021 redistricting process has been underway for over a year. Currently the independent Citizens Redistricting Commission is in the middle of their line drawing process, having already received thousands of comments from members of the public and organizations about potential districts. For those of us watching closely, it is evident that engagement during this cycle – from across the political spectrum – is significantly greater than during the 2011 cycle.

At the same time, the new commissioners are on the lookout for efforts used to influence the last commission and are more skeptical about the political parties attempting to "fool them." Additionally, the media is maintaining a much keener focus on redistricting this time around. Already, there have been press articles highlighting partisan efforts fueling seemingly organic public testimony.

While no one knows how redistricting is going to shake out, it is clear that now, more than ever before, everyone understands what is at stake.

California's redistricting process will conclude by the legally set December 27 deadline. We will then understand the district lines by which California's electoral political battles will be fought for the next decade.

Over the coming months, I will continue to track the process closely and look forward to sharing the outcomes with you in the new year. ■

Orchard Success and Why It Pays to Focus on Root Health

Below the surface of the soil, where plant roots are meant to thrive and provide a healthy support system, is the place to start your orchard health program.

Root health is a basic necessity impacting orchard health for many years. Sustainability, production and growth are all compromised by poor root health.

Sampling and Monitoring

With permanent crops like almonds, the biggest threats to tree root systems are destructive nematode species that feed on them, leaving trees struggling to take up sufficient nutrients and water. Whether the orchard is a new re-plant or mature, growers should consider soil sampling for nematode levels and continue to monitor for diseases that can also erode soil health.

According to the California Department of Food and Agriculture, nematodes reduce vigor and yield in tree nuts, causing 15 to 20 percent yield loss on average but sometimes as much as 50 percent.[1]

Fumigation

Restrictions on soil fumigant use due to air quality concerns make pre-plant soil fumigation less likely to be a permanent nematode management solution. In addition, nematode populations in soil can rebuild over two or three years, threatening the health of maturing trees, and additional applications to suppress nematodes after fumigations are necessary.

Nematicides and insecticides are reliable post-plant protection against nematodes. “Research shows annual applications, as trees establish root systems, can add to crop yields,” says Rob Kiss, Bayer Customer Business Advisor in central California.

Nematicide and Insecticide Solutions

Velum® One is a nematicide that can be easily applied via drip and microjet chemigation.

It suppresses a wide range of nematodes and

Nematode populations can ***rebuild over two or three years,*** *threatening the health of maturing trees.*

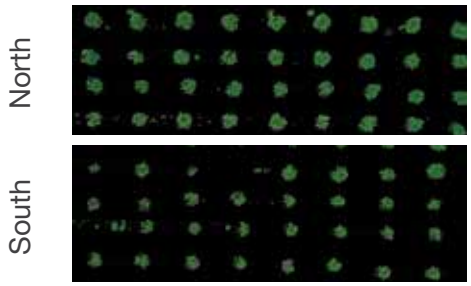
Nematodes reduce vigor and yield in tree nuts, causing ***15 to 20 percent*** *yield loss on average but sometimes as much as* ***50 percent.***[1]

has been shown to protect root health and help establish the crop. Trials conducted in California showed that ***young almond orchards treated with Velum One saw improved canopy diameter by more than half (58%) as well as improvement in yield***.

Movento® insecticide can be applied as an in-season foliar spray. It moves through the leaves, down to the roots, protecting the roots from the effects of nematode feeding.

Velum® One Helps Establish Young Almond Orchards

Velum One-treated trees show 58% increase in canopy diameter (green canopy pixels).



Velum One applied at 6.5 oz. per acre, spring 2017, via drip irrigation. Trees planted in January 2017.

Fungicide Solutions

Serenade® ASO applied through chemigation colonizes the roots, helping to protect them from damage caused by soil-borne diseases. Healthier roots improve soil health and plant nutrient and water uptake.

Summary

Growers looking for an optimal start for their newly planted orchards and maturing trees should continue to be vigilant in managing soil pests and diseases in order to extract the maximum production and value from their orchards.

Making sure the root systems are protected from soil diseases and pests will give trees every chance to produce up to their full potential and ensure the long-term vigor and health of your orchard.

Learn more at: www.BayerCropScience.us

[1]California Department of Food and Agriculture 2015 Specialty Crop Block Grant Program Project Abstracts.

IMPORTANT: This bulletin is not intended to provide adequate information for use of these products. Read the label before using these products. Observe all label directions and precautions while using these products.

MOVENTO® VELUM® ONE SERENADE® ASO

BAYER

Why using KNO_3 prevents and alleviates soil salinization

Potassium Nitrate **experts**

Salinization is recognized as the main threat to environmental resources and human health in many countries, and is a serious environmental factor limiting the productivity of crops around the world. Even though soluble salts are inherent in all soils (salinity), build-up of salts in a given soil layer above a certain level- (salinization) adversely affects crop production.

Some agronomic practices such as fertilizer and pesticide application are among the leading causes of soil salinization.

The World Bank states that soil salinization caused by inappropriate irrigation practices affects about 60 million ha, or 24% of all irrigated land worldwide. In Africa, salinization accounts for 50% of irrigated land.

How can you prevent or mitigate soil salinization?
Fertilize with potassium nitrate (KNO_3). The K^+ and NO_3^- are fully absorbed by the plant following crop demand, no nutrients are left behind.

