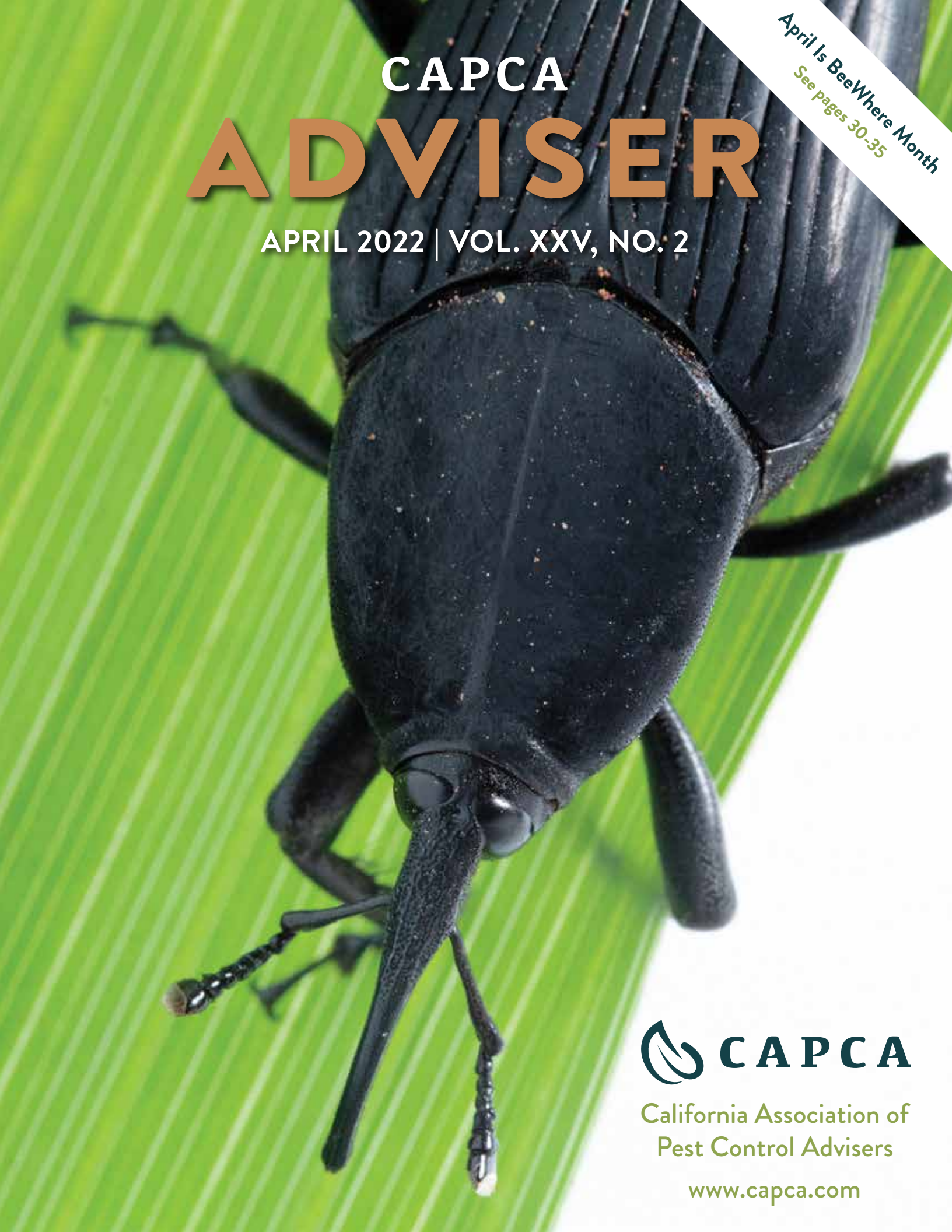

CAPCA ADVISER

APRIL 2022 | VOL. XXV, NO. 2

April Is BeeWhere Month

See pages 30-35

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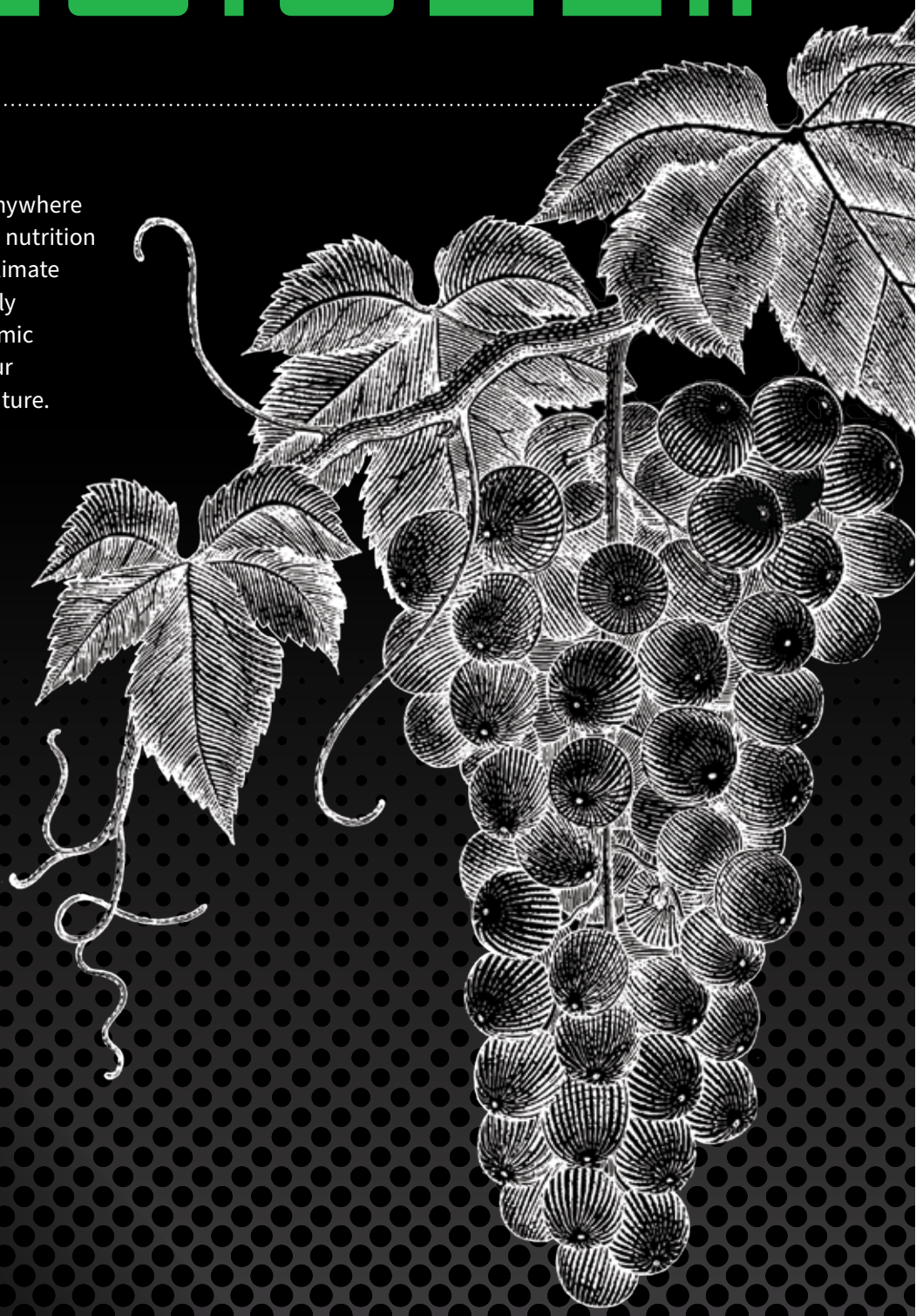

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Free Online CE for Members!

