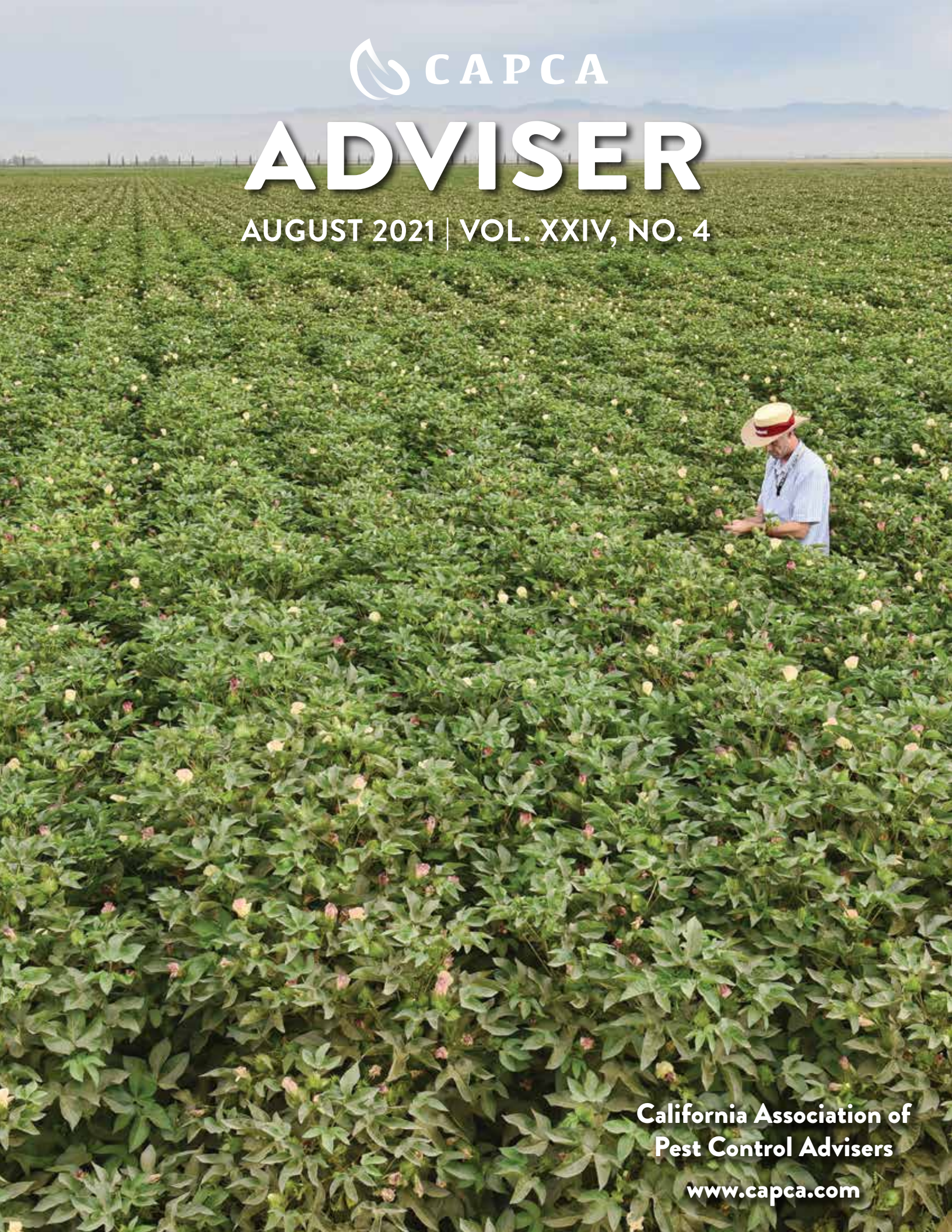

CAPCA

ADVISER

AUGUST 2021 | VOL. XXIV, NO. 4

California Association of
Pest Control Advisers

www.capca.com

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[1]*Source: BRANDT Field Trials 2016-2018*

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Photo, this page: J. McNutt

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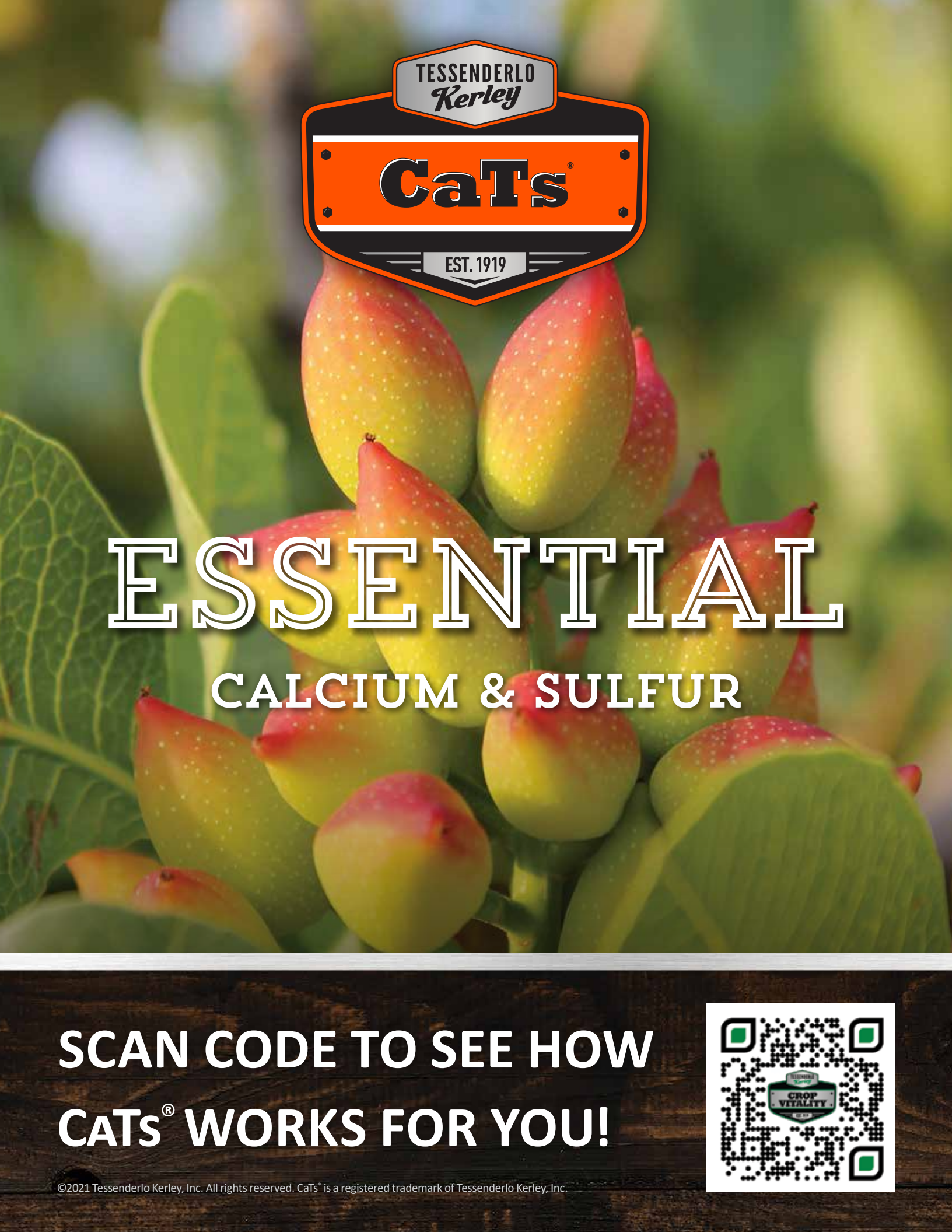

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CAPCA
AT THE CENTER OF PLANT HEALTH

CAPCA Continues to Expand Engagement Opportunities for Members

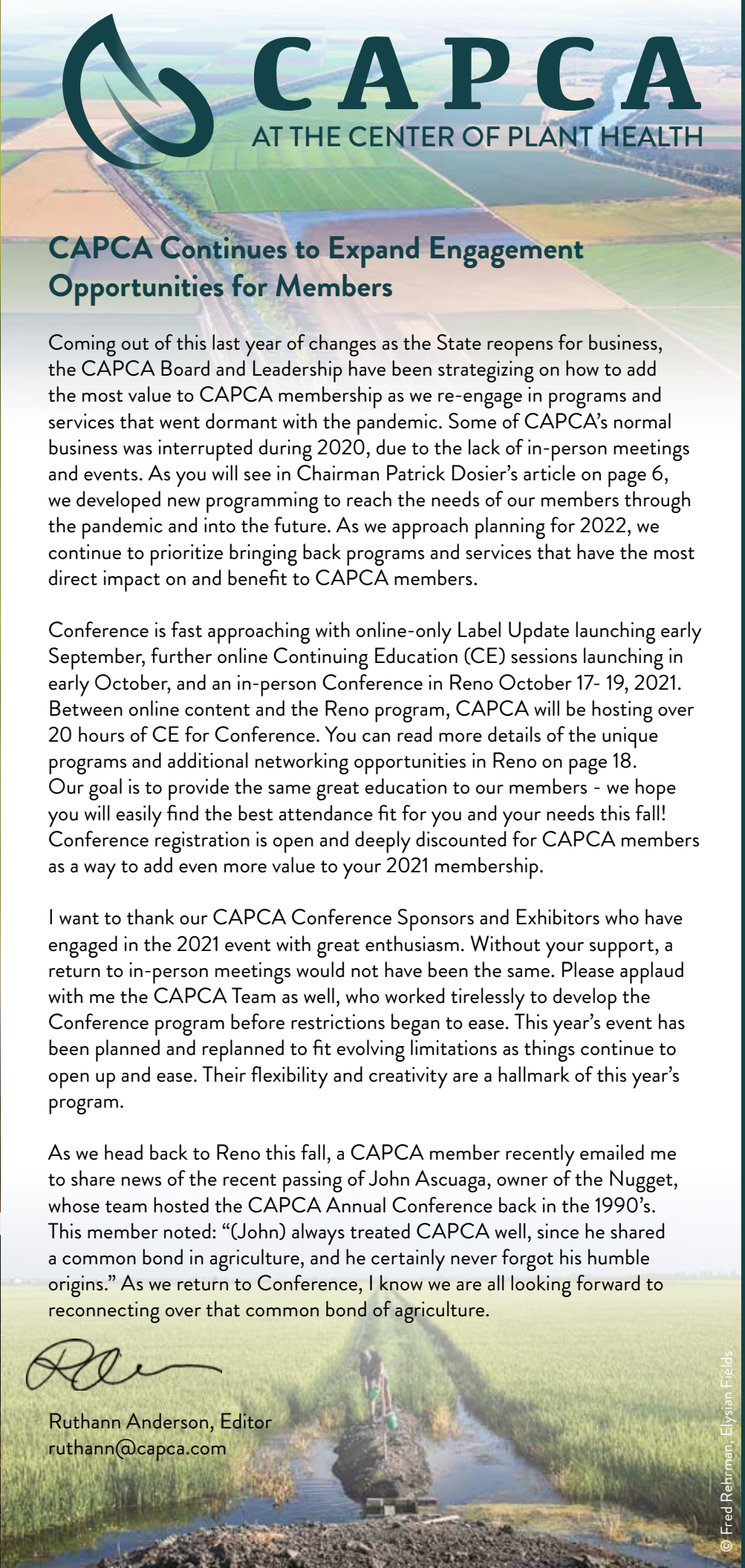
Coming out of this last year of changes as the State reopens for business, the CAPCA Board and Leadership have been strategizing on how to add the most value to CAPCA membership as we re-engage in programs and services that went dormant with the pandemic. Some of CAPCA's normal business was interrupted during 2020, due to the lack of in-person meetings and events. As you will see in Chairman Patrick Dosier's article on page 6, we developed new programming to reach the needs of our members through the pandemic and into the future. As we approach planning for 2022, we continue to prioritize bringing back programs and services that have the most direct impact on and benefit to CAPCA members.