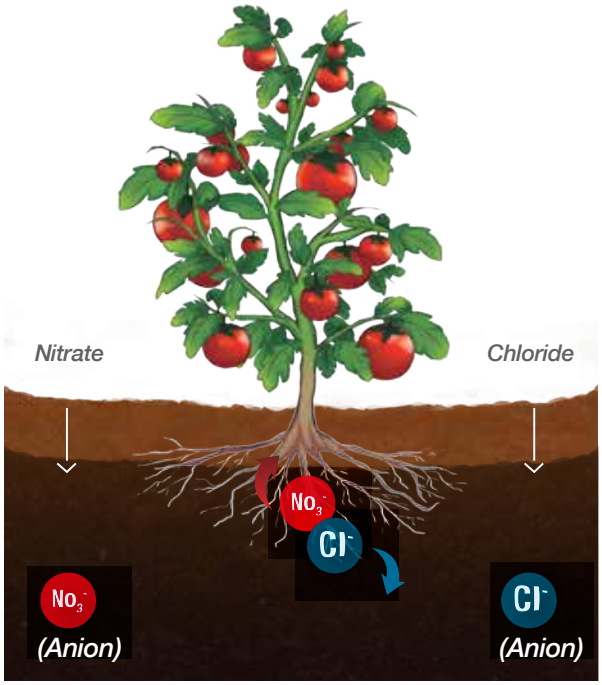
With a dominant presence of N as nitrate (NO_3^-) in the soil it stimulates K uptake and in turn K stimulates NO_3^- uptake. This is a very synergistic effect that can also benefit the uptake of other nutrients. Other sources of N, such as ammonium can have the opposite effect.

Since salts move with the wetting front, they accumulate in specific profiles according to the irrigation regimen and the type of irrigation used. For instance, when irrigating using sprinklers, water and salts move deeper, according to the soil's infiltration capacity and the water quantity, until they stop at a certain depth. When using drip irrigation, there is also a lateral movement of water and salts. Using potassium nitrate prevents these buildups and can help reduce the need for over watering to flush accumulated salts out of the soil.

Fertigation can reduce soil salinization and mitigate the effects of salt stress effects because it improves the efficiency of fertilizer use and increases nutrient availability. In arid regions, nitric acid and sulfuric acid fertigation represent rapid ways to reduce or minimize salinity and sodicity. Nitric acid applied with fertigation reduces soil pH and increases Ca^{2+} dissolution in clay soils, thereby minimizing salinity injury due to Ca^{2+} /Na^+ competition. It may also reduce chloride salinity in the root zone, because the nitrate can counterbalance the excess of chloride.

Nitrate helps to prevent excess chloride-induced salinity stress

Antagonism



When choosing a K source, proper nutrient balance should be considered. Sulfur is a critical nutrient, however, if 100% of the K is supplied by potassium sulfate, the level of sulfur applied far exceeds plant demand and most is left behind in the rooting zone. Potassium sulfate should be applied, for example, to reach the required sulfur demand of the crop. That's it. The balance of the K requirement should come from a source such as Potassium Nitrate that will also supply a portion of the crops required nitrogen demand.

By replacing some of the potassium sulfate (K_2SO_4) and potassium chloride (KCl) we can avoid excess sulfate and chloride accumulation in the soil, thereby, reducing soil salinity. In the case of potassium thiosulfate, using potassium nitrate as a K source can avoid potential toxicity by using too much thiosulfate.

We must also understand the salt index (SI) of a fertilizer, to see additional benefits of using potassium nitrate as a main source of nitrate N and potassium. There are two common methods to determine the SI.

The old method was based on tables developed from soil solution osmotic pressure (Rader et al 1943). These can be misleading and do not reflect the correct measurement of the salt index of a fertilizer. The second and more widely accepted method comes from electrical conductance – Jackson (1958); Murray & Clapp (2004) or the EC of a fertilizer.

When other K-fertilizers are compared with the Electrical Conductivity method, then potassium nitrate has the lowest salt index, partial salt index and EC-level.

As seen below, potassium nitrate appeared to have a higher salt index using the old method. Using the new Jackson & Murray method shows more accurate readings.

Salt index comparison

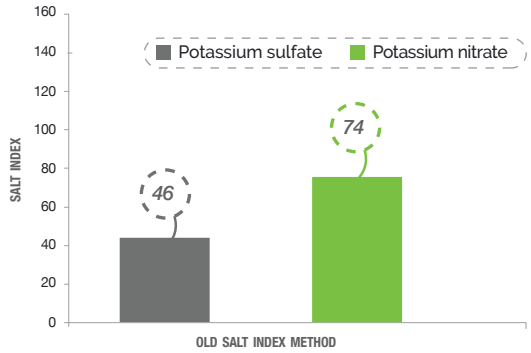


Figure 1. Rader (1943)

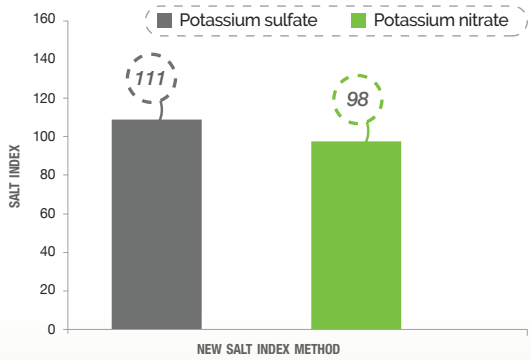


Figure 1. Jackson (1958); Murray and Clapp (2004)

References for both methods:

Jackson M.L. (1958) Soil Chemical Analysis, Prentice Hall, Englewood Cliffs, NJ.

Murray, T.P. and Clapp, J.G. (2004) Current fertilizer salt index tables are misleading. Communications in Soil. Science and plant Analysis, 35 (19-20): 2867 - 2873

Rader L.F. Jr, White, L.M., and Whittaker, C.W. (1943) The salt index: a measure of the effect of fertilizers on the concentration of the soil solution, Soil Sci., 55 201-218

Neem insecticides as oviposition deterrents against spotted wing drosophila in cherries

Sudan Gyawaly and Jhalendra Rijal, University of California Statewide IPM Program and Cooperative Extension, Stanislaus Co.