As we return to our typical rotation of Spring Summit and CAPCA Annual Conference in 2022, CAPCA is working to incorporate the live program into professionally recorded sessions for an online CE version. We believe this flexibility is a critical part of giving back to membership and furthering the vision of hybrid events that provide our membership and industry stakeholders with a choice in their professional development and continuing education.

As a part of this year's Spring Summit, six manufacturers piloted a 3-hour Product Profile program in which they had extended time to discuss products in the context of research, field trials and IPM. For CAPCA members and Spring Summit attendees only, we will be offering a repackaged version of the Product Profile online for free. Just sign up for your 2022 membership before March 31, 2022, and the Product Profiles will be available on your CAPCA member dashboard in early April.

Once the CE hour bundle is on your member dashboard, the hours will be available to view and receive CE credit through December 31, 2022. All you need to do is log in, click the "Online Learning" tab, select the course and complete the content and questions for CDPR CE hours. We hope to provide additional free CE hours to CAPCA Active and Associate members as added value to your CAPCA membership.

Your engagement and feedback on this free pilot drives the development of more free CE.

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.

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All Organizations Must Become Tech Companies, Including CAPCA

By Patrick Dosier

It is becoming cliché to reference famed venture capitalist Marc Andreessen's opinion that "software is eating the world". Personally, I think it is true that every organization needs robust digital capabilities to remain relevant, and to deliver value to the emerging generations of consumer. However, I am not convinced that all organizations need to behave like startups, taking "make-it or break-it" style risks. I believe organizations need to treat technology as a critical business function in the same way they treat finance, operations, and HR. They need to find common-sense ways to manage software risks and expenses. CAPCA is no exception.

Where are we coming from?

Around 2013, former CAPCA Chairman Gary Silveria led a special committee called CAPCA Forward. This group was charged to look ahead ten years and to define CAPCA Members' needs in the coming decade. Among many issues, this committee wisely focused on updating the CECPM (Continuing Education Center for Pest Management) hours-tracking database and the CAPCA website. Having served on that committee, I recall that many of the "younger" Members were advocating for a "CAPCA App". At that time, these requests for more robust, interactive software features were recognized as too early, too expensive and that they would not be perceived as valuable to CAPCA's sizeable 55+ demographic.

In 2019, the CAPCA Board approved funds to slowly develop CAPCA's Online CE (Continuing Education) services. This project was accelerated in response to the pandemic and the requirements for a virtual Conference.

Software is evolving at blinding speed, so the upgrades made to our website and to CECPM during the last decade are now deprecated (software speak for facing obsolescence in the coming years). Our website was built on a technology intended for static information, and it is not ideally suited to accommodate rich interactive features like Online CE and financial transactions.

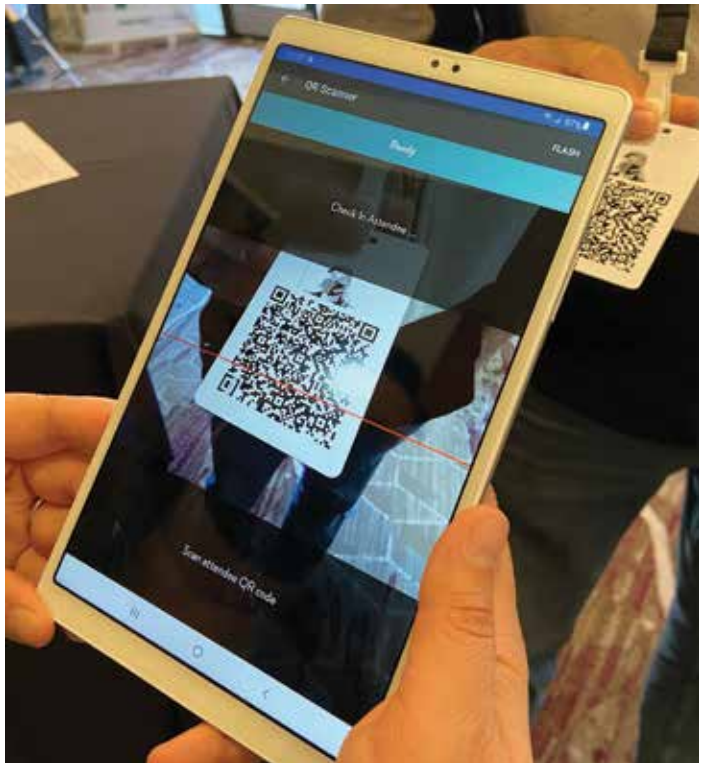
Timing is everything! Our valued 55+ demographic are still with us, and we have an emerging generation of Millennial and Gen Z PCAs. Now is the time for CAPCA to upgrade our basic services, to future-proof our software capabilities, and to explore all the ways in which technology can deliver tangible value to our Members.

Where are we going?

At the CAPCA Board meeting in February, it was unanimously agreed that CAPCA should make significant and sustained investments in our technology offerings. There was consensus that CAPCA.com should be the one-stop shop for all things a PCA needs to maintain their license, to find opportunities to engage with CAPCA, and to stay informed. Our aim is to deliver all of this through a seamless and, dare I say, pleasurable Member experience.

More specifically, items on our software development roadmap include modernization of the website, refinement of Online CE, Crop Team news feeds, modernization/ redundancy to CECPM, social media feeds and much more.

One recent example is the recent pilot of a QR code system to replace the abysmally outdated Scantron system for in-person CE meetings. CAPCA built this system in anticipation of forthcoming regulations from



State and Federal levels. The QR code adds a new level of professionalism to meeting attendance as we expect the current Scantron process for events like Conference to become incompliant.

Attendees at CAPCA's Spring Summit in Napa were the first PCAs to ever use an alternative to Scantrons. For a pilot program, that CAPCA built from scratch, I felt that it was an unqualified success. What we learned from that pilot will be incorporated to an even better QR code experience at this year's CAPCA Conference.

How will we get there?

Software development is expensive. Software development is frustrating. Software development requires skills and capabilities not traditionally found in agriculture nor the not-for-profit sectors. CACPA's plan is to mitigate these risks by partnering with the pros. We have formed an alliance with Technicate Solutions, Inc., a custom software development firm located in Rancho Cordova, California. This team of US-based software developers are eager to learn about our industry, our Members' needs, and our technology stack. Partnering with them instantly increases our capability and flexibility, without the risk of putting full-time developers on CAPCA's staff.

CAPCA has directed a member of our staff, Carrie Kihlthau, to act as a product manager. She will study Members' requests, incoming regulatory changes, and evolving technology all to manage our software development roadmap. She will work with our technology partner to ensure that they are building the right features, on time, and on budget. Carrie has already demonstrated that she is well-suited to serve in this position!

The CAPCA Board recognizes that technology investment needs to be significant and sustained. The Board gave directions to staff and the Finance Committee to allocate a higher amount to technology in future budgets, and to recognize this as a permanent condition. There is a slight shift in mindset here; the Board defines the budget allocated to technology, which essentially defines the pace at which we proceed. It will then be up to Carrie, Technicate, and engaged members to prioritize what software features we develop next.