Conference is fast approaching with online-only Label Update launching early September, further online Continuing Education (CE) sessions launching in early October, and an in-person Conference in Reno October 17- 19, 2021. Between online content and the Reno program, CAPCA will be hosting over 20 hours of CE for Conference. You can read more details of the unique programs and additional networking opportunities in Reno on page 18. Our goal is to provide the same great education to our members - we hope you will easily find the best attendance fit for you and your needs this fall! Conference registration is open and deeply discounted for CAPCA members as a way to add even more value to your 2021 membership.

I want to thank our CAPCA Conference Sponsors and Exhibitors who have engaged in the 2021 event with great enthusiasm. Without your support, a return to in-person meetings would not have been the same. Please applaud with me the CAPCA Team as well, who worked tirelessly to develop the Conference program before restrictions began to ease. This year's event has been planned and replanned to fit evolving limitations as things continue to open up and ease. Their flexibility and creativity are a hallmark of this year's program.

As we head back to Reno this fall, a CAPCA member recently emailed me to share news of the recent passing of John Ascuaga, owner of the Nugget, whose team hosted the CAPCA Annual Conference back in the 1990's. This member noted: "(John) always treated CAPCA well, since he shared a common bond in agriculture, and he certainly never forgot his humble origins." As we return to Conference, I know we are all looking forward to reconnecting over that common bond of agriculture.

Ruthann Anderson, Editor
ruthann@capca.com



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

PUBLISHING INFORMATION
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PRINTING:
Sundance Press
Tucson, Arizona

CAPCA.com gets a BIG upgrade!

Patrick Dosier, CAPCA Chair; patrick.dosier@gmail.com

CAPCAce.com was launched last year within a very short development timeline. We used "off the shelf" software, "glued it together" with minimal customized software, and launched in time to have a great virtual 2020 Conference. This was no easy feat and the CAPCA staff, along with our vendors, delivered excellent results. However, as with anything subject to time constraints and resources – this online experience is not as efficient and user-friendly as we wanted.

That is why we are excited to begin rolling out the new and improved CAPCA.com experience! Members will now go to one place and have a single dashboard where they have seamless access to all things CAPCA:

- Member Newsfeed with exclusive content. Soon this will be customizable by your membership preferences.
- See your CAPCA Membership status at a glance and download your Official CE Hours Certification.
- Coming Soon: Online CE Upgrades
  - Online CE content will be accessed seamlessly via CAPCA.com. No more navigating to multiple sites!
  - Simpler, more intuitive, and more flexible navigation for CE content viewing. Courses like Label Update can be viewed in the order attendee chooses and CE credit will be assigned once the full course is complete.
- Access to receipts for all your CAPCA purchases.
- Coming soon: Status icons for completion of Online CE Hours purchased, as well as hours-to-complete for renewal.
- Better presentation of sponsors' logos and advertisements, and better analytics for these ads.

All of this will be accessible directly from CAPCA.com, under one website, one shopping cart, and one login!

In addition to these outward facing benefits, the software will also greatly decrease CAPCA's cost of online CE content creation and will decrease our long-term software maintenance costs.

Please recognize the support of the CAPCA Board and our CEO in making this valuable investment. We believe it will make our Members' virtual experience much more enjoyable. This project is being led by Kent Hinson, CAPCA's Director of Engineering and Technology, who is managing a third-party team of accomplished software engineers located in Rancho Cordova, CA.

In reality, this has been a project a long time in the making. I remember serving on Gary Silveria's CAPCA Forward Committee back in 2014. Many of these forthcoming features were first defined when the, then youthful, committee members said "CAPCA needs an app!" ■

Perceptions, facts and politics

George Soares, Kahn, Soares & Conway

Perceptions unchallenged by facts allow perceptions to become facts which in turn can distort political reasoning. The already messy process of governance becomes less productive, and the public becomes increasingly disenchanted with the process. There is risk of this dynamic every day in Sacramento as ideas spin through the Legislature, Governor's office and dozens of administrative agencies. That's why CAPCA is there every day, keeping a watchful eye on proceedings and inserting facts into debates to affect the best possible outcome.

The following examples—one affects water supplies and the other relates to pesticides—impact the work of PCA's and provide a look into the workings of government.

In 2014 Governor Brown signed into law the Sustainable Groundwater Management Act (SGMA) that would for the first time in California, regulate pumping of groundwater to prevent aquifers from further imploding. The goal was laudable, but construction of the law was a terribly flawed, one dimensional approach to a two-dimensional problem.

The need for urban and agricultural water supplies was increasing while SGMA would, within a few years after its adoption, reduce pumping and thereby reduce water supplies to large and small communities and farms. The obvious missing provision in the legislation was expansion of surface water opportunities to compensate for SGMA reductions. More surface water storage and recharge, expanded infrastructure to move water, and correcting canal subsidence occurring along the California Aqueduct and elsewhere were essential but left out of the law. So were protections for disadvantaged communities and a secure food supply for 40 million California residents.

The reality of need was pushed aside by perceived political considerations and the dye was cast. Now, in 2021, government is scrambling to correct what it knew in 2014 but didn't address because perceptions and the resulting vote count in the Legislature dictated otherwise.

The Department of Pesticide Regulation (DPR) provides another timely example equally close to home for CAPCA members but with a better outcome.

In summary, earlier this year DPR made a tactical error by urging industry to increase taxes it and other users pay on pesticide purchases (mill tax) before justifying the need and before explaining DPR's performance on issues critically important to all in the private sector who were expected to write the checks. The ask was $45 million more in funding to erase DPR's deficit and to fund new programs well beyond its statutory mission and of questionable merit. Further, DPR was looking to make it happen in the midst of the COVID pandemic with about half coming from farmers, and the remainder from household products, hospitals, schools, childcare centers, restaurants and many others.

To lessen the impact on some, the tax increase would have been tiered so that higher mill taxes would be charged for purchases of higher risk pesticides. The flawed assumption, of course, was that purchasers would abandon what works and move to less efficacious products (assuming any such products were available in the marketplace) to save a relatively few dollars while jeopardizing massive investments in crops and public safety. DPR's only counter was to state that "this kind of investment will make for a safer and more sustainable environment generally" without any facts to support the assertion.

This came at the same time that DPR was struggling to get the trains to run on time...so to speak. For instance, untimely licensing of PCA's and many other groups had become the norm; an electronic system to expedite registering pesticides had dragged on for years with little accomplished; cancellation of efficacious products was happening prior to approval of new technology; and questionable data was being used to support air quality restrictions and greatly expanded notice of pesticide use.

Thanks to CAPCA and colleague organizations, the facts became so well known and compelling that unfounded perceptions fell to the side; policy and politics began to join hands; and within a couple of months the Legislature and

Governor agreed to scrap the ill-conceived tiered mill tax and dropped the idea of increasing the mill tax this year. Instead, the 2021-2022 State Budget will fund various DPR programs with tax dollars such as pest management research and alliance grants, ecosystem monitoring, and also use significant tax dollars to retain a consultant to study the mill tax tiering system.

Beyond the uncertain merits of these programs, the concern is mission creep. New programs are funded, people are hired, contracts are issued and within a year or two the programs are institutionalized as if they existed when DPR was formed in the 1990's. Knowing this reality, CAPCA and several other groups with a vested interest have formed an ad hoc group to monitor these and other DPR activities and ask the questions that need answering before government does what it often tries to do—shift the cost of its creation to the private sector which, in this instance, would mean more taxes. ■




2021 License Renewal

Crystelle Turlo, Chief Operations Director

License renewal season is almost here. DPR started sending renewal packets in June to all license holders that do not need continuing education hours to renew and also those who have already obtained their 40 hours. In July, all others should expect to see their renewal packet in the mail. If you do not receive your renewal packet, remember that you can print the necessary paperwork from the DPR website. DPR is suggesting that PCAs submit their renewal packet by October 1st so that you can receive your license by the end of the year.

Ready to renew? Get ahead of the line and don't wait on your Official CE certificate to come in the mail. PCA's that are also Active CAPCA members can easily access their CE hours at any time and print an Official CE certification from their dashboard at CAPCA.com. Need a little help accessing your dashboard or have a technical question about our website? For a fast response, please email support@capca.com.

Did you take CE courses and they are not showing up on your Official CE Certificate? When that happens, it can be because the sponsor has chosen not to report the hours.

Unfortunately, when a sponsor does not report CE hours, it causes more work for you, the PCA. Now you need to track those few individual CE hours. This can be time consuming and frustrating if you don't remember all the details of the course you had taken. There is now a simple solution to this problem. When looking or signing up for continuing education, keep an eye out for the mark above. When you see this mark, you know that the hours that you are taking will be reported and tracked on your Official CE cert.

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 seven 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. ■

Photo: J. McNutt

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY • DEPARTMENT OF PESTICIDE REGULATION

Early Renewal REMINDER

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

AVOID PROCESSING DELAYS

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

SUBMIT BY OCTOBER

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

HAVE QP RENEW EARLY

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

California Environmental Protection Agency
dpr Department of Pesticide Regulation

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

2021 Renewal Information for DPR M-Z License and Certificate Holders

Dates for Renewal

DPR encourages submitting completed renewal applications to DPR by October 1, 2020 to best ensure you receive your new license/certificate before the New Year.

Processing time is 60 days for applications with payments processed by November 1. Applications received after November 1 may experience a longer processing time and you may not receive your license/certificate by January 1. You cannot legally work without a valid license/certificate.

Note that submitting your renewal before October will ensure you have your license/certificate by early December and allow you to renew with the County by the New Year.

Address Changes

Always notify DPR in writing immediately of any address or name changes. When emailing DPR it is best to include your full name (First MI Last) or business name as well as your DPR License or Certificate Number.

Mailing of Renewal Packets

DPR is mailing renewal packets in August to provide sufficient time for license and certificate holders to submit their applications by October 1. Renewal applications must be postmarked on or before December 31, or a late fee applies.

If you did not receive your renewal application or misplaced it, download a renewal packet from DPR's website.

Qualified Person for Business

Business applications are held until the Qualified Person's license or certificate has processed. It is best to submit the Business and Qualified Person's individual application by October to allow time to register with the County before the New Year.

Individual License and Certificate Renewal

The following forms will be included in the renewal packet:

- Renewal Application DPR-PML-141
- License/Certificate Renewal Information
- CE Records Renewal Summary DPR-PML-123
- Visa/MasterCard Transaction DPR-105

Renewal applications need to be signed and must include the required CE records summary and correct fee.

Check Your Renewal Status on DPR's Valid License Web Page:

Continuing Education

You must retain copies of your CE records for three years. DPR may request copies of your CE records to audit at any time. DPR does not track CE hours for individuals.

Submit the CE Records Renewal Summary, DPR-PML-123 or a summary record of CE attendance from a third party professional association.

Your CE records must include:

- License/Certificate Holder's Name
- License/Certificate Number and Type
- Course Location
- Course Title
- Course Date
- DPR Course I.D. Number
- Course hours attended for each CE category
- Name of instructor or sponsoring organization
- Your Signature

General Information about CE Courses

DPR-approved CE hours must be obtained during the valid period of the license or certificate. The valid period is listed on the license or certificate (from the 'date of issue' until the 'valid through' date). No grace period is given to obtain CE hours. No CE hours can be carried over to the next renewal period.

If renewing multiple licenses or certificates, you only need sufficient CE hours to meet the license/certificate with the most CE hours required.

Questions about your CE hours?

For questions about your CE hours, you must contact the course sponsor or your professional association. See DPR's website for current or previous years' courses and sponsors' contact info.