Spotted wing drosophila adults.
Credit: M. Hauser, CA Dept of Food and Agriculture

Background

Spotted wing drosophila (SWD), *Drosophila suzukii* (Matsumura), is a globally important invasive pest. It was first detected in the United States in 2008 in California and has spread throughout most of the country now. SWD adults are tiny flies (about 3 mm long) with red eyes and a pale brown thorax. Male flies have a black spot on the tip of each wing and a dark circular band on the forelegs. Female SWD flies have a saw-shaped ovipositor that enables them to cut open the fruit skin to deposit eggs inside healthy fruits.

SWD is a highly polyphagous pest but preferably feeds on soft thin-skinned fruits such as berries and cherries. An adult female can lay as much as 300 eggs in her lifetime. Larvae (3.5–4 mm long) are white and feed inside the fruit and pupate before emerging as adults. It has multiple generations per season. Cherry is one of the most susceptible hosts to SWD damage, and feeding damage on the fruit makes it an easy target for other pests and disease attacks.

SWD in California cherry is managed using synthetic insecticides. Current management practice includes applying adulticides three to four times from the fruit-color stage through harvest. However, frequent use of limited insecticides, mainly organophosphate, pyrethroid, and spinosyn, can lead to unwanted problems, such as secondary pest outbreaks and insecticide resistance. For example, SWD populations exposed to the repeated use of spinosad in caneberries in the Central Coast region have been found less susceptible to this compound. Similar studies of increased risk of insecticide resistance to SWD have been reported in other states as well. In this context, exploring additional insecticide active ingredients, ideally with shorter residues, is desirable so that they can be used in rotation to minimize the resistance build-up. Higher residue on fruit at harvest is another concerning issue affecting California cherries because of the lower maximum residue level (MRL) requirements in the countries where cherry is exported. Using insecticides that are less likely to result in higher MRLs is necessary to address this issue.

Commercial neem-based products are one alternative group of pesticides that have oviposition deterrent effects against multiple insect pests, including, tephritid flies. Neem seed kernel extracts have reduced oviposition activity of Oriental fruit fly, *Bactrocera dorsalis*, by more than 80% in guava. Similarly, acetone-based extract of deoiled neem seed kernel powder significantly deterred oviposition in some tephritid fruit flies (*B. dorsalis* and *B. cucurbitae*). There are varieties of neem-based products with multiple active ingredients available in the market. When neem oil is mixed with alcohol, azadirachtin is separated from the oil, and the remaining oil without azadirachtin is called clarified hydrophobic extract of neem oil (CHENO). In this study, we report the results of laboratory studies evaluating the oviposition deterrent activities of selected neem-based insecticides that contain azadirachtin (Azadirachtin products) or CHENO (CHENO products) or both.

Methods

Laboratory studies were conducted using SWD reared in the laboratory at the UC Cooperative Extension, Stanislaus Co.

A series of no-choice and choice tests were conducted. In the no-choice test, cherry fruits were treated individually with each insecticide (see Table 1) or distilled water (control group). Treated fruits were hung singly on the fine mesh screened lid inside plastic deli cups (12 oz.). A total of 3 female and 2 male flies (7–10 days old) were released into the container to allow egg-laying. Each set of the trial had 10 replicates for each treatment and control. Individual fruits were inspected for oviposition stings (oviposition scars on the fruit) at 24 h. A total of 2 to 3 repetitions of the trial were conducted for each product tested. Ripe cherry fruit purchased from local grocery stores were used. Cherries were washed thoroughly and air-dried before use.

In the choice test, a fruit treated with one of the neem and other products (see Table 1) was hung in one quadrant inside

Table 1. Neem products used to conduct spotted wing drosophila oviposition deterrent studies. CHENO = clarified hydrophobic extract of neem oil

Product	Active Ingredient	Rate per Acre
CHENO product A	CHENO 0.90%	0.90%
CHENO product B	CHENO 70%	1%
CHENO and azadirachtin product	67% (CHENO + Azadirachtin)	1 quart/100-gallon water
CHENO product C	CHENO 70%	1 fl oz/gallon water
Azadirachtin product A low rate	Azadirachtin 4.5%	4 oz
Azadirachtin product A high rate	Azadirachtin 4.5%	8 oz
Azadirachtin product B	Azadirachtin 1.2%	32 oz.

Detail view of spotted wing drosophila ovipositor. Credit: M. Hauser, CA Dept of Food and Agriculture

the ventilated plastic container (36 oz.) while an untreated fruit (i.e., control) was attached to the opposite quadrant of the container. A total of 5 female and 3 male flies (7–10 days old) were released into the containers to allow egg-laying. After 24 hours, fruit were examined, and the number of oviposition marks (i.e., stings) was counted under a dissecting microscope.

Data for the effect of neem products on oviposition deterrence activity in both choice and no-choice tests were analyzed using the Unpaired Student t-test.

Results

In choice tests (Fig. 1), CHENO product A (t = 2.00, df= 56, *P* = 0.002,), CHENO product B (t=1.99, df= 62, *P* = 0.01), CHENO + azadirachtin product (t = 2.00, df = 60, *P* = 0.04), CHEENO product C (t= 2.04, df = 28, *P* = 0.003), and Azadirachtin product A higher rate (t = 2.10, df = 18, *P* = 0.03) reduced the number of oviposition stings significantly more than the control treatments did. However, Azadirachtin product A lower rate (t = 2.10, df = 18, *P* = 0.098), and Azadirachtin product B (t = 2.04, df =18, *P* = 0.51) did not reduce the number oviposition stings as compared to the control treatment.