In summary, we have heard from Members that you want more out of CAPCA.com, and we aim to deliver! ■

Meet Your Directors

DANILU RAMIREZ
Chapter: Central Coast
Employer: President, DRAM Agricultural Consulting, Inc.
Education: BS Crop Science, Cal Poly SLO
Year of PCA License: 2004
Additional Licenses/Certificates: QAL, CCA
Specialties: irrigation and nutrient management

JACKIE TABAREZ
Chapter: Central Valley
Education: BA Ag Studies, CSU Stanislaus
Year of PCA License: 2016
Additional Licenses/Certificates: PAC
Specialties: tree nuts, vines

MICHAEL TERRY
Chapter: Desert Valleys
Employer: M Terry Ranch
Education: BS Agribusiness, Oregon State
Year of PCA License: 2012
Additional Licenses/Certificates: QAL, CCA
Specialties: vegetable crops, farm technology

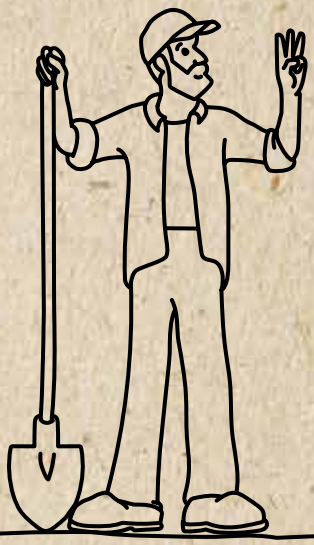
ADAM TAVARES
Chapter: Fresno-Madera
Employer: ADAMA
Education: BS Crop Science, CSU Fresno
Year of PCA License: 2009
Add'l Licenses/Cert's: QAL, Water Distrib. #1
Specialties: permanent crops, row crops

MIKE HAUPT
Chapter: Kern County
Employer: Trinitas Farming
Education: BS Crop Sci./Hort, CSU Chico
Year of PCA License: 2017
Additional Licenses/Certificates: QAL, CCA
Specialties: IPM, orchard mgmt, almonds, pistachios

SEAN MORELOS
Chapter: Monterey Bay
Employer: Nutrien Ag Solutions
Education: BS Cal Poly SLO
Year of PCA License: 1997
Additional Licenses/Certificates: QAL
Specialties: lettuce, grapes, strawberries, cole crops

ANNA PAGE
Chapter: NorCal
Employer: Nichino America
Education: BS Ag Business, CSU Chico
Year of PCA License: 2014
Specialties: tree crops, rice

Photo by Steve Beckley



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Meet Your Directors

DAVID DRUCKER
Chapter: San Diego
Employer: Nutrien Ag Solutions
Education: Cal Poly SLO 1982, Ag Science
Year of PCA License: 1983
Additional Licenses/Certificates: CCA
Specialties: wine grapes, avocados, citrus, strawberries, landscape ornamentals

LEONARD DUNN
Chapter: San Francisco Bay
Employer: City of Sunnyvale
Education: UC Davis
Year of PCA License: 1976

EDGAR TUNA
Chapter: SoCal
Employer: Nutrien Ag Solutions
Education: Agriculture Engineer
Year of PCA License: 1975
Specialties: nursery, greenhouse, turf, landscape, golf, irrigation

COREY THOMPSON
Chapter: Tri-County
Employer: Basin Fertilizer
Education: BS CSU Chico
Year of PCA License: 2009
Add'l Licenses/Cert's: NW CCA, OR PCA, QAC
Specialties: potatoes, alfalfa, Timothy hay, small grains, forage, range, pasture

DENNIS FULLER
Chapter: Tulare-Kings
Employer: Adama
Education: Cal Poly SLO
Year of PCA License: 2013
Specialties: walnuts, almonds

PATRICIA DINGUS
Chapter: Ventura
Employer: YARA
Education: Cal Poly SLO
Year of PCA License: 2009
Additional Licenses/Certificates: CCA, QAL
Specialties: vegetables and berry production

MARK ALLEN
Chapter: Woodland
Employer: Verdesian Life Sciences
Education: BS Horticulture (Cal Poly Pomona)
Year of PCA License: 2009
Additional Licenses/Certificates: QAL
Specialties: crop nutrition, soil science, apiculture & pollination biology

North Coast Chapter: vacant
Sutter Buttes Chapter: vacant

Visit Our Chapter Pages Online!




ADVOCACY: The Key to Survival

Adam Tavares, Advocacy Committee Chair

In 2022, Advocacy Committee is going to focus on issues that directly affect PCAs. Three major areas we will work on in 2022 are as follows:

1) The DPR Statewide Pesticide application notification system
2) Pest control license changes
3) Local government officials' outreach by our trained chapter champions.

The Governor has allocated $10,000,000 for DPR to establish a statewide notification system to inform the public of any chemical applications taking place. DPR has tasked Santa Cruz, Riverside, Ventura, and Stanislaus counties with implementing a pilot notification program. While each pilot will differ, our concern is to who, where and how the notification is implemented. There was a public comment period in November where ideas were presented as to how the system should work. Ideas ranged from wanting access to information statewide, to a more local approach with only those in the immediate area having access to the information. There was debate over how to share the information as well, with ideas ranging from automated text messaging platforms to websites with live updates. Another discussion point was whether this information should be provided through the system before or after the application has taken place, as well as what details should be included in the notification regarding the application. CAPCA is working with multiple Ag entities to provide a realistic, science-based approach, which will allow our PCAs to continue writing legal recommendations, as needed by the growers, to provide the safest IPM recommendations without fear of unjust litigation or increased safety risks. CAPCA has participated in multiple workshops and phone calls to work through this process. **We**

encourage our PCAs to actively get involved in the counties that the pilots are taking place in to ensure we have a seat at the table as programs are developed and implemented.

A win for CAPCA in 2021 was getting more access to testing for our PCAs in the state. As California moves toward a more computer-based testing system, we felt PCA testing had been left out. CAPCA's CEO Ruthann and team were able to get the issue front and center and get DPR to include more access for PCA testing in this COVID era. Issues that still concern us are the request for licensing and certification fee changes. They will be implemented in 2024-2025. When approved, the new funding will be used to address and implement unfunded federal mandates issued in 2017, but more importantly, it will be used to modernize elements of the Licensing and Certification system. We are working diligently to make sure that not only are the increases fair, but that they are utilized to our advantage in making licensing and renewal an easier option. Ideas that have been presented so far include: a change from 2 years to 3 years between your renewal, to the number of hours needed and the type of hours available to PCAs. Currently the topic of IPM does not qualify for continuing education credit, so we are working with DPR to find a way to make IPM CE hours count towards our license renewals. While the state has only recently begun preaching the power of IPM, CAPCA and our PCAs have been using IPM for over 50 years and are glad the State is willing to support our continued use of IPM in the field. We also are working with DPR to use the increased fees for updated PCA Exam study materials and establishing a clear submission and renewal time frame if the current 2-year renewal cycle is changed.

The last area of focus is to get local involvement from our trained advocacy champions to engage with local government officials. **The time is NOW to let your city, county and state representatives know who we are as an organization and why our voice as licensed PCA professionals should be heard.** The current narrative demonizing Ag, and the tools we use to provide safe and affordable food to customers around the world, continues to grow, negatively impacting our toolbox. While the advocacy committee does not focus on individual products, we will continue to support and defend scientifically sound, safe active ingredients which various groups are attempting to eliminate. We had a substantial increase in participation on the last DPR public comment call on neonics thanks to the efforts of our Chapter champions. We will continue to ask for and seek help from all PCAs and partners moving forward, as groups call for the ban of Ag products. **For 2022, we ask all PCAs to comment and actively participate when a call to action is executed** – your voice is the most powerful tool we have to educate the public and stand up to anti-Ag messaging. Thank you in advance for your much needed engagement. ■

CAPCA Ed ONLINE

CAPCA Online CE Opportunities

https://capca.com/onlinece/

NOTE: *Conference Updates I & II are purchased as one course.*

Conference Update I - 2.0 DPR Hrs (1.5 Other 0.5 Laws)

Presentations from the 2021 CAPCA Annual Conference: Paul Crout, CAPCA sharing Licensing Reminders; Ruben Arroyo, Riverside Agricultural Commissioner providing a CACASA Update; Paul Squires, Independent PCA presenting "Drift Issues with High Value Crops – Mitigation and Best Practices"; and Drew Wolter, Senior Specialist, Pest Management from The Almond Board of California discussing "Herbicide Resistance in California – Identification and Management."