DPR Electronic Mailing List

Sign up for important information and updates from DPR about Licensing and CE.

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

License or Certificate Type	DPR Staff Contact
General Questions	LicenseMail@cdpr.ca.gov
Pest Control Advisers (PCA)	Rebecca Olson Rebecca.Olson@cdpr.ca.gov
Qualified Applicator License/Certificate (QAL/QAC)	Ashley Maderos Ashley.Maderos@cdpr.ca.gov
	Robin Caserta Robin.Caserta@cdpr.ca.gov
Pest Control Businesses	**Alpha: A-D, S-U, W-Z** Regina Maglia Regina.Maglia@cdpr.ca.gov
	Alpha: E-G, M-O Heather Allen Heather.Allen@cdpr.ca.gov
	Alpha: H-L, P-R, V Elizabeth Dummert Elizabeth.Dummert@cdpr.ca.gov
Pilots Manned and Unmanned (APC/JPC/Vector)	Shernee Tousant Willie.Tousant@cdpr.ca.gov
Dealer Designated Agents (DDA)	Elizabeth Dummert Elizabeth.Dummert@cdpr.ca.gov

Ag Commissioner Profile: Melissa Cregan

By CAPCA Staff

Melissa Cregan has served as the Fresno County Agricultural Commissioner for a little over two years, and 20 years with the Ag Commissioners' offices in Fresno and Madera Counties. She graduated from the University of California, Davis in 2001 with a Bachelor of Science degree in Animal Science. She serves as the public member on the Citrus Research Board, and as a member for the Fresno State Transportation Institute Advisory Board.

She grew up in the Chico area of Butte County surrounded by agricultural fields and cow/calf operations and, while her family was not directly involved in agriculture, her experiences growing up gave her a start in the industry. "I participated in 4-H and raised market hogs and steers to sell at the Silver Dollar Fair. In college I had jobs at the campus feed mill and also worked on some research projects caring for study animals, including goats and pigs."

After college, her first job was with Madera County as an Agricultural and Standards Inspector. She spent over 10 years with the County, eventually becoming the Deputy Agricultural Commissioner overseeing the pesticide regulatory program. In late 2012, Cregan was hired by Fresno County as a Deputy Ag Commissioner and transitioned to overseeing the exotic pest exclusion/detection and export programs. Six years later she was promoted to Assistant Agricultural Commissioner. The following year, in 2019, she was appointed Agricultural Commissioner and Sealer of Weights and Measures for Fresno County.

Asked what the role of Agricultural Commissioner in her county entails, Cregan responded, "Simply put, the purpose of the Ag Commissioner's Office is to promote agriculture and a fair marketplace through equal enforcement of laws for the protection of society and the environment." She explains that her office is the local regulatory agency responsible for carrying out various activities that fall within 11 different agricultural program areas. "In Fresno County, our largest program areas are export services, pesticide regulatory, and exotic pest detection/exclusion. As a local government agency, we also are designated as disaster service workers. In the past year this has meant distributing PPE to protect agricultural workers from COVID-19 and wildfire smoke, providing for the care and shelter of livestock during the Creek Fire, and assisting other county departments impacted by staffing shortages due to the pandemic, such as providing staff to assist with contact tracing and the November election."

Painting the picture of agriculture in the county, Cregan points out, "Fresno County's agricultural

Left: Canine Soya and a shipment of produce intercepted at a parcel carrier

Above: Deputy Agricultural Commissioner Mario Reeves unloading animals displaced by the Creek Fire.

strength is based on the diversity of crops produced." She highlights that in 2019 the county's farmers and ranchers produced over 300 different commodities, 78 of which have a gross value in excess of $1,000,000. "Our top crops include almonds, grapes (raisins, table, and crush), pistachios, citrus, poultry, stone fruit, milk, garlic, cattle, and tomatoes." Acknowledging the concerns for agriculture, Cregan says that they are often in areas which she has no authority or direct regulatory role. This is, in fact, one of the most challenging parts of her job: "The County Ag Commissioner has many well-defined legal mandates, but we are also expected to be aware of all the challenges and conditions affecting agriculture that we do not have legal mandates or authority to regulate, such as water, air, and labor issues. We are often asked to comment or get involved in these issues and I try my best to stay in my lane and refer people to the appropriate contact who can assist." She works hard to keep up on the myriad of issues facing agriculture, as well as manage a staff of 95 employees.

Discussing the relationship that she and her staff have with CAPCA and local PCAs, Cregan notes that her staff issuing pesticide permits and reviewing notices of intent frequently interacts with PCAs, and the pesticide division supervisor and/or deputy attends local CAPCA Chapter meetings to provide updates on regulatory issues. Her staff often presents at CAPCA's continuing education seminars, and this past year collaborated with CAPCA and industry to host a successful Spray Safe event. Cregan says, "Planning and hosting annual Spray Safe events would go a long way to increasing collaboration opportunities." When asked if there is an issue that would be good for the Adviser's readers to be reminded of, she responded, "I always remind growers and businesses to make sure they communicate the importance of safety to their employees. Don't assume they know. They need to be told it is ok to slow down and make sure the application or work area is safe. Often, in investigations of pesticide-related incidents, employees express an urgency to finish a job, which led to mistakes that caused the incident. Or, they saw a hazard, but were afraid to stop an application. They need to know they won't get in trouble for prioritizing safety, and they need to have someone they can contact for help or guidance when they see a hazard."

Cregan is also keen to see the industry get the recognition it deserves: "It is important for Ag to tell their story. Every day I see a network of farmers, ranchers, and industry professionals working together to ensure the delivery of the safest agricultural products all across the U.S. and the world, while managing the ground and protecting its viability for generations. For the most part, this is done quietly, without a lot of people patting themselves on the back, so it goes largely unnoticed by the consumers. Unfortunately, the ones who are telling the story are continuously attacking agriculture with false narratives that are taken as fact and re-shared on social media."

In spite of challenges and difficulties, there are noteworthy moments and accomplishments as well. Asked about a career highlight, Cregan says: "Being able to assist the residents of Fresno County displaced by the Creek Fire has been the most personally rewarding. Being from the Chico area, the 2018 Camp Fire destroyed homes of many family and friends, so I know firsthand how devastating it is to lose an entire community to a disaster. Being able to provide a safe place for the community to be able to bring their displaced animals and livestock and to see the relief on the owners' faces was rewarding. While not a personal accomplishment, it was inspiring to see the different county agencies come together with community organizations on a moment's notice to help the community get through and recover from the biggest fire in California history." ■

PROTEUS Inc. mask distribution event, September, 2020

CAPCA 47th ANNUAL CONFERENCE & AGRI-EXPO

CAPCA 2021 Annual Conference Registration is Now Open!

Annual CAPCA Conference & Agri-Expo

Continuing to address the needs of our members and community concerns, CAPCA has developed both virtual and in-person opportunities to participate in our annual conference.

Registration options are available for both online CE and a networking-focused event in Reno, NV. https://capca.com/conference

The Label Update session of CAPCA's 47th Annual Conference with CE will be a virtual program only - online, on-demand. This will be made available to attendees beginning September 1, 2021 through the end of October.

Agri-Expo and Networking event in Reno will include limited, additional CE programming. Watch our website for amended program at *https://capca.com/conference/*

Attendance will be limited based on CDC, State, and restrictions observed by the facility. Pre-registration will be required. **No on-site registration will be accepted.**

CAPCA Conference CE Approved!

21.5 Total DPR Hours have been secured. Be sure to register for BOTH the Reno Event AND Full Online Program to Access all 21.5 DPR Hours + CCA Hours.

RENO EVENT

October 17-19, 2021 | Reno, NV
7.5 DPR Hours Approved | CCA, ISA, GCSAA, AZ, NV, WA, OR, ID pending
Additional hours may become available through sessions hosted by sponsors & exhibitors.
Attendance will be limited, based on CDC and State restrictions observed by the facility. Pre-registration is required; NO ON-SITE REGISTRATION ACCEPTED.

FULL ONLINE PROGRAM

September & October 2021
14.0 DPR Hours (4.5 Laws & 9.5 Other) | CCA hours pending
Full Online Program registration includes: General Sessions, Breakout Sessions, Nitrogen Management Update & Label Update

LABEL UPDATE-ONLY

September & October 2021
4.0 DPR Laws Hours | CCA hours pending
Looking for a small number of CE hours in Laws? Register for the Label Update-Only to access online, on-demand beginning in September. (No Label Update Session will be held in Reno)
EARLY REGISTRATION ONLY THROUGH 8/27/21 | 2021 MEMBERSHIP DISCOUNTS AVAILABLE*

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

Photo by CAPCA member, M. Jeffries

CAPCA CONFERENCE 2021

CONTINUING EDUCATION ONLINE PROGRAM

Available On-Demand, September–October, 2021

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

MICHAEL CAHN
Helena Chemical

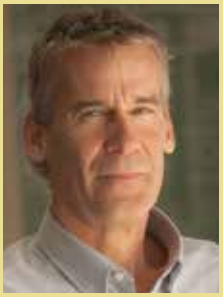
Assessing and Managing Salinity

SCOTT OCKEY
Certis USA

Induced Resistance Technologies in Agricultural Production

MICHELLE MOYER
Washington State Extension

Powdery Mildew Biology and Control in Grapes



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

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

NICK CLARK
Helena Chemical

Nutrient Management in Forage Crops

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

Spotted Lanternfly: Risk areas in California and Current Management Options

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

CACASA Update

DAVID HAVILAND
Farm Advisor, Cooperative Extension Kern County

New innovation in IPM - Navel Orangeworm BMPs

BEN FABER
UC Cooperative Extension

Who's Afraid of Avocado Root Rot?

ALEX PUTMAN
UC Riverside

Soilborne Diseases of Strawberry: Precision Fumigation and Impact of Irrigation

Additional CE in Nitrogen Management will also be included.

Annual CAPCA Conference & Agri-Expo

CAPCA CONFERENCE 2021 ONLINE CE PROGRAM PRESENTERS

BRAD HANSON
UC Davis

Current Weed Management Issues and Control Strategies

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

Phytophthora in California: Beyond Sudden Oak Death

DANIELLE KIRKPATRICK, PH.D.
Trécé

Comprehensive Almond Insect Management

JIM ADASKAVAGE
UC Riverside

Efficacy Data for Conventional Practices and Associated Diseases

ROB SCHERZINGER, Aspen Helicopters & CAAA Chairman
KEVIN MISKEL, Aspen Helicopters, Pilot

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

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

Pesticides in the Orchard 2025

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

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

JOHN PALUMBO
Extension Entomologist, University of Arizona

Insect Management for Fall Produce

JHALENDRA RIJAL
Area IPM Advisor, University of California Cooperative Extension

New Innovation in IPM - Leaffooted & Stink Bugs BMPs

MARGARET LLOYD
UCCE Small Farm Advisor, Yolo County

Nitrogen Budgeting with Organic Sources

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Newsom and lawmakers continue to negotiate budget details

Brad Hooker, Agri-Pulse

Gov. Gavin Newsom and legislative leaders passed a final budget plan ahead of the Governor's July 1 deadline. While the budget bill "Junior," as it is known, adds to the budget framework approved earlier in June, many details relating to agriculture are still to be negotiated. More than 100 trailer bills are expected to further refine the budget bills throughout the summer, signaling the extraordinary challenge in negotiating a record $262.6 billion budget within a shortened timeframe due to the pandemic.

The two branches have been wrangling over details for an expansion on healthcare for undocumented immigrants—which could benefit some farmworkers—as a well as a raise for childcare providers.

With farm policies, a sticking point has been Newsom's proposal for overhauling the pesticide mill assessment. With heavy industry opposition, the Senate Budget Committee shot down the idea and the budget bill junior reflects this. The agreement with Newsom does, however, include $500,000 for hiring a consultant to study the proposed tiered mill approach based on pesticide toxicity.