In no-choice tests (Fig. 2), only CHENO product A (t= 2.02, df = 38, *P* = 0.003) significantly reduced oviposition than that of the control. CHENO product B (t = 2.02, df = 38, *P* = 0.18), CHENO + azadirachtin (t = 2.10, df =18, *P* = 0.32), and Azadirachtin product B (t = 2.10, df =18, *P* = 0.07) did not reduce the oviposition activities compared to control treatments.

Study Implications and Conclusion

Naturally occurring organic insecticides can be important to manage the SWD populations. Neem products are natural products and also have very short residuals. If found effective in field conditions, these products have excellent potential to be an important tool in the pest management toolbox of SWD. Our study examined ovipositional deterrent activities of several neem-based compounds against SWD in sweet cherries in California. Our study found that the most effective product was CHENO product A, which contains 0.90% CHENO. Another promising product is Azadirachtin product A that contains 4.5% azadirachtin. CHENO product C, also containing hydrophobic extract of the neem oil, showed a good promise for potential use in oviposition reduction and SWD management.

In conclusion, our study indicated that some of the neem products might help reduce oviposition activities. In addition to affecting the oviposition activity, such as repelling insects from oviposition, these products may affect the SWD population by directly causing mortality of various life stages of insects, in other words, eggs, larvae, and adults. We did not consider those impacts of neem products on SWD in our study and suggest further research be conducted to examine the effect of neem products on the mortality of various SWD life stages. Moreover, examining the overall effect of these products on SWD at the field level should be conducted to fully recognize the potential of neem products in the integrated management of spotted wing drosophila in cherry. ■

FIG. 1. *Effect of neem products on oviposition by spotted wing drosophila in choice test studies. CHENO = clarified hydrophobic extract of neem oil; ns = not significant; *= significant at P<0.05; **= significant at P<0.01*

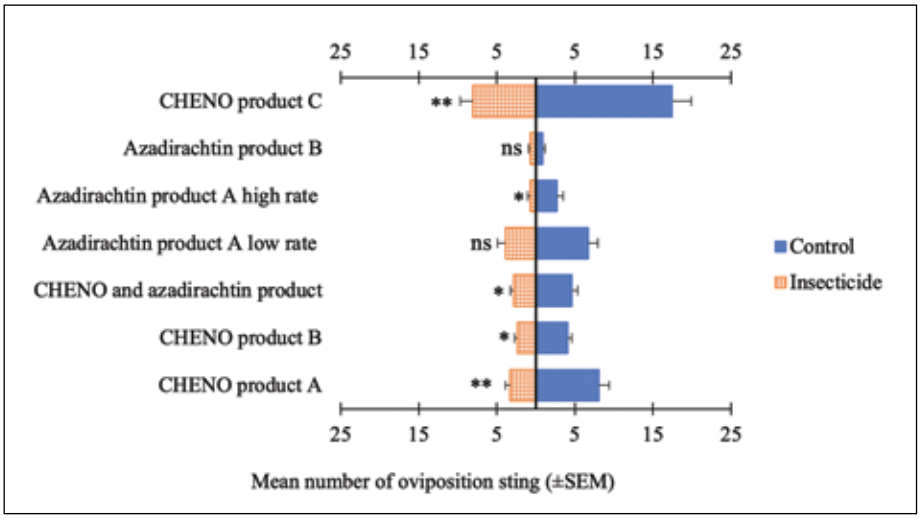
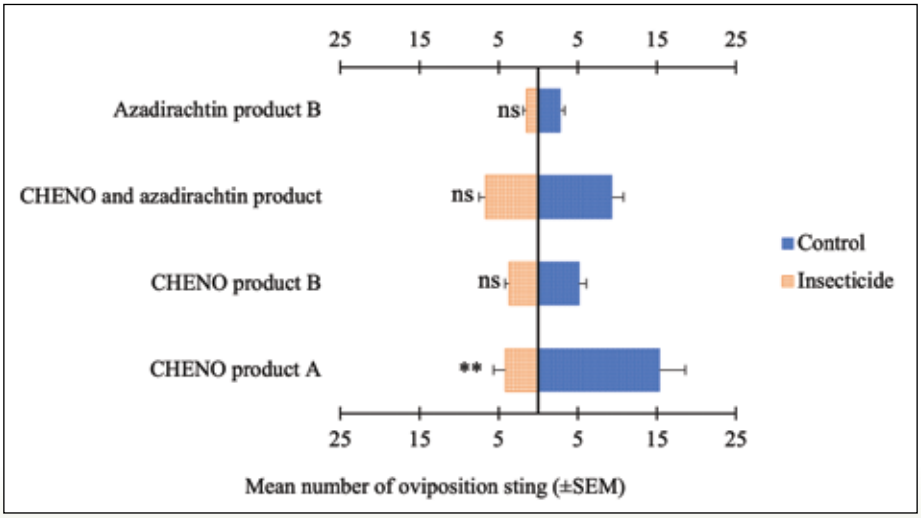


FIG. 2. *Effect of neem products on oviposition by spotted wing drosophila in no-choice test studies. CHENO = clarified hydrophobic extract of neem oil; ns = not significant; *= significant at P<0.05; **= significant at P<0.01*



Larva of spotted wing drosophila. Credit: Larry L. Strand, UC Statewide IPM Program.