Conference Update II – 2.0 DPR Hours (2.0 Other)

Presentations from the 2021 CAPCA Annual Conference: Ian Lemay, CEO of California Fresh Fruit Association shares the State of Fresh Fruit; David Holden of Holden Research and Consulting presents "Current Integrated Pest Management Research in Avocados and Citrus"; Mohammad Yaghmour, UCC Area Orchard Systems Adviser discussing "IPM for Fruit and Nut Tree Diseases."

Pollinator Risks and Benefits - 1.0 DPR Hours (1.0 Other)

James A. Bethke, UCCE Emeritus presents "Pollinator Risks And Benefits From The Landscape And Nursery Industries" – recent research findings relevant to balancing the needs of pollinators with the need for pest management in the ornamental horticulture industry (green industry).

From the speaker: *"This presentation will present an update on information acquired from a nationwide research effort that tries to answer major gaps in our understanding of the level of bee exposure to pesticides in pollen and nectar and the relative attractiveness of ornamental plants as pollinator food sources."*

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

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

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

Nominees should submit a completed application form and copies of their transcripts. ***Applications must be postmarked no later than May 6, 2022*** and submitted with required letters of recommendation so that the committee can make final selections. The student selected will be notified in July.

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

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

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CAPCA Spring Summit

2022 CAPCA Spring Summit Recap

The Spring Summit was held in Northern California for the first time at the Napa Valley Marriott Resort as we begin the rotation between northern and southern California in off-set to the Annual Conference. It was CAPCA's fifth Spring Summit, held as a one and a half day in-person event in a new location and venue. The educational program focused on the unique issues faced by Northern California, along with additional programing for CAPCA Members and PCAs.

This year's General Session was held Tuesday, February 1st, and we started with an hour Label Update program. The General Session featured a Pest Management in Rice update by Whitney Brim-DeForest of Sutter and Yuba Counties, along with Roberta Firoved from the California Rice Commission. An informative discussion panel followed addressing Cannabis and Industrial Hemp with Crystal Thoin (Agrian Supply), Lisa Herbert (Sutter County Ag Commissioner), Brian Malin (Vital Garden Supply and Vital grown), and Erika Rohr-Luke (Marrone Bio Innovations). Wrapping up the session were talks on Asian Citrus Psyllid and Huanglongbing Treatment and Quarantines by Victoria Hornbaker of CDFA and Processing Tomatoes – Best Management Practices for Mid-Season Diseases and Insects by Renee Rianda of Morning Star Packing Company.

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Our Welcome reception gave 200+ attendees a chance to mingle with the 30 exhibitors that were present. It's with the generous support of our tabletop exhibitors and sponsors that a mini-conference like Spring Summit is possible - our thanks to: Baicor L.C., Oro Agri, Nichino America Inc., ALZ Chem, Biobest USA, Kemin Crop Technologies, Western Region Certified Crop Advisers, Marrone Bio Innovations, Magna-Bon, Verdesian Life Sciences, SummitAgro-USA, FBSciences, Momentive, Corteva Agriscience, Lallemand Plant Care, Kim-C1, Trécé Incorporated, Westbridge Agricultural Products, Polymer Ag, Motomco, Citrus Pest & Disease Prevention Program, FarmX, Ferticell, Grow West, Suterra, Syngenta, True Organic Products, US Silica, Wonderful, and Arborjet.

Continuing the exhibitor presentations February 2nd, and the morning General session featured a CACASA Update (Lisa Herbert, Sutter County), DPR Overview & Update (Karen Morrison, CDPR), Update on Invasive Forest and Shade Tree Pests in California (Tom Smith, Cal Fire), Controlling Grape Trunk Diseases (Akif Eskalen, UC Davis/ UCANR), Multi-pronged Approach to Managing SWD in Soft Fruits and Berries (Jhalendra Rijal, UCCE), Identifying Diseases of Walnut and Management Strategies (Kari Arnold, UCCE), and Managing Navel Orangeworm (Drew Wolter, UPL). This year's Spring Summit also featured two new breakout options on Wednesday afternoon: the Advocacy session for CAPCA Members to more effectively share their voice and represent the PCA in current affairs, and Product Profile presentations from Suterra, Lallemand Plant Care, Marrone Bio Innovations, Kemin Crop Technologies, Verdesian Life Sciences and Wilbur-Ellis featuring industry representatives sharing research and education information on their company products. All Spring

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As CAPCA continues to serve as a leader in the industry, this was the first event to retire scantrons in place of new badge scanning technology to track CDPR hours. The pilot was successful, and we look forward to its use in Anaheim for the Annual Conference in October as a means to uphold the professionalism of the PCA and the integrity of the CE process.

We have the exhibitors, sponsors, and attendees to thank for participating and contributing to making our 2022 Spring Summit a success. Hope to see you next year in Temecula, April 25-26, 2023. ■

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Tom Tucker, Tulare County Ag Commissioner

CAPCA Staff

Tom Tucker is in his 14th year with the Tulare County Agricultural Commissioner/Sealer of Weights and Measures office. He began his career in 2008 with the then Tulare Agricultural Commissioner Gary Kunkle, but within his Weights and Measures Division. "I worked several years, gaining experience in this Division and passing the State required examinations to move up through the ranks," says Tom. "In time, I was able to pass the Deputy Ag & Sealers Licensing exams making myself qualified to hold such positions. When Commissioner Kunkle retired the County Board appointed Commissioner Marilyn Kinoshita, who eventually hired me as her Assistant Agricultural Commissioner/Sealer. I worked for her several years until appointed Agricultural Commissioner/Sealer of Weights and Measures on March 30, 2019."

In addition to this position, Tom holds all eight Agricultural Inspector Biologist/Weights & Measurers licensing exams, Deputy Ag & Deputy Sealers Licenses, as well as the Agricultural Commissioner and Sealer of Weights and Measures licenses. "In college I was able to get my Qualified Applicator License (QAL) and shortly after graduating, my Pest Control Adviser license (PCA)." A 1984 graduate from California State University-Fresno with a Bachelor of Science degree in Plant Science, his emphasis was in Plant Protection.

"I have lived and worked on small farms all my life since my parents bought their first ranch when I was about eight years old. It was a 20-acre table grape vineyard and I spent much of my weekends and days after school pruning, cutting canes, and eventually driving tractor when I turned 10," Tom recalls. "Disking and furrowing became my next responsibilities, and then spraying when I got a little older. Along with this agricultural experience, I helped my grandfather on his 35-acre citrus ranch and commercial spray business. This took me well into and out of college, gaining industry experience along the way."

Reflecting on his role as Agricultural Commissioner in Tulare County, Tom explains: "The Agricultural Commissioner in Tulare County plays a role in just about every conceivable agricultural activity there is. Our largest division is relating to

Quarantine Certifications with our Pest Exclusion Inspectors checking commodities as industry prepares the product for export, across the state, country, and world. These same inspectors handle our fruit and vegetable standardization responsibilities too. They are checking for quality control requirements, such as cracks in cherries, and standardized packaging requirements listed in the California Food and Agricultural Code."

Providing more in-depth observations, Tom explains that his county's Pesticide Use Enforcement Division is responsible for regulating virtually all the pesticide applications occurring in Tulare County, including non-ag, and structural activities as well. "Inspectors are there to enforce the laws and regulations but also to offer up training to prevent issues before they happen. These trainings occur at our office and at Industry events, to name a couple. We are always asked to present at CAPCA, PAPA, and other organizational events too. Included in some of these events are community outreach events where parents and teachers can hear more about keeping themselves and their children safe around agricultural treatments, but equally as important, household chemicals and cleaning supplies. The list of training opportunities continues to grow."

Continuing, he explains: "We have strong Pest Management and Pest Detection programs as well. Vertebrate pest control is essential in keeping a well-managed property safe from these destructive pests, and we provide guidance on the proper use of baits too, as our Agricultural Pest Management specialist offers non-chemical control alternatives. Our trapping program consists of 17 seasonal Inspectors that place and monitor traps used to detect a myriad of exotic pests, such as fruit flies and Asian citrus psyllid."