The Department of Pesticide Regulations (DPR) has also been facing a structural budget deficit due in large part to extensive growth in programs and staff. The mill assessment, which makes up the bulk of its revenues, was last increased about 20 years ago. The agreement provides about $9 million to address the deficit.

The budget also includes $10 million to fund a statewide pesticide notification network. DPR plans to publicly post notices ahead of applications to a website and send push notifications to interested individuals. DPR has elevated this as one of its highest priorities.

Another $3 million will fund pest management research grants and $1.4 million will go to pest management alliance grants, while the Department of Food and Agriculture gains $3.8 million for integrated pest management grants. The department will cover ecosystem monitoring with another $500,000 in spending.

DPR hopes to upgrade its registration system from an outdated and time-consuming paper-based process to a digital format, adding another $5 million to its budget spending.

Policy advocates for agriculture and for chemical manufacturers have strongly opposed the two years of bridge funding for pesticide air monitoring network and other new or expanded programs.

"We have serious concerns with growing the department's budget by 40% without including any accountability measures," said Nicole Quiñonez, a policy advocate for the Household and Commercial Products Association, during a budget subcommittee hearing in May. "In two years, we anticipate being back here and asked to pay 50% of the staff in the increased budget."

More details are likely to come on funding for pollinator habitats. In his May revision of the budget proposal, Newsom added $20 million for the Conservation Agriculture Planning Grant Program within CDFA, which would support pollinator habitat, nutrient management, soil health and irrigation water management.

Newsom also pushed for $100 million for CDFA's Healthy Soils Program. The latest budget bill cuts that down to $50 million, which is still nearly double the spending Newsom first proposed in January. First Partner Jennifer Siebel Newsom and billionaire hedge fund manager Kat Taylor, a friend of the Newsom family, have played prominent roles in boosting the program among lawmakers.

A bill in the Senate, meanwhile, would encourage farmers to provide forage and habitat for pollinators through $5 million in incentives grants.

"Without honeybees there would be no almonds," said Almond Alliance President Elaine Trevino during a recent hearing on the legislation. "Working land offers an opportunity to expand habitat and forage for pollinators, which helps sequester carbon and contribute to climate risk reduction."

The bill's author, Assemblymember Carlos Villapudua of Stockton, said the measure aligns with Gov. Gavin Newsom's 30x30 order to conserve 30% of the state's land and coastal waters by 2030 in an effort to promote biodiversity.

The bill is also in coordination with a new public-private partnership known as the California Pollinator Coalition, which is bringing the industry, the Newsom administration and conservation groups together to establish more on-farm habitat. The measure has passed several policy committees in both houses.

The budget also includes funding to create a reference library for California insects based on DNA barcodes, tagging new and existing specimens from the Central Valley and other agricultural regions.

Budget negotiations will continue as DPR faces a leadership vacuum for its top two posts. After months of rumors, DPR Director Val Dolcini officially resigned in July to return to Washington. D.C. Chief Deputy Director Jesse Cuevas left his role in May to lead the Assembly's Accountability and Administrative Review Committee. And after serving less than a year, DPR's communications director has left the department and is now with the Delta Stewardship Council.

Dolcini made it a personal goal to establish a new pesticide notification system, after unsuccessfully pushing the county agricultural commissioner to adopt a local system for Fresno County. Dolcini has also led the charge on setting new limits on the use of the fumigant 1,3-D and reviewing a set of controversial neonicotinoids for further mitigations. Filling the leadership void is DPR Assistant Director Karen Morrison, an environmental scientist who has worked at the California Environmental Protection Agency since 2014, including three years at the recycling department. ■

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Targeted weed management can reduce risk of silverleaf whitefly infestation on melons

Apurba Barman, Area IPM Advisor, University of California Statewide IPM Program and Cooperative Extension Imperial, Riverside, and San Diego Counties

The Coastal Plains of Georgia and the Imperial Valley of California are far apart geographically and weather wise. These areas are somewhat similar with both producing vegetable and fruit crops such as melons, broccoli, cabbage, onions and lettuce. My personal experiences in both locations have also noted a significant difference between the two regions in the amount of precipitation received, which greatly influences the abundance and diversity of overall plant species in the landscape that can serve as hosts for various pest insects. One such insect is the silverleaf whitefly (*Bemisia tabaci*), a common and persistent pest in both regions.

The silverleaf whitefly is an insect pest with piercing-sucking mouthparts. Adults are small (0.8 to 1.2 mm in length) with a light-yellow colored body and white wings. There are four immature stages, which are translucent to light yellow in color with an oval shaped body. Silverleaf whiteflies feed and reproduce on more than 600 host plants including many cultivated crops as well as weed species from multiple plant families. It is practically impossible to eliminate silverleaf whitefly populations in the landscape as a number of host plants are available at any given time of the year.

Besides host plants, silverleaf whitefly population dynamics are also influenced by the ambient temperature. In areas that experience cooler winters (with freezing temperatures) such as the Coastal Plains of Georgia, silverleaf whitefly populations first tend to build up during late May to the early part of June. In Imperial County, winter daytime temperatures could still be in 70's and silverleaf whitefly populations are found in cole crops such as cabbage and lettuce even early in the calendar year. This past winter, silverleaf whiteflies were observed infesting cabbage crops during early February. In the low desert areas of California and Arizona, silverleaf whiteflies have been a constant threat to the production of cucurbit crops and require timely efforts to keep the pest populations under control (Fig. 1).

Understanding the how and when the initial whitefly infestations start in a melon field is critical for later management decisions and successes. There are at least three possible ways how this initial infestation could start: 1) Seedlings are already infested in the nursery, 2) Whiteflies moving from the available weeds in the field margins and

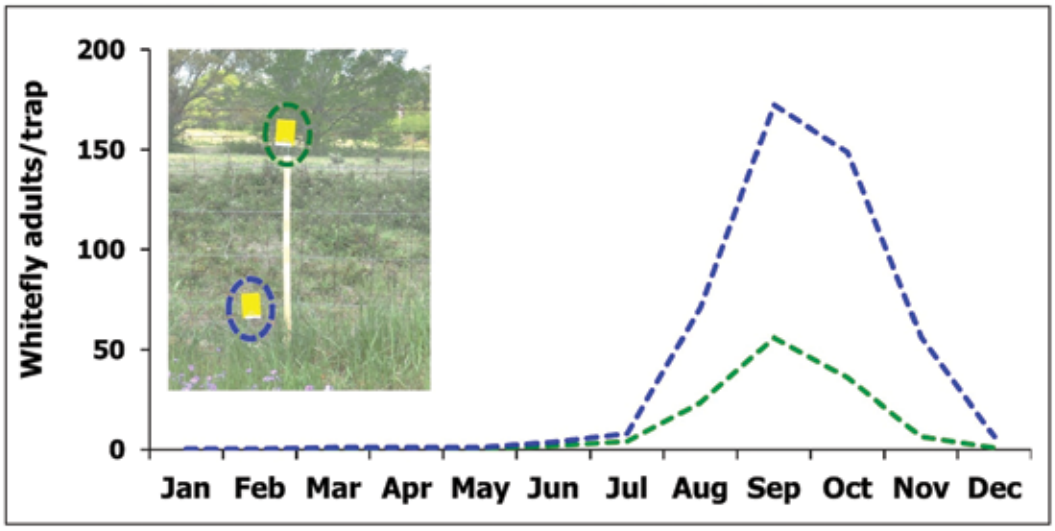
Figure 1. Silverleaf whiteflies on the underside of melon leaves. Credit: Apurba Barman, UC IPM.

3) Whiteflies dispersing from nearby crops that are either harvested or destroyed. These potential infestations may happen individually or in combinations. If melon seedlings are used, they should be treated in the nursery for different pests and diseases and are most likely free of whitefly prior to transplanting, but need to be checked to be certain. Dispersal from field margins and nearby crops may occur at the same time or at different times during the life of the crop.

Research conducted in the Coastal Plains region of Georgia documented seasonal whitefly population dynamics using yellow sticky traps placed in 125 different locations represented by 24 southern Georgia counties during 2018 and 2019. The research results clearly indicated that in most cases silverleaf whitefly populations were much more likely to disperse from field margins rather than moving from nearby crops in large numbers. The yellow sticky traps were placed at two different heights, one just above the ground and another in about 4.5 feet above the ground (Fig. 2). The traps placed just above the ground consistently captured more silverleaf whiteflies as compared to the traps placed at 4.5 feet above the ground level. These height-dependent silverleaf whitefly captures recorded from multiple locations and in multiple years confirmed that silverleaf whitefly individuals generally disperse at low heights and are facilitated by the presence of available vegetation. The massive dispersal of silverleaf whitefly individuals occasionally seen at various times of the year is not the most common method of dispersal. The captures on traps placed at 4.5 feet above the ground were always lower than the traps placed at ground level (Fig. 2).

As dispersal of silverleaf whitefly appears to be highly localized and associated with vegetation during the early stage of crop infestation, focus needs to be placed on plants around the field, especially the available weed species. Among the various weed species that exist in the field margins or in the undisturbed areas of the field, it is likely that some of those weed species are already harboring silverleaf whitefly populations and could be the potential source of the initial pest population to infest the crop (Fig. 3). Once established, silverleaf whitefly can quickly multiply into greater numbers and eventually the entire field could get infested. To reduce the chance of this initial infestation, focusing on identifying and managing those weeds, which are the favorable hosts of silverleaf whitefly is a prudent strategy. By reducing silverleaf whitefly numbers going into the melon field in the early stage of the crop development, it should delay the build-up of the pest population and reduce the number of necessary insecticide applications.

Figure 2. Silverleaf whitefly captures differed with the trap height, 2019, Costal Plains of Georgia. Credit: Apurba Barman, UC IPM.