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GO Isolates® is a powerful soil inoculant that is manufactured organically by our patented isolate technology. It has a positive impact on soil biology as the microbially activated carbon complexes in GO Isolates® contain more than 1,500 naturally occurring beneficial microorganisms. GO Isolates® also serves as a carbon source for indigenous soil microbes. Adding GO Isolates® to the soil not only builds the concentration of microbes, but enhances the diversity of beneficial microbes which have a long-term effect on soil health. Applied to any soil type, it builds soil crumb structure and texture which enables improved water infiltration and aeration for root proliferation. These beneficial microorganisms also secrete enzyme systems to break down organic matter and mineralize nutrients for enhanced bioavailability.

At BioFlora, we understand the critical role microorganisms play in the maintenance of soil health and fertility. More importantly, we understand by taking time to build soil structure and soil biology it can pay growers long-term dividends for years to come.

- Stimulates soil biological activity
- Enhances water holding capacity
- Enhances rooting and plant nutrient bioavailability
- Improves plant defense mechanisms
- Builds up suppressive soils
- Buffers salts to impact salt tolerance

UNTREATED

TREATED

Pictured left is a treated field using a combination of microbial products; GO Isolates® and Isoguard®. qPCR showed no Sclerotinia sps.

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Armyworms in rice: an update

Luis Espino, Rice Farming Systems Advisor, UC Cooperative Extension; Ian Grettenberger, Extension Entomologist, UC Davis

If it were not for the drought, the 2021 rice season would have been an excellent one for the industry. At the field level, it was a good year though and yields look very good. As we write this article, 75% of the rice acres have been harvested. We'll have to wait to see where the quality stands. In general, pressure from arthropods and pathogens was low, including from that mid-season insect pest that always raises some concern, true armyworm (*Mythimna unipuncta*, Fig. 1).

After the 2015 armyworm outbreak, yearly infestation levels have been variable. However, larval populations seemed to be overall higher for the last several years than what the industry had experienced in the past couple of decades. The 2021 armyworm season was different; larval populations were more like what was typically experienced before 2015 with larvae few and far between in rice fields.

UCCE established a monitoring network using pheromone traps to serve as an early warning system after the surprises of severe outbreaks. The network was expanded to 15 locations across the Sacramento Valley since 2018, and the trapping information has been shared with growers and PCAs to help improve armyworm monitoring. As can be seen in Fig. 2, moth catches for the first three years were very consistent, but moth catches in 2021 were much lower.

The trapping network has helped us better understand the armyworm life cycle in the rice system. The traps made clear that there are two moth flights, one that starts at the end of May and peaks in late June, and another one that starts in late July and peaks in mid-August. The first peak seems to originate from migratory armyworm moth populations. The second flight seems to be somewhat dependent on the armyworms that complete their life cycle in rice and perhaps other hosts in the area. For example, in an insecticide trial conducted in 2020, it was found that treatments that controlled worms during early July reduced injury to panicles caused by armyworms during August (Table 1). It is unlikely that an insecticide would have such a long residual; most likely, the pesticide reduced the number of armyworms completing their cycle, resulting in fewer moths and fewer worms later. A similar pattern has been observed in one of the network fields that has been treated every year in early July; in this field moth captures in August are very low compared to what we see in other fields nearby.

Table 1. Effect of insecticides on armyworm larvae in early July and panicle injury 64 days later.

Treatment	Number of larvae/2 min search 11 DAT	% reduction from pre-treatment	Number of injured panicles/ft^2 64 DAT
Untreated	4.1	0	3.2
Methoxyfenozide	0.1	97.4	0.3
Experimental product	0.1	92.3	0.2
Bacillus thuringiensis	1.3	42.9	5.1

DAT=days after treatment

FIG. 1. *(left): The true armyworm larvae can severely defoliate rice fields when populations are high. Photo credit: Ian Grettenberger.*

We have used the trapping information to garner the attention of growers and PCAs about armyworms and remind them to monitor their fields during times when adult populations were on the upswing. However, unlike other crop systems where a certain number of insects per trap can be used as an action threshold, we have not seen a clear relationship between moth numbers and number of larvae or defoliation level in the field. At minimum, it does appear that high larval numbers in fields, paired with substantial defoliation, tends to accompany high moth captures. However, in some fields, moth numbers have been very high but larval numbers very low, with defoliation being barely noticeable. Larval numbers are affected by many factors and therefore can change from field to field. For example, natural enemies, rice stand, grassy weeds, can all affect how many armyworm larvae develop in a field and survive to a size that can cause noticeable defoliation, even if there was significant egg laying.

In 2019 and 2020, weekly larval searches were conducted in three fields of the network to figure out the relationship between when moth captures peaked (and thus egg laying should peak) and when larval counts were the highest. We found that the larvae counted in fields peaked one to two weeks after the peak moth captures. This means that we can use peak moth catches to predict when peak larval populations will occur. Unfortunately, there is still a poor predictive relationship between moth captures and larval counts as we noted, so we cannot conclusively say high moth captures guarantee high larval counts and cannot predict how much defoliation will occur. However, PCAs can use this piece of information to make sure that they intensify their monitoring during those times and keep a close eye on fields to avoid the surprise of a heavily defoliated field.

Other studies have been conducted to improve on the management of armyworms, including examining effects of defoliation on yield and plant measurements. The action threshold for armyworm damage developed in the 1980s is 25% defoliation, meaning that economic losses are not realized until defoliation is higher than 25%. Defoliation studies were conducted in 2019 and 2020 to confirm this threshold with current varieties and production practices. When plants were 100% defoliated about 45 days after seeding, meaning all foliage was cut to the water level (Fig. 3), plants were 15-20% shorter and panicles 18-25%

lighter than control plants. These negative effects on plant characteristics produced a 25% yield loss. When defoliation was 50%, the effect on plant height and panicle size was much smaller, resulting in only a 4% yield reduction in one year of the studies. When plants were 25% defoliated, no effects on plant height or yield were detected.