Tom reflects on a positive and rewarding relationship with the Industry, CAPCA, and local PCAs in his county. He is happy to say that his relationship with the Industry is very good, just like with those of his predecessors. "We are partners in the goal of keeping everyone safe as food and commodities are produced, managed, harvested, packed, and moved into the supply chain. It is in everyone's best interest to work together, and that is exactly what we do."

The experiences with PCAs and CAPCA have been equally beneficial and rewarding: "Working with our local PCAs and CAPCA has been a personal pleasure over the years. I mentioned being a licensed PCA right out of college, and

that is when I joined CAPCA as well. Not only was I able to enjoy the membership benefits, but the collaboration with colleagues as well. It is truly a symbiotic relationship."

"The Ag Commissioner's staff is there to serve as a liaison of sorts in keeping them (PCAs) informed of all the laws and regulations that affect them directly and the growers they serve," says Tom. "We are a regulatory agency as well, but it is always our hope that enforcement action occurs only after guidance and training has been given but sometimes forgotten. I am encouraged when our local CAPCA chapter regularly invites me, my Assistant Agricultural Commissioner, and staff to join them for a working breakfast where we can share information and concerns."

Tulare County's major crops and diseases/pests are quite varied. Tom explains: "A few times in years past, Tulare County held the title as the highest producing ag county throughout the state. Currently, we are coming in at $7.14 billion dollars of gross production value, according to the 2020 Crop and Livestock Report. It would be difficult to name a crop that wasn't grown in the county, and 43 of them come in with more than $1 million of total value. Milk is number one at $1.86 billion, oranges next with $1.06 billion, and followed by cattle & calves with over $602 million in value. Each of these products and related industries are leaders themselves, bringing a great deal of value and work into the county and valley."

The primary pests of concern are generally considered A-Rated: "These are quarantine pests that we try very hard to keep out. Our Pest Detection Division provides a first line of defense in this area. We have many thousands of traps spread across the County in several different habitats to capture any exotic pest that finds its way into the County," relates Tom. One of these is the Asian citrus psyllid (ACP). With so much citrus, they certainly cannot let it get established in Tulare County. "The psyllid would not really be much of a problem if it didn't vector the citrus disease, Huanglongbing (HLB). It is known to kill citrus trees, devastating the Industry and citrus communities where it infests uncontrolled. Just look at Florida, where they have now lost over 50% of their Industry, primarily to HLB."

Continuing, Tom says: "Fruit flies have been of great concern too, with all the fruit here in the valley. We also have lesser-rated pests, such as California red scale, Oriental fruit moth, navel orangeworm, and many more. These pests do a great deal of damage to the commodities themselves, but equally important, to the ability of the marketer to export out of the County. If these pests are found in a shipment destined for overseas, quite often the shipment is redirected or subject to costly treatments, post-harvest. Neither a great alternative."

Tom says that water, or the lack of it, is the greatest concern Tulare County has been facing for years: "We forget sometimes when we are in the middle of a rainy year, but this issue is growing, and we have precious few alternatives to getting more. We all know about SIGMA and the regulations being developed from it, but I would prefer to focus on the issue itself."

Tom points out some additional water issues affecting Tulare County: "One of the first questions asked and answered was 'How can we be even more efficient?' From there we ask 'How can we store more of it when available, and then, how can we get more?' Let's look at efficiency first. This is one of those areas that almost drives itself. Efficiency usually means cost savings and/or better quality for less." He explains that the agricultural industries of the state and country have

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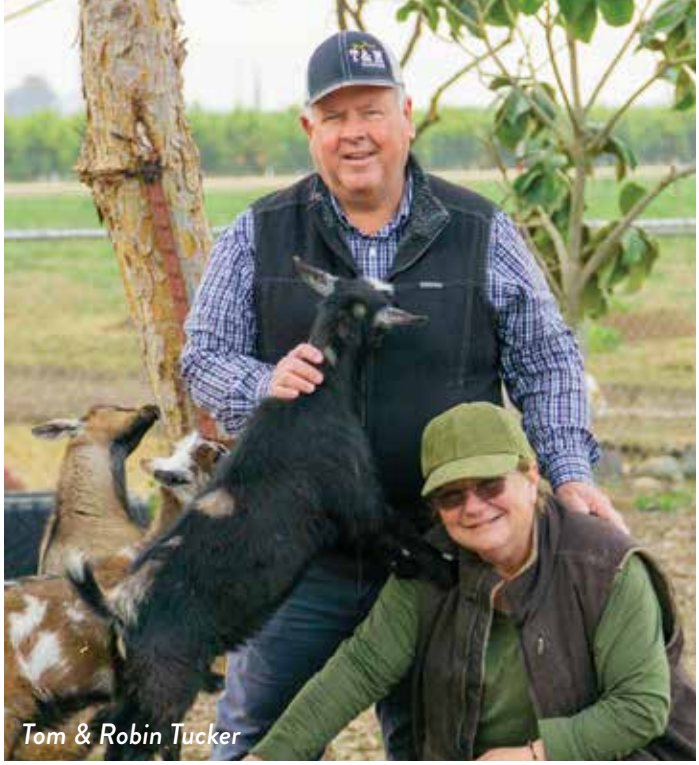
made great strides in this area, and they didn't need new regulations to do so. "We used to be almost 100% flood or surface irrigation, but now we are using drip and fan jet systems that are cheaper and easier to use. These are just a couple methods to consider."

Expanding on the topic of water, Tom feels the next step is to look at storage: "In the last century, there were a multitude of reservoirs built to do just this, and they have been critical in developing irrigated agriculture in Tulare County and through the state. Since then, we have been able to make a couple steps forward in this area with some rather small storage projects, but they are not enough. We need wholesale changes in the way the State processes storage projects, because we can't wait 20 years for every decision made."

When asked how we can better work together to communicate and collaborate, Tom doesn't hesitate to point out: "Communication and collaboration are the beginning steps to answer any question. Not uncommon is a grower speaking with another grower, but we should also be communicating with other non-grower neighbors. For example, if you are planning to spray next to your neighbor on a certain date, it is always a good idea to inform your neighbor so they can make appropriate plans. Perhaps they are planning a children's party and you inadvertently drift on them. Where would everybody be then? A little communication would have prevented a lot, not to mention preserved your friendship."

He continues by articulating that we can take this same thought process and move it to a local Farm Bureau meeting, Industry group meeting, or CAPCA meeting. "Thoughts and questions can be discussed, and others may give input too. Perhaps it is about larger issues that deal with laws or regulations? These are the beginning steps to obtaining a beneficial result. I have found that collaboration at all levels will go a long way to reaching an amicable agreement, no matter the issue. You may still not like the outcome, but what would it look like if you didn't even try?"

Reflecting on what stands out during his years as an Agricultural Commissioner, Tom says: "I am not sure that there is a single biggest highlight of my career as an Agricultural Commissioner, other than being an Agricultural Commissioner/Sealer of Weights and Measures. I mentioned earlier that my working life started on the farm, continued through college and beyond to where I am now. In the process, I grew different commodities, worked in, and owned different agricultural businesses where I rubbed shoulders with other Industry folks and regulators as well. Now, I am and have been working on the enforcement side of things



Tom & Robin Tucker

and have found out that it is all about cooperation. The goal is to gain cooperation and give it too. I came to realize that I am just one part of our community, and my goal is to leave Agriculture in Tulare County better than I found it. Not that I have all the answers."