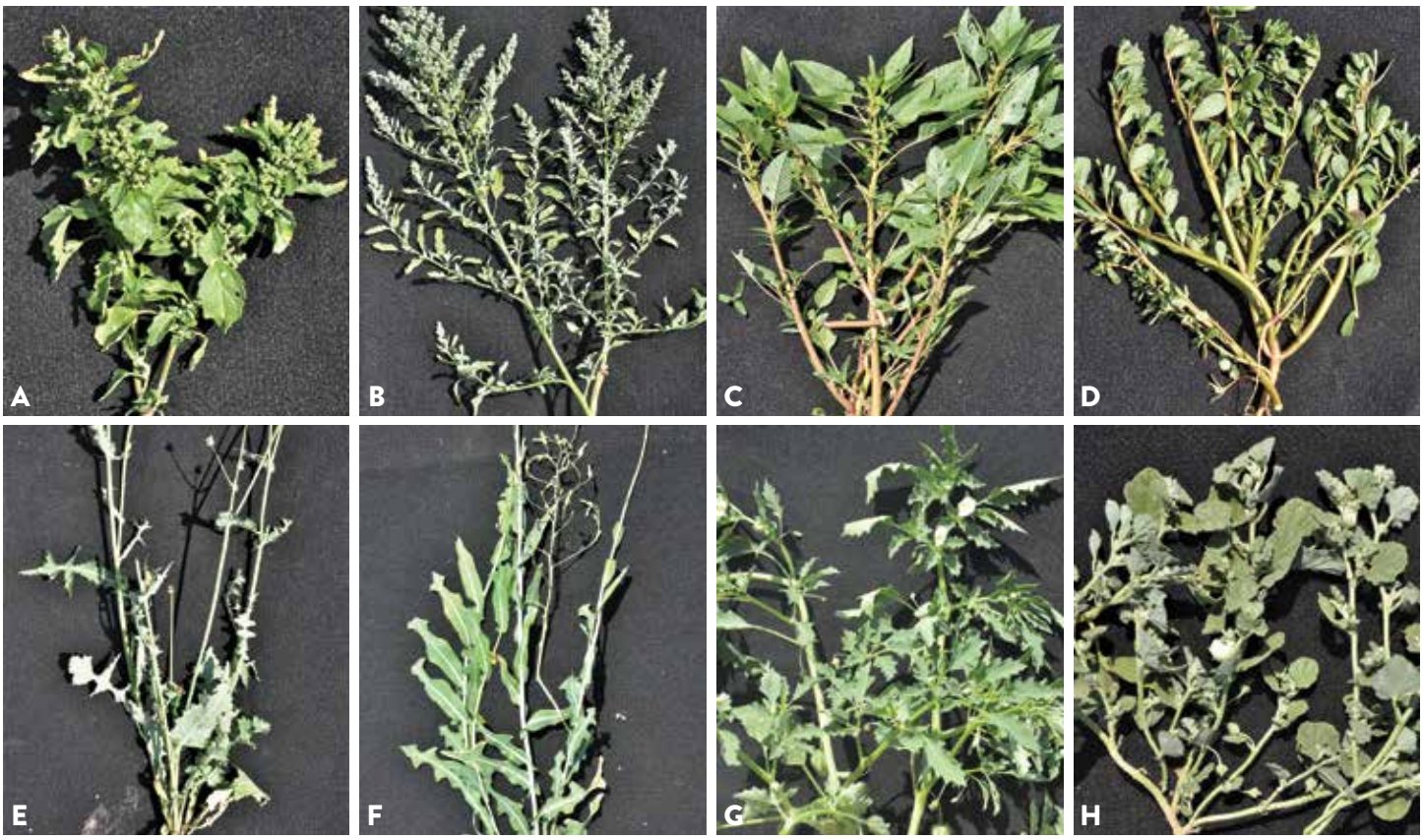


One aspect of vegetation management is that not all weed species are host plants for silverleaf whiteflies. There are only few weed species requiring one's attention in the Imperial Valley in order to reduce the risk of initial events of infestations in their melon crops. Thorough examinations of several common and abundant weed species during the spring and summer noted that sowthistle (*Sonchus oleraceus*), prickly lettuce (*Lactuca serriola*), Wright's groundcherry (*Physalis acutifolia*) and alkali mallow (*Malvella leprosa*) usually support silverleaf whitefly populations (Fig. 4). Nettleleaf goosefoot (*Chenopodium murale*), common lambsquarters (*Chenopodium album*) and pigweed (*Amaranthus* spp.), and common purslane (*Portulaca oleracea*) tend not to support whitefly populations. Therefore their presence in the field or around the field margins are less likely to pose a risk of whitefly infestation in melon crops.

There are a number of other weeds species yet to be examined for their role in supporting silverleaf whitefly populations. Recognizing the different weed species and their importance in contributing to whitefly populations in crop fields will allow us to utilize this knowledge to lower the infestation risk from silverleaf whiteflies on melon crops. ■

Figure 3. *Silverleaf whitefly adults (left) and immatures (right) colonizing on sowthistle plant. Photos: Apurba Barman, UC IPM*

Figure 4. *Weeds examined for their suitability as host of silverleaf whitefly in Imperial County.* **A.** *Nettleleaf goosefoot,* **B.** *Common lambsquarters,* **C.** *Pigweed,* **D.** *Common purslane,* **E.** *Sowthistle,* **F.** *Prickly lettuce,* **G.** *Wright's groundcherry,* **H.** *Alkali mallow. Photos: Apurba Barman, UC IPM.*



UC University of California Cooperative Extension

New UC publication documents herbicide damage symptoms on hemp

Sarah Light, Agronomy Advisor
Brad Hanson, Cooperative Extension Specialist

The introduction of a new crop into a landscape brings certain unknowns, including the risk of pesticide drift from neighboring crops. Hemp (*Cannabis sativa* spp.) is a new, high-value commodity that is now being produced in many parts of California. In order to begin an assessment of potential phytotoxicity issues that could occur when hemp is grown in diversified field crop situations, plants were sprayed with herbicides that are widely used in a range of crops during the summer hemp growing season for California's Central Valley (May through September). Materials were selected that are likely to be sprayed on commodities planted adjacent to a hemp field. A new University of California publication provides a brief description of herbicide injury symptoms that could be expected from exposure to 19 specific herbicides or similar modes of action. The publication does not address the relative sensitivity to the full range of potential levels of exposure. A selection of the herbicides evaluated are described in this article and the full publication can be found here: https://anrcatalog.ucanr.edu/Details.aspx?itemNo=8689

Methods: Drift simulation treatments were applied to hemp plants three weeks after transplanting. Herbicide rates for this symptomology demonstration were based on 25% of common label rates in Central Valley agricultural systems (Table 1). Treatments were applied to the foliage of 12-18 inch tall hemp using a two-nozzle boom set up with one nozzle applying 20 gallons per acre and the other 40 gallons per area or twice the volume of spray solution. Thus, one row of plants was sprayed with approximately 25% of labeled rate and the other with 50% of labeled rate but also at greater coverage. These rates and spray coverage are significantly higher than what would commonly occur in herbicide drift situations, however, the purpose of this demonstration was to compare typical symptoms from several common herbicide modes of action on this crop. The specific herbicide symptoms, progression over time, ultimate severity, and potential for recovery all can vary with route of exposure, spray coverage, droplet concentration, plant health, and environmental conditions. Thus, in a more typical drift situation symptoms may be less severe than those documented in this publication, while direct applications of full rates may cause even more severe symptoms (including plant death).

Plants were photographed over a two-week period (1, 2, 7, 12, and 14 days after application) and photos were selected for inclusion based on illustrating typical herbicide damage. Photos are not intended to show symptom development over time, but rather distinct symptoms for each herbicide. The date of photograph included is indicated in the captions as Days After Application (DAA). For a full set of injury photos, see ANR publication 8689 (https://anrcatalog.ucanr.edu/Details.aspx?itemNo=8689) or refer to the UC-IPM Herbicide Symptoms image database (http://herbicidesymptoms.ipm.ucanr.edu/index.cfm).

Glyphosate is a postemergence herbicide that affects an enzyme important in the production of several specific essential amino acids in plants. Injury from drift of this type of herbicide typically is seen in the meristematic regions and youngest tissues first because these regions are rapidly growing and have the greatest need for amino acids. Glyphosate can translocate, or move within the plant, and moves from treated tissue to above and below ground meristems. The most typical symptom, which was observed in hemp, includes chlorosis (yellowing) in younger leaves. Glyphosate injury can eventually lead to necrosis beginning with the younger tissues and advancing to older leaves over the course of 5-10 days and some species can take on a purple coloration as well. In large annual plants or established perennial plants, sublethal doses can sometimes lead to

TABLE 1. Herbicides applied to hemp in a simulated drift symptomolgy demonstration in 2019

Active Ingredient*	Common registered uses in California
glyphosate	Many agricultural, industrial, and homeowner uses
paraquat	Preplant burndown in annual crops, orchard and vineyards
glufosinate	Preplant burndown in annual crops, orchard and vineyards, in-crop use in Liberty-Link cultivars
saflufenacil	Orchards, alfalfa, corn, grasses
carfentrazone	orchards and vineyards, cereal crops, some turf products.
oxyfluorfen	Widely used in orchards, vegetable crops, fallow, roadsides, industrial sites.
propanil	Rice cropping systems
bipyribac-sodium	Rice cropping systems, some turf products
imazapyr	Industrial and roadsides, aquatic weeds, riparian and range restoration
rimsulfuron	Corn, orchards and vineyards, tomato, noncrop and industrial sites
triclopyr	Rice, brush and tree control, rights of way, aquatic weeds, turf products
2,4-D	broadleaf weed control in many grass and cereal crops
clopyralid	Rangeland, roadside, cereals and some tolerant crops
mesotrione	orchards, corn, some legume crops
clomazone	Rice systems, some vegetable and berry crops
ammonium nananoate	many preplant or directed-spray applications. Organic certified.
methylated seed oil	Spray adjuvant used with many pesticides
sethoxydim	Grass weed control in many broadleaf crops and ornamentals, some homeowner products
cyhalofop	Grass weed control in rice cropping systems.

*Herbicide rates for this symptomology demonstration were based on 25% of common agricultural use rates and were: glyphosate at 0.1 and 0.2 lb ae/A, paraquat at 0.15 lb ia/A, glufosinate at 0.25 lb ai/A, saflufenacil at 0.009 lb ai/A, carfentrazone at 0.008 lb ai/A, oxyfluorfen at 0.25 lb ai/A, propanil at 1 lb ai/A, bispyribac-sodium at 0.08 lb ai/A, imazapyr at 0.15 lb ai/A, rimsulfuron at 0.015 lb ai/A, 2,4-D at 0.16 lb ae/A, triclopyr at 0.15 lb ai/A, clopyralid at 0.02 lb ai/A, mesotrione at 0.043 lb ai/A, clomazone at 0.25 lb ai/A, Axxe herbicide at 10% v/v, and MSO at 10% v/v, sethoxydim at 0.07 lb ai/A, and cyhalofop at 0.07 lb ai/A. Herbicides included appropriate surfactants at full rates if recommended on the product label.

Glyphosate symptoms on hemp, 7 days after application

Paraquat symptoms on hemp, 7 days after application

"witch's broom" due to shorter than normal internodes and "stacked" leaves as the plant begins to regrow. Because the herbicide is tightly bound to soil, crop injury from glyphosate is almost always associated with foliar exposure.

Paraquat is a postemergence contact herbicide that disrupts energy flow during photosynthesis. The herbicide can act very rapidly (hours), particularly under high-light conditions. Injury is due to membrane disruption by reactive oxygen and other free radicals; this results in leakage of cellular contents and rapid desiccation of affected tissues. Paraquat does not translocate well in plants, thus symptom severity is often a function of coverage. Symptoms can include chlorosis, and specks from individual droplets to full necrosis from complete coverage. If the dose is insufficient to kill the plant, new growth will not be damaged. Paraquat is extremely tightly bound to soil and not likely to be taken up by plants via soil routes.

PPO-inhibiting herbicides inhibit an enzyme important in chlorophyll synthesis, among other things. These herbicides can quickly lead to the formation of free radicals within the cell which can damage lipids and proteins and cause disruption of membranes. Cells and tissues quickly desiccate

Carfentrazone symptoms on hemp, 4 days after application

Propanil symptoms on hemp, 4 days after application

and dry out. Drift symptoms include chlorosis usually followed by necrosis at the point of contact. Some PPO herbicides are primarily used as foliar herbicides while others can have both foliar and soil activity. Transport within the plant is somewhat limited and occurs via the xylem (water conducting vessels). Because of this, symptom severity from PPO-inhibitor drift is a function of coverage, with low doses causing less-dramatic and slower-developing symptoms compared to greater exposure. However, if the dose is sublethal, new tissues that develop after foliar exposure usually are not affected. Carfentrazone is applied as an example in this photo however similar symptoms can be expected from other PPO-inhibitors.

Propanil is a contact herbicide that inhibits photosynthesis by blocking electron transport through photosystem II. Propanil is translocated via the xylem (water conducting tissues). Thus, injury is usually first observed on the older, fully formed leaves because they are more actively photosynthesizing compared to younger, still-forming leaves. Injury often is initially noted at the leaf margins (chlorosis leading to necrosis) and then moving further into the interveinal areas of the leaf. If the plant survives foliar exposure, newly formed leaves may not be affected.

Although propanil in this example is primarily used as a foliar herbicide, some other photosystem II inhibiting herbicides such as simazine, atrazine, or diuron are used as soil-applied materials and symptoms can vary somewhat depending on route and amount of exposure.