To help establish treatment thresholds and understand the economics of armyworm damage, let's translate the results described above to dollars per acre. Assuming a 95 cwt/a yield, and a price of rice of $15/cwt, severe defoliation can result in a yield loss of 24 cwt/a, or $360/a. Similarly, defoliation of half the foliage of a plant can result in a loss of $57/a. If the cost for armyworm control is $25/a, an application to avoid those levels of defoliation is well justified. These results indicate that a threshold of around 25% defoliation is still appropriate for medium grain varieties.

The trapping network will continue in 2022. Hopefully, population levels will be similar to what we saw in 2021. Using the information from the trapping network, growers and PCAs can have a good idea of what the larval pressure will be by mid to late June. Bookmark our website or subscribe to receive the weekly update by email at https://rice.ucanr.edu. ■

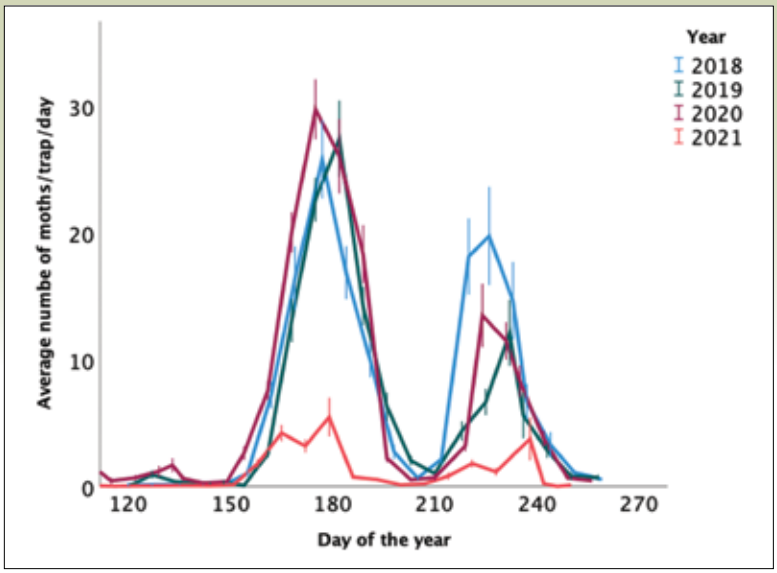

FIG. 2. *Average number of male armyworm moths trapped per trap per day in 15 locations across the Sacramento Valley of California. Years 2018, 2019, and 2020 had similar numbers while 2021 was much lower. Day 150 is May 30, day 180 is June 29, day 210 is July 29, and day 240 is August 28.*

FIG. 3. *Rice plots subjected to different defoliation levels to determine the effect of defoliation on yield. Photo credit: Luis Espino*

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University of California Cooperative Extension

Weed control and safety of herbicides in bearing avocado orchard

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INTRODUCTION

Weed control in avocado does not get as much attention as in other crops. Leaf litter provides a mulch layer that helps suppress weed growth and if needed, glyphosate sprays are used to get rid of unwanted green vegetation. However, in young orchards there are sufficient resources for weed growth, even in the presence of leaf mulch (Figure 1.)

Recently, paraquat has been classified as restricted use material and glyphosate has received a lot of scrutiny for potential links to health issues, leading to a demand for safe and effective alternatives. This need for diversifying weed management was recognized by the California Avocado Commission that funded this project. The objective was to evaluate conventional and organic herbicides currently registered in avocado (reported in this article) and those commonly used in citrus (not currently registered in avocado and therefore not reported in this article) for safety and efficacy in bearing avocado orchard.

METHODS

At two southern California locations, we applied herbicides (Table 1) to avocado alleys in a 15-year-old orchard (Santa Paula) and 2-year old orchard (Riverside) in both: spring and fall. We also sprayed tree branches to simulate drift in order to evaluate potential for injury from the tested herbicides. The 2019-2020 experiment was repeated in 2020-2021 at each location and we collected data on weed control and herbicide phytotoxcity to avocados over time.

Table 1. Herbicides and rates evaluated at Riverside, CA and Santa Paula, CA avocado orchards.

Herbicides	Rates (lbs of active ingredient/acre)
Flumioxazin	0.38
Simazine	4
Oxyfluorfen	1.5
Isoxaben	1.0
Glyphosate	3.8 (lbs of acid equivalent)
Caprylic/capric acids	9% in 50 gal/A

FIG. 1. *Sufficient sunlight and moisture under loose avocado leaf litter allow germination and establishment of weeds such as little mallow and annual sowthistle.*

All herbicides were applied without surfactants using calibrated CO_2 backpack sprayer with carrier volumes listed on labels. After applications, herbicides were incorporated using a temporary sprinkler system to simulate 0.5 inch of rainfall. Weeds at both locations were 2-4 inches tall at the time of application, except for one to two weeds per plot at Santa Paula in the spring of 2021 that were 10-12 inches tall. The primary weed species at the Riverside location were tumble pigweed (*Amaranthus albus*), common purslane (*Portulaca oleracea*), annual sowthistle (*Sonchus oleraceus*), little mallow (*Malva parviflora*, and burning nettle (*Urtica urens*). At the Santa Paula location, the same weed species were present and, additionally, nettleleaf goosefoot (*Chenopodium murale*) was common.

At each herbicide application date, avocado branches were flagged adjacent to treatment plots and were sprayed for three seconds with the corresponding herbicide solution to simulate drift.

At one, two, four and eight weeks after application, we evaluated weed densities in all plots and recorded injury ratings to the sprayed avocado branches. The injury evaluation scale ranged from 0 (no visible injury) to 10 (dead tissue).