We asked Tom what is a frequently asked question he often hears from a grower, applicator or PCA that would be good for everyone to be reminded of. "The question I get asked the most, from growers, is how can we keep others out of our business," says Tom. "For the most part, they are referring to local activists and government. Many times, they feel like they are constantly having to deal with new laws, new regulations, and others that are trying to tell growers what and how to do their job. When it comes to government, I always remind growers that they already have many advocates in their corner, they probably just don't realize it. California has several commodity groups that work tirelessly to review and prevent bad laws and regulations from coming into existence."

Tom feels he would be negligent to not remind readers that their local agricultural commissioners, and Boards of Supervisors too, are there to protect the agricultural industry. "Yes, we are an enforcement agency, but we also have an eye out to protect the Industry from poorly thought-out legislation. Many times, activist groups can gain some traction with legislators, and county agricultural commissioners, as an association, can work to bring common sense into the discussion. Working with your local agricultural commissioner will help growers understand the issues and may provide a pathway to prevent some group from getting further into your business." ■

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[1]California Department of Food and Agriculture 2015 Specialty Crop Block Grant Program Project Abstracts, 2015.
[2]BCS Internal Demo Trials: Fresno, California, 2017. [3]BCS Internal Demo Trials (13 total): San Joaquin Valley, California, 2016-2018.

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DPR targets neonics on two fronts, while Newsom's climate plans raise more pesticide discussions

Brad Hooker, Agri-Pulse

The California Department of Pesticide Regulation is finalizing a years-long effort to further tighten the use of neonicotinoids in the state. The department plans to approve in early 2023 regulations for new tier-based restrictions to protect bees and other pollinators. At the same time, it is investigating contamination in drinking wells from one of those four pesticides, which brings the potential for new regulations aimed at protecting human health and safety.

"Our continuous evaluation of pesticides plays a critical role in accelerating a transition to safer, more sustainable pest management that protects the health of our communities, our pollinators and the environment as a whole," said DPR Director Henderson in a statement on the draft proposal.

DPR has revised the proposed regulations on imidacloprid, thiamethoxam, clothianidin and dinotefuran to address several concerns farm groups raised in 2020. The department is now seeking to tailor the requirements to specific crop types and factor in emergency uses to contain certain outbreaks, allowing growers to combat citrus greening and leaf curl virus in grapes.

"Through the risk determination process, DPR found that a one-size-fits-all approach to mitigation would not be feasible," explained Brittanie Clendenin, an environmental scientist within DPR's registration branch, during a recent meeting for the Pesticide Registration and Evaluation Committee. "Therefore, DPR is proposing mitigation measures through crop-specific regulations."

DPR has organized the regulations by crop group, with some general restrictions, such as bloom prohibitions, that apply across each group section. The groups will have specific application and timing restrictions based on residue data. The revised regulations present a tiered approach based on attractiveness to bees and harvesting practices, applying research from a 2018 USDA report that indicates the relative attractiveness of each crop to pollinators.

For highly attractive crops, such as citrus, DPR would levy general restrictions along with specific rate and timing requirements. Moderately attractive crops, which do not provide a significant portion of a bee's diet when other food sources are available, would have general restrictions. But rate and timing restrictions could apply when managed pollinators are brought into the field for pollination services. DPR would allow some exemptions for crops that are not attractive to bees or that are harvested before bloom.

Along with the restructured layout, DPR is updating its proposed rate and timing restrictions for citrus crops, grapes, cereal grains, fruiting vegetables, legumes, oil seeds, palm fruit and the root and tuber crop group.

DPR is also revising exemption language for applications to quarantine invasive pests, like Asian citrus psyllid (ACP), and applications to address emergency situations, along with exemptions for commodities grown inside enclosed spaces, such as greenhouses or under a structure blocking out insects. DPR would no longer limit applications to a single chemical or application method in the year, but does plan to cap the total application rates for all four pesticides for each season.

DPR estimates the regulations will impact 57 products currently registered in California and will reduce the amount of neonicotinoids applied across the state by approximately 45%. A DPR report acknowledges the regulations would hurt the ability of California farmers to compete with those in other states.

A CDFA assessment found the regulations, over the course of the five-year implementation, would impact more than 70,000 growers, costing them as much as $166 million. Though a steep price, DPR reasoned that it would only cost each grower an extra $470 per year and is a minimal price tag within the context of one of the world's largest economies.

"While the proposed regulations will have a statewide economic impact, the impact will not be significant," DPR determined.

DPR is taking comments through April 26, with a hearing set for April 25.

Meanwhile, DPR is considering whether it should allow the registration of imidacloprid specifically to continue for agricultural use.

Last year DPR discovered 15 groundwater wells in Fresno, Santa Barbara and Tulare counties tainted with high concentrations of the neonicotinoid. DPR determined the contaminants came from legal use of the pesticide. At the hearing, DPR's advisory committee for pesticide registration will review the evidence and take testimony from registrants, along with other public comments, before providing recommendations to the DPR director.

DPR has scheduled a hearing for late March with a later follow-up hearing to be decided later.

As far as imports, new data from USDA's Agricultural Marketing Service shows that fruits and vegetables coming into the U.S. more frequently contain trace amounts of neonicotinoids. The neonicotinoid acetamiprid was detected in about 41% of Guatemalan cantaloupes and 8.3% of domestic samples. The neonic imidacloprid was detected in 55.5% of the samples from Mexico and 17.9% of the U.S. samples.

For U.S. products, on the other hand, less than 1% had pesticide residues above tolerances established by the U.S. Environmental Protection Agency, and 30% had no detectable residue.

Several California agencies outside of DPR will be focused on pesticides this year as the Newsom administration implements a series of climate plans, which are opening new conversations about reducing the use of conventional pesticides to lower emissions and protect biodiversity while ramping up organic farming to capture more atmospheric carbon within the soil. This includes an update to the state's seminal climate policy, the AB 32 Climate Scoping Plan, and reports for adapting to climate extremes and climate-smart strategies for natural and working lands. ■

Protecting Our Pollinators- Modernizing Bee Protection Regulations

Brian Gatza, Kern County Deputy Agricultural Commissioner

Over the past few years the need and desire to protect bees, whether it be by regulation or industry cooperation, has been a work in progress. To that end, collaboration amongst regulators, growers and the bee industry has been gaining ground to strengthen pollinator protections. There was a necessity for a more streamlined approach which would allow for improved communication and coordination between all stakeholders comprised of regulatory agencies, Pest Control Advisers, Pest Control Operators, and apiary operators, to come together for the goal of protecting bees. Previously, communication between the regulated communities was lackluster, and often times, teetered from just okay to downright frustrating. Typically, bee clearances were primarily handled by the local Agricultural Commissioner's office during their business hours. Some counties also may have utilized private or local bee services. However, both relied on obsolete technologies, such as markups made to paper maps displaying apiary locations. Usually, these maps were pinned to walls and often rampant with line outs, blurring the lines between what locations were current and ones which were not. Discrepancies were bound to occur- and did- but often as a result of human error.

California law and local County ordinances reinforced and updated the requirement that all apiary operators register their apiaries with their local agricultural commissioners. BeeWhere was created in partnership with CAPCA, CACASA, CDFA, and CDPR with the intent to create a better platform to host communication amongst growers, pesticide control applicators and advisers, and the bee industry. The BeeWhere program functions as an electronic hub for beekeepers to register their apiaries, and for growers and pest control applicators to run bee checks for apiaries located within a mile of where they intend to make an application of a pesticide known to be toxic to bees. Fundamentally, it's an efficient, clean, and accurate plan of action that can be accessed anytime to accomplish the multiple roles needed in one common place.

Despite the technological advancement that is the BeeWhere program, bee protection regulations were in need of freshening. Last year, DPR began the process of updating this set of regulations. As a result, DPR amended and renumbered Title 3, California Code of Regulations (3CCR) for Bee Protection. The bee protection regulations are now sections 6980, 6981, 6982, 6983, and 6984 and went into effect on January 1, 2022. This regulatory update was more about cleaning up and clarification of previous regulatory language than it was about a drastic overhaul of the previous regulations. This update includes amendment and revisions to improve consistency between State regulations and Federal pesticide labeling laws as required by FIFRA.