ALS Inhibitors: Several classes of herbicides inhibit the ALS enzyme, which is important in the synthesis of branched chain amino acids. Most of these herbicides have both foliar and soil activity. Like other amino acid synthesis inhibiting herbicides, symptoms from ALS inhibitors are usually first seen in the meristems and youngest tissues because they are rapidly growing and require large amounts of amino acids. At the whole plant level, symptoms are typically characterized by general chlorosis leading to necrosis. Depending on the dose, sometimes an above ground growing point may die and axillary meristems released from dormancy, which can result in an abnormal "branching" structure, as well as leaf stacking, and crinkling and stunting of leaves. Imazapyr is applied as an example in this photo however similar symptoms can be expected from other ALS Inhibitors.

Synthetic Auxins: There are several classes of herbicides that are known as synthetic auxins, plant growth regulator herbicides, or auxin-mimics. These foliar-applied herbicides affect primarily broadleaf plants, although there are some grasses affected by some herbicides. In general, as hormone mimics, synthetic auxin herbicides impact many cellular processes and lead to abnormal cell division and cell growth. At the whole plant level, this abnormal growth can take the form of leaf and stem twisting, cupping, bending, cracking and other epinastic growth. In some cases, leaf thickening, stem cracking, "strap" leaves, and other abnormal growth is observed. These symptoms can start relatively quickly after exposure and progress over days or weeks and eventually lead to necrotic tissues. Most synthetic auxin herbicide exposure is via foliar routes, however there are several herbicides in this class that can persist in soil and be taken up by that route. Triclopyr is the example in this photo however similar symptoms can be expected from other synthetic auxins.

HPPD-inhibiting herbicides and PDS-inhibiting herbicides affect different steps in carotenoid biosynthesis. The carotenoids function to protect chlorophyll from damage from excess light energy. When carotenoid synthesis is inhibited, the most common symptoms is "bleaching" that can range from yellow in some plants to almost pure white leaf tissue in others. Usually, symptoms are first observed in the newly formed tissue that were never able to produce carotenoids but eventually can progress to older tissues as older carotenoids turn over and cannot be replaced. Bleaching can lead to tissue necrosis. Damage to established plants from drift of bleaching herbicides can be visual dramatic but rarely lethal. Damage to seedlings or young transplants from soil carryover may be more damaging. Mesotrione is the example shown in this photo however similar symptoms can be expected from other HPPD and PDS-inhibiting herbicides. ■

Imazapyr symptoms on hemp, 7 days after application

Triclopyr symptoms on hemp, 4 days after application

Mesotrione symptoms on hemp, 4 days after application

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Biological control of the olive psyllid in California

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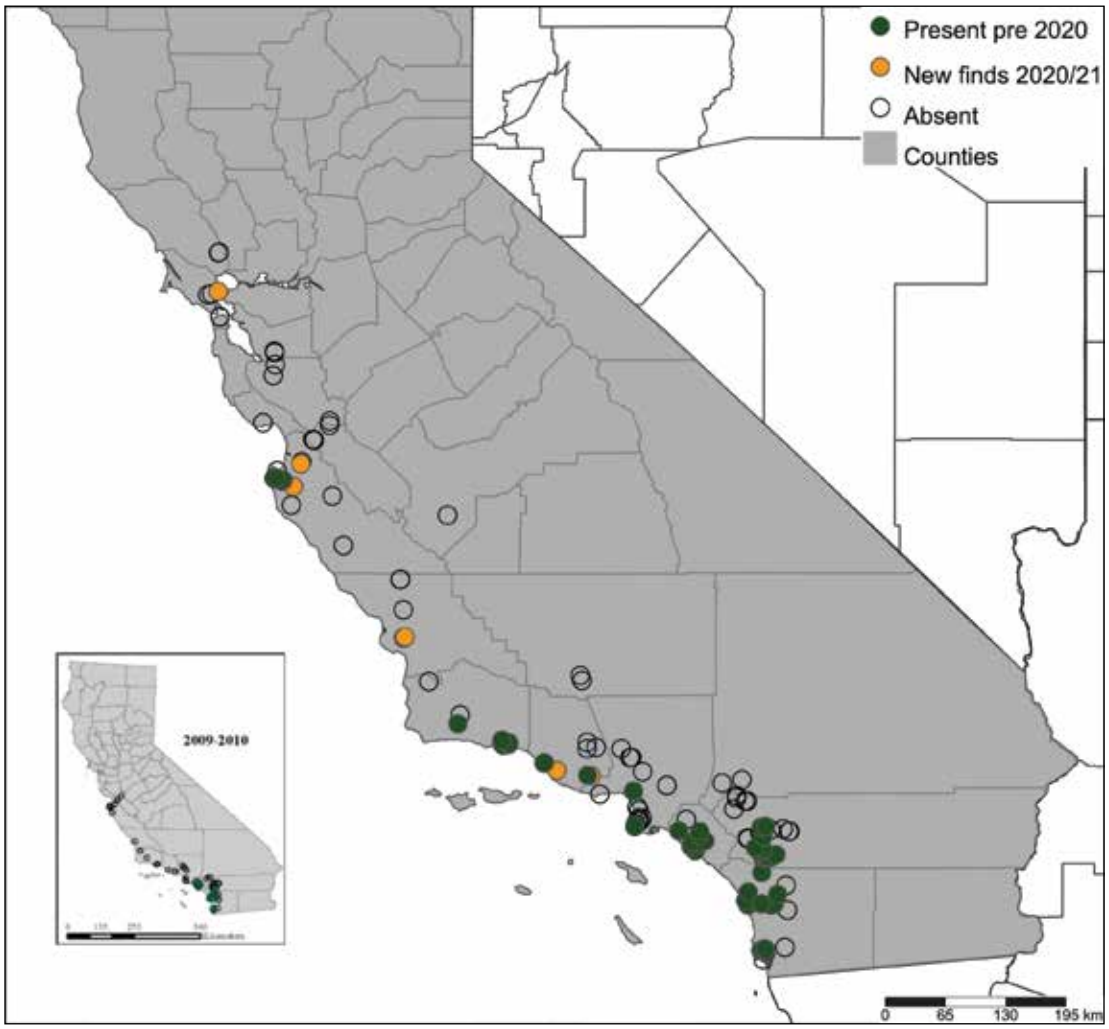
[1] CDFA, IPC, Biological Control Program; [2] University of California, Berkeley

The olive psyllid, *Euphyllurae olivina* was first reported in North America in 2007. It is native to southern Europe and first detected in the US in Orange County, California. By the time this psyllid was found on olives in southern California, it was widespread. Since it is restricted to one commodity in California, olive trees, and found widely dispersed in the state, the California Department of Food and Agriculture (CDFA) decided not to carry out an eradication effort. The pest has since then gradually spread northward towards regions of commercial olive production (Fig. 1). Unlike the Asian citrus psyllid, *Diaphorina citri*, the olive psyllid is a weak flyer and most likely can only move long distances aided by human activity. We have a difficult time getting it to move from one plant to another inside cages housed in our quarantine facility. In less than 10 years, the psyllid reached the Monterey Bay area, roughly 370 miles north from where it initially invaded California, and has just been reported for the first time in the Bay Area, San Rafael, May 2021. Based on our own surveys, and data on newly-discovered populations in California, the olive psyllid appears to have primarily limited its initial spread to the cooler, coastal areas of the state. CDFA's Pest Detection Records show that the number of submissions for olive psyllid have increased from one in 2010 to eight for last year, another indication of spread and establishment. This psyllid will eventually move inland, into drier, warmer areas since it is widely established in the southeastern corner of Spain, west of the city Murcia, where the climate is similar to Fresno in the central valley of California (Pickett, pers. obs). It has already been found in Temecula, California 60 mi inland from the ocean. To our knowledge, olive psyllid has yet to cause economic harm to olive trees grown in California, however we know for certain it is spreading and can cause losses in yield to olive orchards in the western Mediterranean region (Jardak et al. 1984, Tzanakakis et al. 2006). The young nymphal stage of the insect aggregate and feed on the flowers of olive tree creating masses of waxy flocculent (Fig. 2).

Classical biological control is an effective way of dealing with exotic, invasive pests that are widely established like olive psyllid. This strategy can help sustainably manage pests new to California. *Psyllaephagus euphyllurae* (Hymenoptera: Encyrtidae) (Fig. 3) is a beneficial insect that belongs to a group of parasitoids, or stingless wasps, of which several have been used successfully in classical biological control efforts (Dahlsten et al. 1998, Milosavljevic et al. 2017). They are all highly specialized in attacking and killing psyllids. During collecting trips to Spain, part of the psyllid's home of origin, this stingless wasp was routinely found emerging from olive psyllid mummies (parasitized, with hardened, melanized exoskeleton, Fig. 3). We believe it has co-evolved with the olive psyllid, developing skills and ability to track, and kill this pest, while growing its young within the body of this psyllid. Because this parasitoid is exotic to California, we must demonstrate safety to the environment before introducing it to the state. The wasp must be host-specific, and not feed on plants or other types of psyllids. For several reasons we pursued obtaining a field release permit for this parasitoid sooner than later, before olive psyllid becomes an economic pest. First, we knew the psyllid was beginning to spread with potential to reach much of the commercial olive growing regions. Secondly, the parasitoid's field biology strongly suggests it is highly specialized in reproducing only on olive psyllid. The parasitoid enters a resting state mid-year (unpubl. data, CHP) as does the psyllid. They both resume activity mid-winter to early spring the following year when the olive psyllid is developing from an egg to an immature adult. Lastly, it can take years to demonstrate safety to the environment and be issued a field release permit. We had initially hoped to release this parasitoid into southern California before the pest moved north into olive production areas, perhaps limiting its spread; that was in 2013. Over the last seven years, host specificity testing has been conducted to demonstrate the specificity of this parasitoid for olive psyllid and its lack of harm to the environment, i.e. attacking other insects related to olive psyllid.

In four years of testing, three at the University of California (UC) Riverside and one at UC Berkeley, *P. euphyllurae* has shown a strong preference for olive psyllid, never reproducing on other species of psyllid including those native to California. The parasitoid was unable to develop into an adult on 255 non-target (related) psyllid individuals to which it was exposed, i.e. non-target, native species.

Fig. 1. Spread of olive psyllid in California from 2009 to 2020



Typically, a parasitoid uses its ovipositor to place one of its own eggs into the body of its host victim. Our results showed that the parasitoid also used its ovipositor to just probe its host, which in turn killed some of the 'non-target' psyllids. Sometimes they just poke at their victim, damaging it. Additional studies, however, showed that the waxy, flocculent material covering psyllid bodies help guide parasitoids to their target for oviposition, i.e. inserting one of their eggs inside the body of the olive psyllid (Hougardy et al. 2020). If this flocculent is removed, the parasitoid has difficulty discriminating which psyllid to attack. We are currently waiting on a decision by the USDA APHIS to grant us a field release permit. Meanwhile, rearing methods are being developed for the wasp at our Sacramento-based Quarantine facility where we are permitted to maintain cultures of the olive psyllid parasitoid, *P. euphyllurae*.

Fig. 2. *Wax flocculent on damaged olive flowers, Salinas, California 2020. Photo: C. Borkent.*

Acknowledgements:
We thank Michael Calacsan for excellent technical support on this project and Marie Roche of the USDA ARS, European Biological Control Laboratory for help with collections and shipment of the olive psyllid parasitoid *Psyllaephagus euphyllurae* in Spain and southern France. We are grateful to Dr. Alessandra Rung of CDFA's Plant Pest Diagnostics Laboratory who provided identifications of psyllids.