RESULTS

Weed control

Consistently among locations and application seasons, glyphosate provided the best weed control (Table 2). It was especially valuable against larger established weeds that were killed before producing seed. Compared to other herbicides, glyphosate was most consistent against common purslane which, true to its name, was very common at the Santa Paula site. Oxyfluorfen and flumioxazin were effective against germinating annual weeds and small weed seedlings that were already established, but failed to control larger weeds and prevent seed production. Simazine injured weeds, causing chlorosis, but did not kill most of them. Isoxaben provided only partial weed control (Table 2). Caprylic/capric acid provided immediate control of some young weeds but, as expected for a contact material, did not affect weeds germinated after application and by the eighth week after treatment those plots became weedy. Generally, weed control with all herbicides in fall was greater compared to spring applications, possibly due to lower weed germination rates at cooler winter temperatures.

Table 2. Weed control at 8 weeks after herbicide treatments at two locations and application timings in established avocado orchards.

Treatments	Weed control, % compared to untreated			
	Riverside, spring	Riverside, fall	Santa Paula, spring	Santa Paula, fall
Flumioxazin	69	55	28	91
Simazine	23	77	42	62
Oxyfluorfen	51	53	63	94
Isoxaben	29	56	36	69
Glyphosate	80	84	75	80
Caprylic/ capric acids	30	26	45	43

Weed densities increased for four weeks after herbicide application in all plots, but the highest increase was in the untreated check (Figure 2). Weed densities declined slightly after fourth week after treatment likely due to intra- and inter-specific competition for resources between weeds at high densities that survived herbicide treatments. Glyphosate plots were an exception since very few weeds survived herbicide treatment, and thus, there were plenty of safe sites for weed germination and establishment, especially for seed of wind-dispersed species such as annual sowthistle.

Figure 2. Total weed number at one, two, four and eight weeks after treatment (WAT) following spring application of herbicides at Santa Paula, CA.

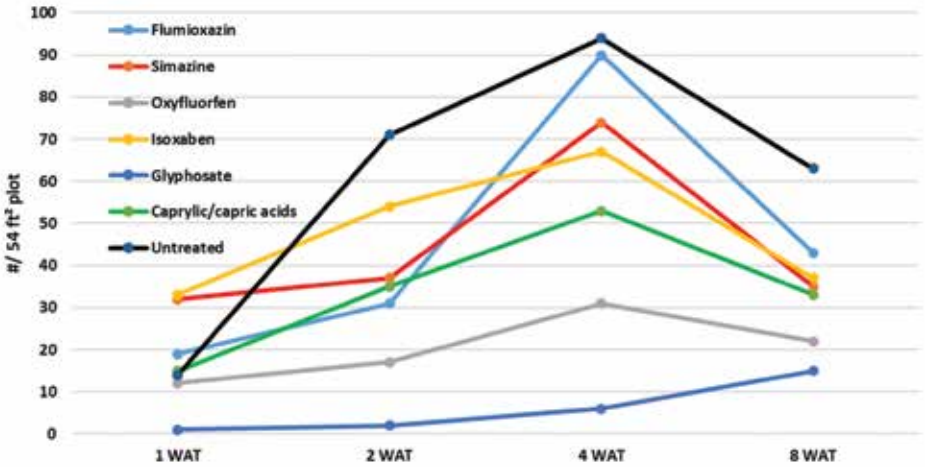

Figure 3. Oxyfluorfen controlled germinating weeds and small emerged weeds, such as burning nettle (left), but did not control established little mallow (right) that produced seed even after herbicide injury or perennial field bindweed.

Figure 4. Glyphosate provided excellent control of most weeds, including common purslane, which was difficult to control with other herbicides.

Injury to avocado with simulated drift.
Glyphosate, which was most effective in controlling weeds, appeared to be most injurious compared to all other treatments to avocados when sprayed to foliage (Table 3). The branches exposed to simulated drift from glyphosate lost leaves, dried and did not recover. We did not observe phytotoxicity symptoms in adjacent branches, suggesting that the herbicide did not translocate at levels that caused visible injury. For all other tested herbicides, injury scores from simulated drift were very low and not different from untreated branches by the eighth week after treatment (Table 3).

Table 3. Injury to avocado foliage at 8 weeks after herbicides were applied to simulate drift. The data are averaged over spring and fall application timings that had similar results. Injury was scored on a scale from 0 (none) to 10 (dead tissue).

Treatments	Riverside	Santa Paula
Flumioxazin	0	0.66
Simazine	1.3	0
Oxyfluorfen	0.1	0.5
Isoxaben	0.8	0.5
Glyphosate	4	7.3
Caprylic/capric acids	1.1	0.9
Untreated	0	0

Figure 5. When applied directly to avocado foliage to simulate drift, glyphosate caused irreversible injury (left), while oxyfluorfen had none by the 8th week after application (right).

SUMMARY

This project showed that:

- Glyphosate provided superior weed control compared to other tested herbicides currently registered for avocado
- Herbicides that controlled germinating weeds had limited activity on established weeds (especially large weeds that produced seed), and may need 'burn-down' partner or mechanical removal methods for complete weed management program.
- When applied to the ground, all herbicides were safe to avocado; however, in the case of drift, glyphosate was highly injurious to foliage while other herbicides were not.
- It is important to know weed species in the orchard and to apply pre-emergent herbicides to moist soil which ensures herbicide activity on germinating weeds. ■

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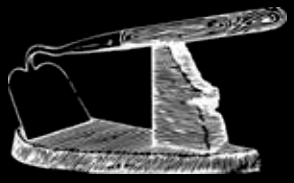

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Ventura Chapter awards $6,000 in Student Scholarships

Enrique Rodriguez, $1,500 Scholarship
Agri-Business-CSU Chico
Enrique recently completed his Associate Degree in Agriculture Business at Ventura College where he held the position of President of the Ventura College Agriculture Ambassadors. In the Fall, he will continue his education at CSU Chico to pursue his degree in Agriculture Business. Outside of college, Enrique still finds time to contribute to his community by actively participating in the Santa Paula FFA and the Santa Paula Optimist Club.