To better understand the changes and to provide some additional clarity with these updated regulations, three critical areas of the new regulations will be highlighted: 1) Definition of pesticides toxic to bees and inactive period for bees; 2) Notification to apiary operators; and 3) Citrus/bee protection areas.

First, what are pesticides toxic to bees? Pesticides toxic to bees are pesticide products with labels that include the words "toxic to bees" regardless of any other modifying words that may be present on the labeling. Vague wording such as "moderate" or "substantially" toxic to bees creates confusion by establishing a misleading categorization of varying levels of toxicity. If a pesticide label contains "Toxic to bees" in its wording, it is toxic to bees, period.

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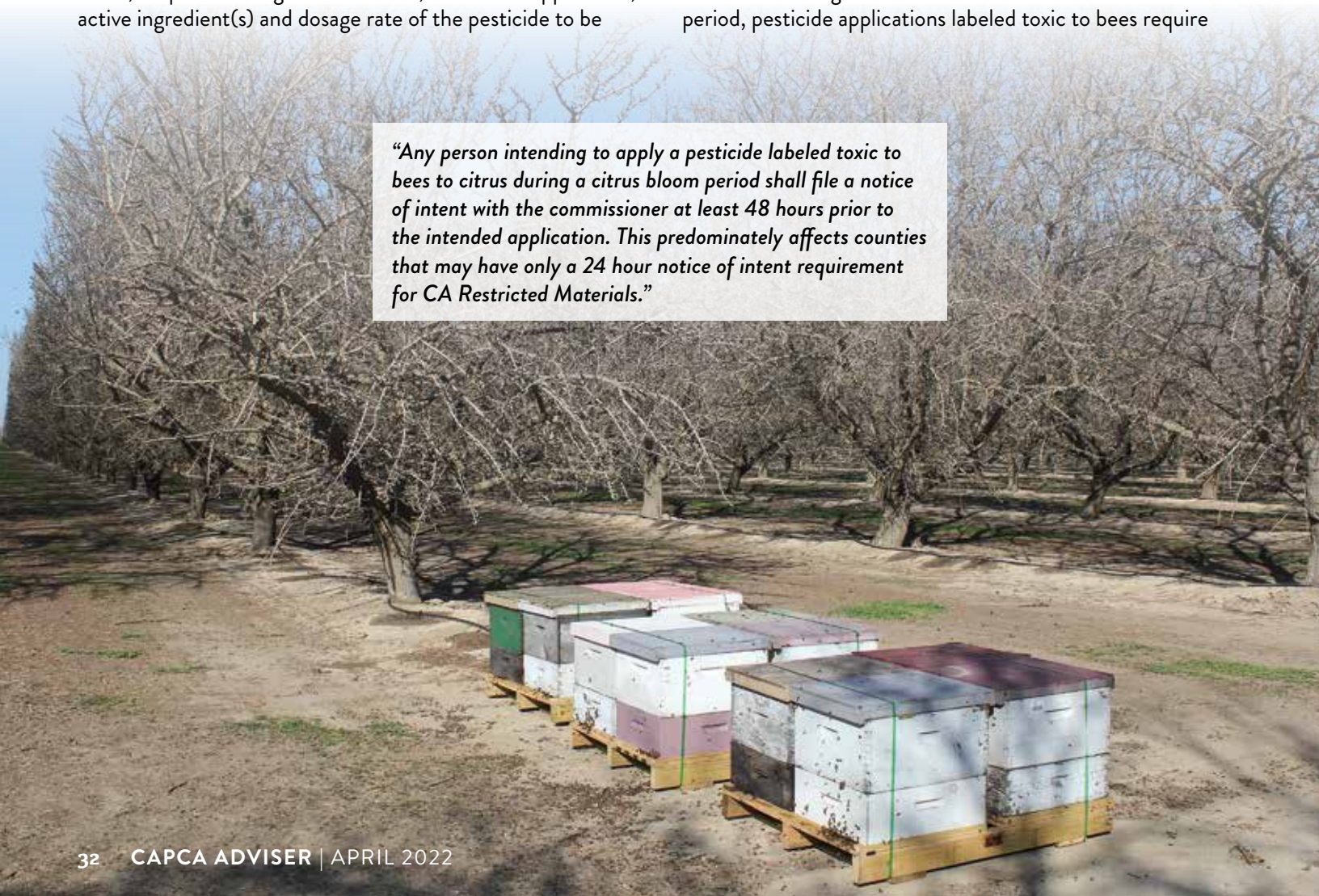
It is also important to define the period of time in which bees are considered inactive. Bees are considered to be inactive from one hour after sunset to two hours before sunrise or when the temperature is below 50 degrees Fahrenheit (previously it was below 55 degrees Fahrenheit). Sunset and sunrise times are those times indicated in the local newspaper or on the local news website (if one prefers to check online).

The second critical area pertains to advanced notification. Previously, notification was primarily addressed to "beekeepers," but due to the large presence of bee brokers managing thousands of apiaries, it was important to broaden the term to "Apiary Operators." Notification requirements remain relatively unchanged in that each person intending to apply any pesticide labeled toxic to bees to a blossoming plant shall, prior to the application, inquire of a notification service (BeeWhere), whether any apiary operator with apiaries within one mile of the application site, has requested notification of such application. If the person performing pest control is made aware of a request for notification, they must notify the apiary operator at least 48 hours in advance. The required notification information remains unchanged in that it must include: time and place the application is to be made; crop and acreage to be treated; method of application; active ingredient(s) and dosage rate of the pesticide to be applied; and how the person performing pest control may be contacted. The most efficient system to run these bee checks and identifying notification requests made by apiary operators is through the BeeWhere system.

Apiary operators are required to register the location of their apiaries with their local agricultural commissioner (BeeWhere) before March 15 and provide any updates within 72 hours of any apiary location changes, including notice of departure from the County. Each apiary operator who desires to receive advance notification of pesticide applications of products labeled toxic to bees that will be performed from March 15 through May 31, shall inform the commissioner (BeeWhere).

The last significant area to highlight is the Citrus/Bee Protection Area. This section of the regulation still may cause the most confusion when compared to the other bee protection regulations due to seasonal requirements. Citrus/Bee Protection Areas only apply during the time period of March 15 through May 31, and are defined as areas within one mile of any citrus planting of one acre or more within Fresno, Kern or Tulare Counties. The methodology for calling citrus bloom and petal fall determinations remain the same. During the Citrus/Bee Protection Area time period, pesticide applications labeled toxic to bees require



"Any person intending to apply a pesticide labeled toxic to bees to citrus during a citrus bloom period shall file a notice of intent with the commissioner at least 48 hours prior to the intended application. This predominately affects counties that may have only a 24 hour notice of intent requirement for CA Restricted Materials."

advanced notification of at least 48 hours (unless exempted). Additionally, applications including pesticides toxic to bees may be made 48 hours or more after the official end of citrus bloom without advance notification to apiary operators until March 15 of the following year.

Any person intending to apply a pesticide labeled toxic to bees to citrus during a citrus bloom period shall file a notice of intent with the commissioner at least 48 hours prior to the intended application. This predominately affects counties that may have only a 24 hour notice of intent requirement for CA Restricted Materials. This section of the regulation applies to California Restricted Materials intending to be applied to citrus during the citrus bloom period when bees are inactive. If any pesticide applications requiring notification to an apiary operator are to be made during a citrus bloom period, and results in an application delay of 48 hours or more, the person intending on making the pesticide application is required to re-contact the apiary operator to inform them of the change in scheduling.