Fig. 3. *Psyllaephagus euphyllurae, beneficial wasp*

Fig. 4. *Healthy (green) and mummified (brown) olive psyllid*

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Building a Better Crop Nutrition Program

By John Leif, AgroLiquid Agronomist

To build a strong crop nutrition plan, you need to begin with a solid blueprint. A complete soil analysis can be the blueprint on which a strong management plan is based. However, upon first glance a complete soil sample report can be overwhelming and difficult to analyze. Having a good, solid understanding of a soil test, and what goes into reading one, will help you build a crop nutrition program for your operation.

CEC

The Cation Exchange Capacity (CEC) shows us the nutrient and water holding capacity of the soil. The higher the number, the more water and nutrients it can store. A soil with a CEC below 8 is considered sandy, whereas a soil with a CEC between 8 and 14 is a medium textured, or loamy soil. When a soil has a CEC higher than 14 there is a fairly high clay content. Those values are not hard-and-fast rules, but generally the higher the CEC the more clay and organic matter the soil contains.

Percent Base Saturation

Base saturation is the ratio, or proportion, of the amounts of potassium, magnesium, calcium, hydrogen, and sodium in the soil. Having the soil's calcium base saturation level between 65 – 75%, magnesium level between 10 – 18%, and potassium level between 3 – 5% provides the best opportunity for all nutrients in the soil to be available, plus a good soil structure, water holding capacity, and good microbial activity. When those nutrients are in their desired ranges, soil pH is usually in the upper 6s to 7s.

pH

Soil pH has a direct effect on nutrient availability. Most nutrients are readily available when the soil pH is 6 – 7.5. Notable exceptions are aluminum, where availability drops substantially at pH levels greater than 5, and iron and manganese where availability drops starting at pH 6 and higher. It is also important to note that most bacteria and fungi are most active in soils with pH above 5.5.

Phosphorus

Phosphorous plays a major role in crop production – from the earliest stages of growth through fruit production and maturity. When recommending phosphorus - or any nutrient - the yield goal is important. Phosphorus recommendations depend on yield goal and the readily-available phosphorus in the soil. That value is found in the Bray P1 column when soil pH is less than 7 and the Olsen Bicarbonate column when the soil pH is greater than 7. Some labs use the Mehlich 3 extraction process to determine available phosphorus, which is not dependent on soil pH.

P_2O_5 recommendations also take into account whether there is low, adequate, or high levels of phosphorus in the soil. Applying the amount of P_2O_5 needed to grow the crop and taking advantage of the nutrients already in the soil will provide for good crop production and reduced potential for environmental problems. The actual amount of P_2O_5 needed to grow the crop will vary by crop and yield goal but if the phosphate level is less than 30 ppm most crops will respond to supplemental P_2O_5 application. Crops that are often planted in cool, moist soils, such as corn, will benefit from a small amount of P_2O_5 applied at planting, even in high phosphorus soils.

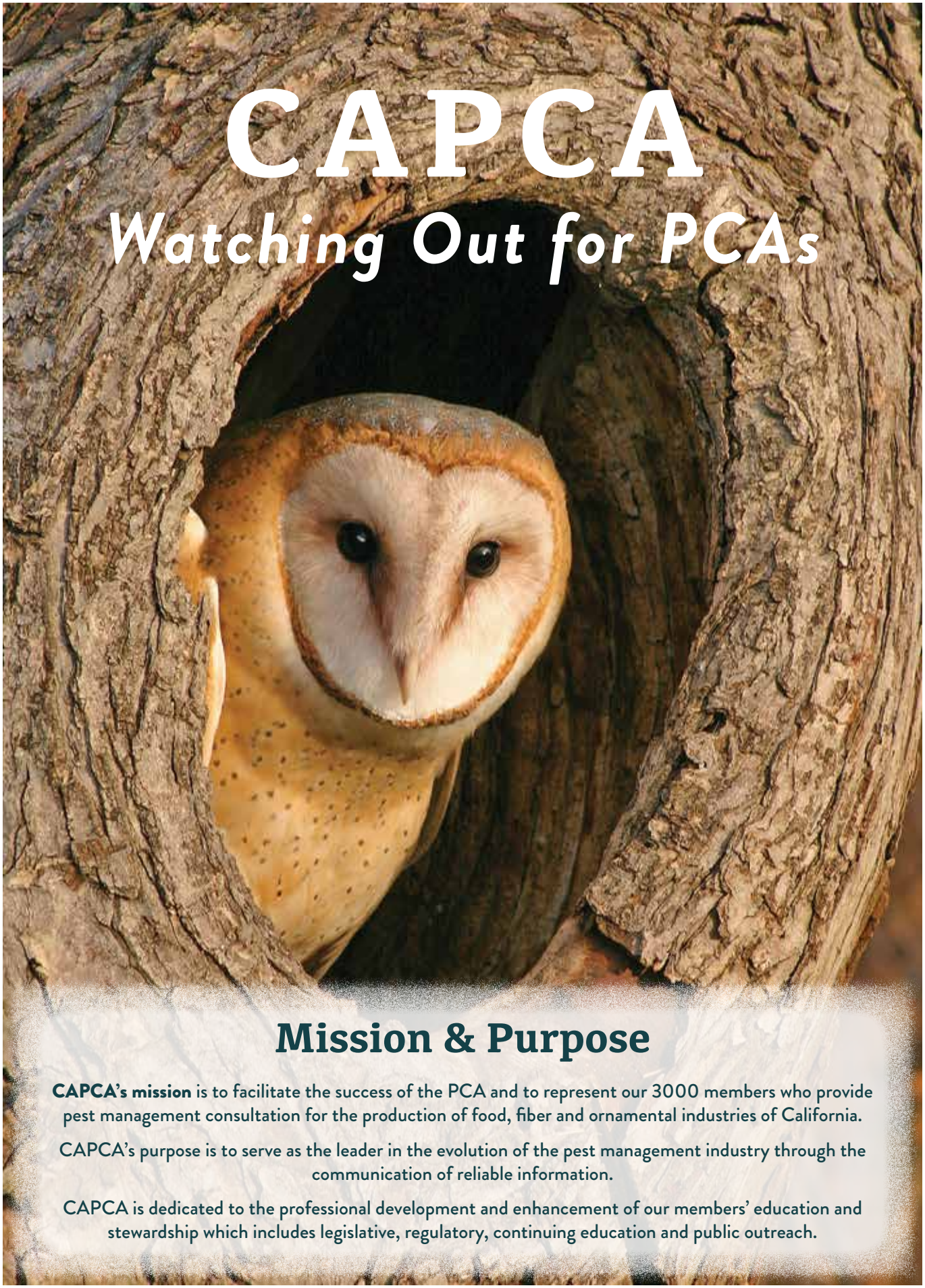
Potassium

Many crops, especially legumes, fruits, and vegetables, have a high demand for potassium. It is necessary for fruit production and water relationships in the plant, among many other functions.

When recommending K_2O, the yield goal is the first piece of information to be collected. However, in addition to yield goal, the CEC of the soil also figures in to making recommendations for potassium. In sandy soils a potassium level of 150 - 175 ppm is considered adequate for most crops, and in higher CEC soils that value is upwards of 200 – 225 ppm. Those values are reasonable for row crops such as corn, soybeans, and wheat, but may not be adequate for crops that have a high demand for potassium.

Sulfur

Sulfur is vital to high yielding, high quality crops. It is not required in as high of a rate as N, P, and K in most crops, but it is just as vital to plant health. Sulfur recommendations are based on several factors including CEC, organic matter, and pH. A rule of thumb to use for determining sulfur need is that most crops require 1 lb of sulfur for every 10 lbs of nitrogen the plant needs. Most crops will respond to sulfur applications when soil sulfur level is below 25 ppm. ■



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Current state of hemp pest management in California

Kadie Britt, Houston Wilson, Thomas Kuhar, Scott Ockey

Introduction

Hemp, *Cannabis sativa* L. containing <0.3% delta-9 tetrahydrocannabinol (THC), is a new crop to modern agriculture, legalized for research in the 2014 Farm Bill and federally legalized for commercial production in the 2018 Farm Bill. While a new crop presents an opportunity for profit and farm diversification, it also comes with a unique set of challenges. From the 1950s until 2014, hemp was prohibited for research and cultivation, thus, very little information is currently available regarding modern pest management strategies. In the current era, hemp is primarily cultivated for cannabinoids, which makes this a vastly different crop and production system than that of the traditional fiber hemp, which was historically grown.

Challenges to effective pest management

Unlike most cropping systems such as corn, soybeans, vegetables, etc., very little archived research information is available to aid current hemp pest management efforts. Previous hemp production focused on crops grown for fiber and arthropod pests were not considered a major hindrance to production. Anyone currently involved with hemp cultivation is rapidly playing catch-up and making use of any relevant pest management information to assist with pest issues. Although pest phenology may differ depending on the crop, management and biology information regarding generalist pests (e.g. corn earworm, twospotted spider mite) in other crops is a helpful starting point for management in hemp. On the contrary, hemp-specific arthropods (e.g. cannabis aphid, hemp russet mite) feed and reproduce exclusively on hemp; since there has been no opportunity to conduct research with hemp until recently, very little is known about the biology and life history of these unique organisms.

Key pests

Many insects and mites can be observed in hemp and the pest complex can differ depending on whether the crop is cultivated indoors or outdoors. Some of the most often-seen pests include corn earworm, twospotted spider mite, cannabis aphid, and hemp russet mite.

FIG. 1

Fig. 1: *Corn earworm in rotted hemp material*

Fig. 2: *Twospotted spider mite on hemp leaf*

FIG. 2

Photos: Kadie Britt

- **Corn earworm** (Lepidoptera: Noctuidae, *Helicoverpa zea*, **Figure 1**) is a generalist insect pest that can be found in hemp grown outdoors. Larvae have chewing mouthparts and can cause considerable damage to buds or inflorescences. Feeding wounds may allow entry of pathogens that facilitate the presence of bud sections that appear dark and rotted, also known as bud rot. Bud rot can compromise the quality and marketability of harvested hemp.

- **Twospotted spider mite** (Trombidiformes: Tetranychidae, *Tetranychus urticae*, **Figure 2**) is a generalist mite pest that can be found indoors and outdoors. Feeding injury causes stippling marks on leaves and webbing can sometimes be observed in apical portions of plants.

- **Cannabis aphid** (Hempitera: Aphididae, *Phorodon cannabis*, **Figure 3**) is a cannabis-specific aphid that can be found in indoor and outdoor hemp. Aphids suck fluids and nutrients from plant phloem with piercing-sucking mouthparts. As cannabis aphid feeds from and moves throughout the hemp plant, a sticky substance, known as honeydew, is excreted. Honeydew forms a sticky coating on the surface of leaves and buds and can ultimately lead to sooty mold development. As aphids grow and molt, they shed exoskeletons which can get caught in honeydew.

Fig. 3: *Cannabis aphid on underside of hemp leaf*

Continued, next page

- **Hemp russet mite** (Trombidiformes: Eriophyidae, *Aculops cannabicola*, **Figure 4**) is a microscopic, cannabis-specific mite that can be found in indoor and outdoor hemp. This mite cannot be seen without the use of microscopy and symptoms are not always visible if only low populations are present. Hemp russet mite feeds by piercing the surface of plant cells and feeding on fluid. Feeding can lead to dull or gray leaves and *sometimes* upward curling of leaves can be observed (depending on hemp cultivar).

A good source of information on the biology and phenology of these and other hemp pests has been developed by Colorado State University (https://hempinsects.agsci.colostate.edu/), but it is important to note that any pesticide suggestions on this website are not necessarily relevant and/or in compliance with California law. For questions about pesticide use in hemp in California, you should refer to the California Department of Pesticide Regulation website for cannabis/hemp (https://www.cdpr.ca.gov/docs/cannabis/index.htm).