Julia Fernández, $1,500 Scholarship
Agricultural Sciences-Cornell University
Julia is completing her degree in Agricultural Sciences, and serves as an Agricultural Science Ambassador and a member of the Cornell University Dairy Club. She held multiple positions in the ag industry, including work for the Ventura Ag Commissioner's Office, Rebecca Nelson Plant Pathology Lab, and New York FFA. Upon graduation, Julia plans to pursue a career in ag policy.

Kayla Reiman, $1,500 Scholarship
Agriculture and Environmental Plant Sciences-Cal Poly SLO
Kayla plans to obtain a CCA and PCA license and pursue a career in plant breeding and vegetable production. She is currently interning for Rijk Zwaan Seeds and previously interned for AGRX as a field scout. While completing her degree, Kayla serves as the Cal Poly Crops Club president and works for the school horse barn.

Diego Briceno, $1,500 Scholarship
Natural Science/Agricultural Science-Oxnard College
Diego became interested in agriculture after working for a local berry grower and learning many of the essential duties on the farm. He plans to earn a Masters in Agricultural Sciences and pursue a career in strawberry production. While working on his undergraduate degree, Diego plays for the college soccer team and practices guitar.

CAPCA STATE OFFICE HOLIDAY HOURS

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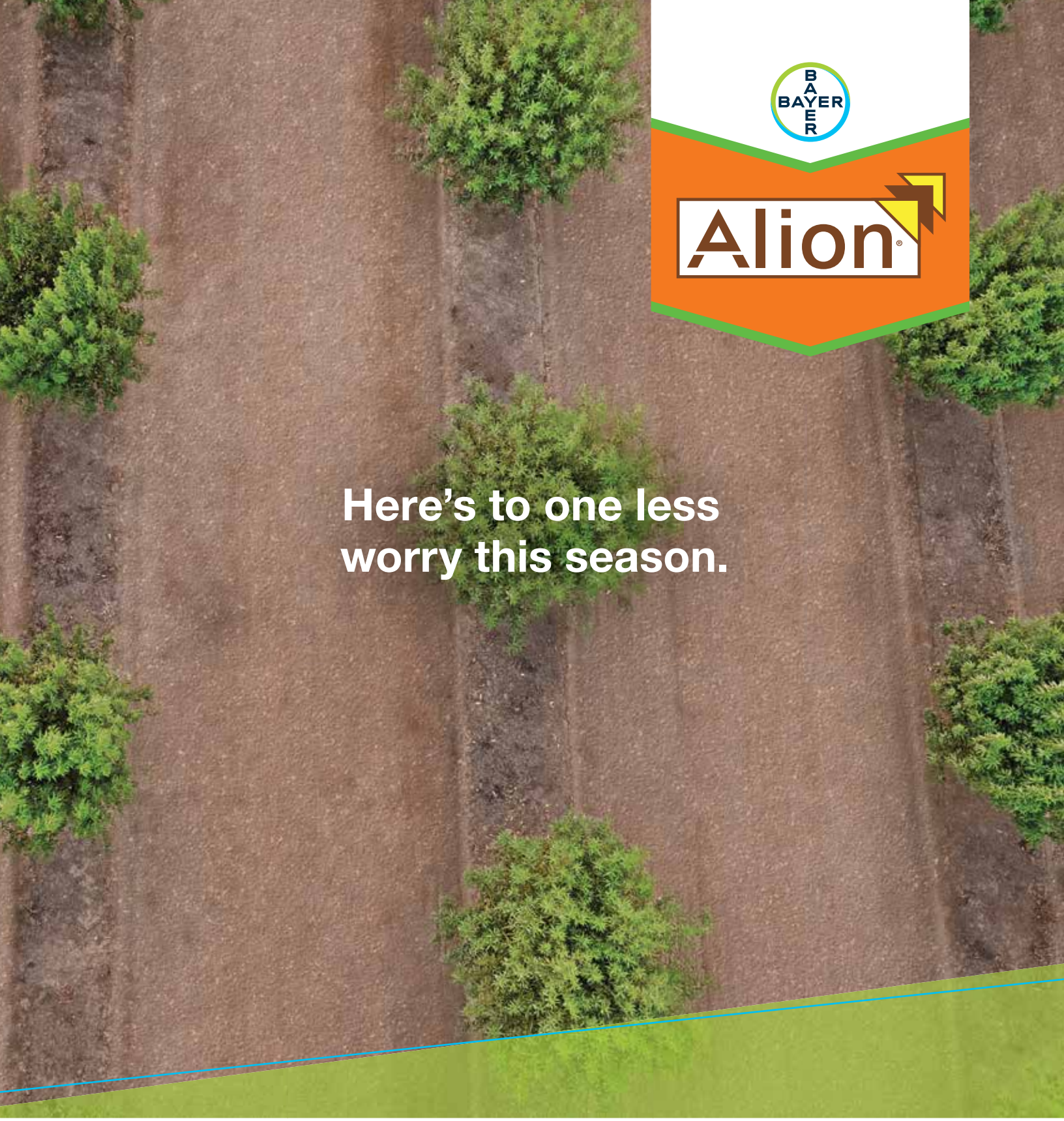

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