Biological pesticides to aid current pest management efforts

A long-term, sustainable pest management program in hemp will be one that is integrated, employing multiple mechanical, cultural, biological, and chemical control tactics. However, implementing multiple control strategies can be difficult, as many research programs are only just beginning to investigate the biology, phenology, and life history of many hemp pests throughout the United States. Given the lack of products specifically registered for use on hemp, many growers appear to be relying on the use of biological pesticides. Information on biological pesticide trials recently conducted with hemp pests can be found in the journal Arthropod Management Tests at the links provided here:

- Laboratory Bioassays of Biological/Organic Insecticides to Control Corn Earworm on Hemp, 2019, Kadie Britt and Thomas Kuhar: https://academic.oup.com/amt/article/45/1/tsaa102/6002834

- Evaluation of Biological Insecticides to Manage Corn Earworm in CBD Hemp, 2020, Kadie Britt, T. David Reed, and Thomas Kuhar: https://academic.oup.com/amt/article/46/1/tsab108/6291448

- Evaluation of Biological Insecticides to Manage Cannabis Aphid in CBD Hemp, 2019, Kadie Britt and Thomas Kuhar: https://academic.oup.com/amt/article/46/1/tsab057/6224655

- Evaluation of Miticides to Control Hemp Russet Mite on Indoor Hemp, 2019, Kadie Britt and Thomas Kuhar: https://academic.oup.com/amt/article/45/1/tsaa082/5870575

Figure 4: *Hemp russet mites on underside of hemp leaf*

It is important to keep in mind that use of pesticides on hemp in California is only legal if the active ingredients found in the product are (1) exempt from residue tolerance requirements and from registration OR (2) exempt from residue tolerance requirements and use of the product would not be legally considered a use in conflict with the registered label. Before applying any pesticide in hemp, check with both the California Department of Pesticide Regulation (https://www.cdpr.ca.gov/docs/cannabis/questions.htm) and your local County Agricultural Commissioner (https://www.cdfa.ca.gov/exec/county/countymap/) regarding use in conflict and other labeling questions.

Parting Thoughts

Pest management in hemp will remain a challenge for the foreseeable future. Research is currently underway in California to determine the arthropod pest complex on hemp, characterize current management strategies, and screen novel chemical/biological controls. Information gained from this work will serve as a baseline for the development of improved monitoring and IPM strategies for hemp in California.

For more information on ongoing hemp pest management research in California, see https://treecrops.ucr.edu/cannabis or contact Kadie Britt at kadieb@ucr.edu. ■

CENTRAL VALLEY CAPCA CHAPTER FUNDRAISER EVENTS

CAPCA CENTRAL VALLEY

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Friday, August 6, 2021
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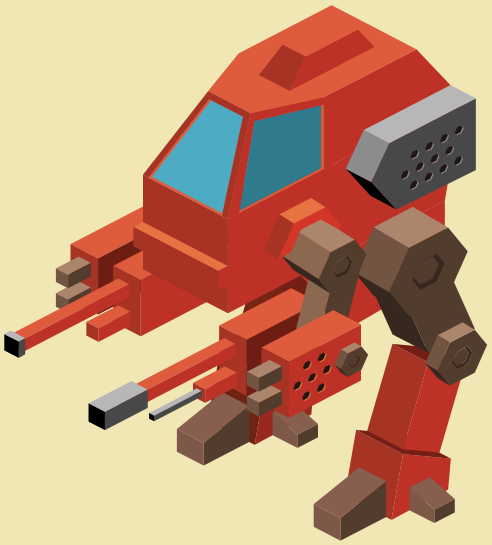

Friday, August 20, 2021
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Evaluating management programs via harvest sampling

Drew Wolter, Almond Board of California Senior Specialist, Pest Management

Windrow sampling is part of an IPM model of continual improvement and two often overlooked components, evaluation, and adaptation, can be added to post harvest activities. By the time harvest arrives, most pest management programs have been executed, making it the time to evaluate how these programs performed. Harvest (AKA windrow) sampling offers a perfect opportunity for growers and PCAs to assess strengths and weakness of each program.

How are results from harvest sampling different from grade sheets?

Grade sheets from the handler provide growers with information regarding relative damage, but not what specifically caused the damage. Harvest samples distinguish specific pest damage and the associated percentage of the damage in the samples. This aides in two crucial IPM steps:

1. The ability to **evaluate** how successful individual pest management programs were during the last growing season. Harvest samples allow you to identify what caused the damage, and thus assess your management decisions, including the efficacy of the material applied, the timing of those treatments, and how well your monitoring programs worked.
2. Through this evaluation process, you are able to develop historical records for each block. Over time, this provides valuable information, such as where infestations may be coming from and where perennial orchard hotspots are prevalent. This information allows you to **adapt** management programs according to the orchard's specific patterns and pressure.

PEST
Navel orangeworm
Ants
True Bug Feeding Damage

Fig. 1: *White frass, and webbings on a kernel caused by navel orangeworm*

DESCRIPTION
NOW creates deep feeding tunnels throughout the kernel. **Key signs:** White frass, and webbings on the kernel (Fig. 1)
In severe cases, nut meat will be hollowed out leaving only the kernels skin. **Key signs:** Shriveled kernels, sanded or stripped kernel skins, sawdust-like residue, without the presence of webbings and white frass (Fig. 2)
Leaffooted bug feeding can result in dark spots on the surface of kernels. BMSB can feed later into the season creating black necrotic tissue on the kernel that appears sunken. **Key signs:** Pitting, stippling, and dark necrotic tissue (Fig.3) According to Dr. Jhalendra Rijal[2], UCCE Area IPM Advisor, soft shell varieties such as Fritz, Sonora, Aldrich, Livingston, Monterey, and Peerless are more susceptible to bug damage throughout most of the season.

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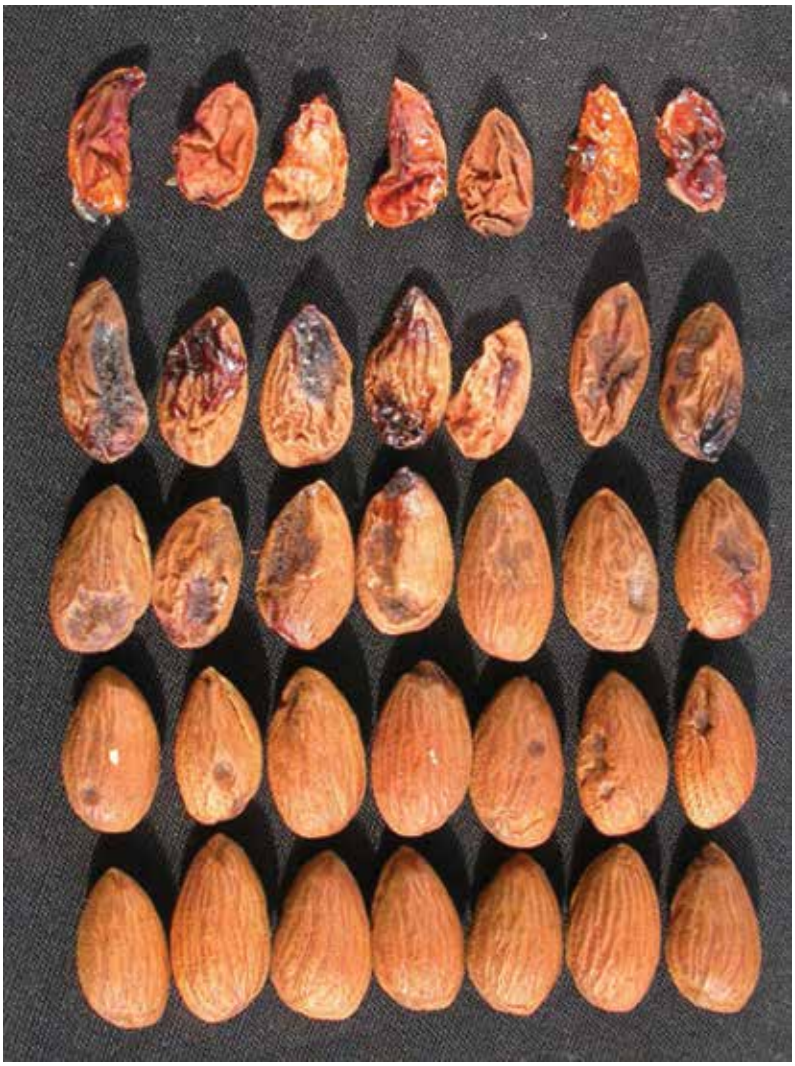
Fig. 2. *Southern fire ant feeding damage (Photo: Jack Kelly Clark, UC Statewide IPM Program)*

Fig. 3. *True Bug Feeding Damage (Photo: David Haviland)*



How to Conduct Harvest Sampling

UC IPM guidelines for harvest sampling[1] recommend that 500 nuts per block should be taken; however, not every block has the same layout, pressure, size, and neighboring conditions and the total number of samples should be adjusted accordingly. Larger blocks may require additional sampling to provide an accurate representation of that location's true pressure and damage. The primary goal should be to obtain a representative sample from multiple areas within a block.

If you know a block has historically shown high pressure, you can partition and denote which rows samples were taken from to gain more precise information. For example, you can take five 100 nut samples from five evenly spaced rows within a block. Because insect populations build over time and space in orchards, this method will give you more detailed information regarding where pressure is coming from.

If you do not have time to crack out samples that week, you can store the samples in a cold room or freezer until harvest activities wind down.

Tips for Identifying Damage

The main insect pests to keep an eye out for during damage assessments include navel orangeworm, ants, leaffooted bugs, and brown marmorated stink bug (BMSB). ■

Citation:

1. UC IPM Harvest Sampling Guidelines: http://ipm.ucanr.edu/PMG/C003/m003hcharvstsmpl.html

2. Plant and Stink Bugs of Almond Orchard-Almond Variety susceptibility: https://www.ipmcorner.com/single-post/2020/04/30/Plant-and-Stink-Bugs-of-Almond-Orchards

Photo: © Fred Rehrman, Elysian Fields

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Hortau

Hydrite Chemical Co.

JCS Marketing Inc.

Motomco

North Valley Ag Services

Pacific Biocontrol Corporation

Polymer Ag LLC

Produce Careers

San Joaquin Grower Services

Southern Valley Chemical Company Inc.

Spectrum Technologies, Inc

SummitAgro-USA

The Morning Star Packing Company

Tiger-Sul Products, LLC

Western Region Certified Crop Advisers

CAPCA Chapter In-Person CE Coming Soon

Save the Dates!

Central Coast Chapter
Thursday, August 19, 2021
Santa Maria, CA
4.5 CE Hours (1.0 Laws & 3.5 Other)
Central Coast CAPCA Summer 2021
CE Meeting Course
Early Registration by 8/12:
$25 CAPCA Members | $40 Non-Members
Regular Registration after 8/12: $50 All

Tulare-Kings Chapter
Wednesday, September 22, 2021

Kern County Chapter
Tuesday, October 12, 2021
Bakersfield, CA
6.0 CE Hours (1.0 Laws & 5.0 Other)
Hodel's Country Dining
5917 Knudsen Dr., Bakersfield CA 93308

Ventura Chapter
Wednesday, September 8, 2021
Santa Paula, CA
Ventura Chapter CE Seminar
Santa Paula Senior Center
530 W Main St, Santa Paula, CA 93060

Visit https://capca.com/events/ for more information as it becomes available.

Photo: "Little Shasta Road," by CAPCA member, E. Kersh

Radiant® SC

INSECTICIDE

Only Radiant® SC insecticide controls worms, thrips and leafminers. ("3 Bugs. 1 Jug.") And university trials in Arizona and California show that Radiant outperforms other commonly-used vegetable insecticides on all three of these pests. As a member of the spinosyn class of chemistry (IRAC Group 5), Radiant controls pests like no other class of chemistry used in vegetables. The Re-Entry Interval is only 4 hours, and the Pre-Harvest Interval is 1 day for most crops.

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