The requirements indicated above do not apply (exempted) to the following pesticides products being made during the citrus bloom period when bees are inactive, nor do they require advanced notification to apiary operators: 1) any pesticides that are not "toxic to bees" according to the product labeling; 2) any pesticide applied so that the time period of Residual Toxicity specified on the product labeling will expire before the next period of bee activity; and 3) Any pesticide with labeling that includes the words "toxic to bees," if the pesticide labeling allows for applications to be made when bees are inactive.

Carbaryl applications to citrus remain prohibited from first bloom until complete petal fall. For any pesticide labeled toxic to bees (apart from the exempted materials stated in the previous paragraph), the regulation allows the application to occur if it is being made to control a California Department of Food and Agriculture declared quarantine pest, or a need for the control of Lepidoptera larvae or citrus thrips has been established by written recommendation of a licensed Pest Control Adviser or University of California Cooperative Extension representative.

The revamping of the bee protection regulations, as any new regulatory change, historically initiates many questions. Your local agricultural commissioner's office serves as the best resource for information and can answer any questions that may arise in regard to these changes. Protecting pollinators is critical not just from a regulatory standpoint, but as a necessity to allow the pollinators to keep doing what they do best pollinating the many crops that we all depend on. ■

BeeWhere Recognition

George Soares - Kahn, Soares & Conway

Making room for success to speak for itself is a road too seldom traveled but is often the wiser path: allow results to be the voice. There are times, however, when context is needed to fully appreciate and energize what happened and why. The newly minted BeeWhere Program is one such instance.

The expanding recognition of BeeWhere in itself speaks loudly to what has been accomplished but perhaps not urgently and loudly enough. The need to protect bees which busily pollinate crops each spring that produce billions of dollars of farm income each fall demands more. Positive noise from every quarter will accelerate recognition and have the beneficial effect of protecting this vital service and thereby make the system function as it must.

Even though protective laws regulating the management of apiaries have existed for decades, loopholes in the system and ongoing communication gaps between beekeepers, growers, pest control advisers, applicators and government officials have been harmful to all, especially the bees which annually provide their pollinating services to millions of acres of crops. Clearly, it's an unacceptable situation for all involved in the largest agricultural industry in the nation.

Rather than be witnesses to this troubling history, the California Association of Pest Control Advisers (CAPCA) and the California Agricultural Commissioners and Sealers Association (CACASA) stepped into the breach and worked with the California Legislature and Governor to upgrade the law which is now commonly referred to as the BeeWhere program.

Thanks to their leadership, those moving bees into California must provide more detailed information, including registration of the owner's name, the number of colonies and their locations, more timely notification of colony movement within California, and increased administrative penalties for non-compliance.

It is often said, and correctly so, that California agriculture is overregulated. There is also merit to the thought that the regulations we have must serve the intended purposes. Thanks to CAPCA and CACASA, we now have BeeWhere and the enhanced regulations we need to actually protect bees and all the good they do. ■

CALIFORNIA LEGISLATURE—2021–22 REGULAR SESSION

Assembly Concurrent Resolution **No. 60**

Introduced by Assembly Member Fong

March 25, 2021

Assembly Concurrent Resolution No. 60—Relative to BeeWhere Month.

LEGISLATIVE COUNSEL'S DIGEST

ACR 60, as introduced, Fong. BeeWhere Month.

This measure would, among other things, proclaim the month of April of each year as BeeWhere Month.

Fiscal committee: no.

WHEREAS, Bee pollinators have been essential to maximizing production in numerous California-grown crops; and

WHEREAS, A regulatory program was established in the 1980s to encourage communication between beekeepers and pesticide applicators to protect working bees during pollination; and

WHEREAS, The California Association of Pest Control Advisors with the leadership of its president, Ruthann Anderson, in coordination with the California Agricultural Commissioners and Sealers Association and, in particular, Commissioners Ruben Arroyo (County of Riverside), Louie Mendoza (County of Butte), and Rick Gurrola (County of Shasta), were instrumental in the formation of the BeeWhere program; and

WHEREAS, Assembly Bill 2468 (Chapter 320 of the Statutes of 2018) provided a statutory mechanism for beekeepers to register their hives and provide notice of hive locations; and

ACR 60 **— 2 —**

WHEREAS, Pesticide applicators can now access such information and thereby protect bee pollinators year round when pesticides are being applied; and

WHEREAS, At least 75 percent of the nation's bees annually bring their services to California during peak pollination periods; and

WHEREAS, This supply of imported bees along with approximately 500,000 native California beehives pollinate millions of acres of California crops; and

WHEREAS, The annual economic activity of pollinated crops results in billions of dollars of farm gate income; and

WHEREAS, It is appropriate for all Californians to recognize the efforts of farmers, pest control advisors, beekeepers, regulators, and others involved in protecting bee pollinators; now, therefore, be it

Resolved by the Assembly of the State of California, the Senate thereof concurring, That the Legislature recognizes and honors those leaders who established the BeeWhere program and hereby proclaim the month of April of each year as BeeWhere Month; and be it further

Resolved, That the Chief Clerk of the Assembly transmit copies of this resolution to the author for appropriate distribution.

L-R: Ruben Arroyo (Riverside County), Louie Mendoza (Butte County), Ruthann Anderson (CAPCA), Assemblymember Vince Fong, Rick Gurrola (Shasta County)

L-R: Ruben Arroyo (Riverside County), Ruthann Anderson (CAPCA), Louie Mendoza (Butte County), Rick Gurrola (Shasta County)

Photo: A. DeSilva

SPECIAL TO THE ADVISER

Protecting Pollinators Throughout the Seasons

Dr. Josette Lewis, Chief Scientific Officer, Almond Board of CA

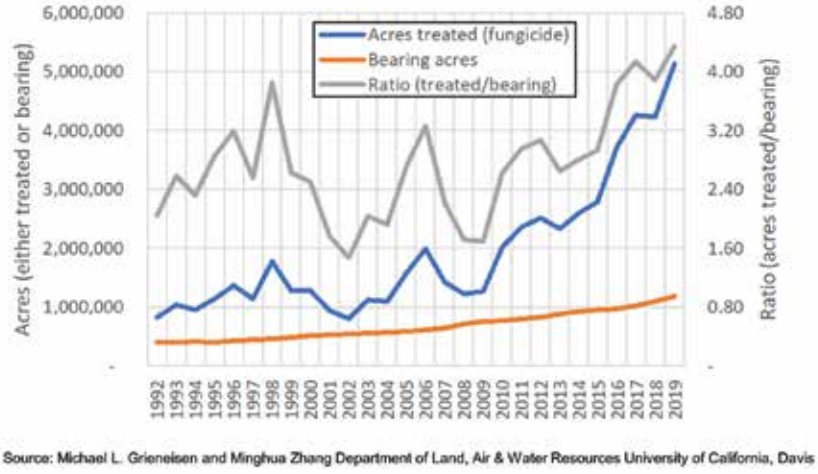
With bloom behind us, PCAs and growers attention turns to protecting the nuts that have now set. While the honey bees have moved on from almonds, protecting pollinators is becoming a season-long consideration. The legal case against listing native bees under the State's endangered species act is still playing out in court. At the federal level, the U.S. Department of Fish & Wildlife will reconsider the listing of monarch butterflies. And we expect the report of the Department of Pesticide Regulation's Sustainable Pest Management Working Group to come out shortly, setting direction for continued pressure on crop protection tools.

Just a year ago, the Almond Board, together with the California Department of Food and Agriculture and Pollinator Partnership, co-founded the California Pollinator Coalition. The majority of the state's crop acreage is represented by their commodity associations, united under the goal of demonstrating that agriculture can be part of the solution to healthy biodiversity. In its first year, the Coalition will produce a California guide for habitat on agricultural lands and is working with the U.S. Fish & Wildlife Service to protect growers who step-up on providing habitat so that they are not penalized should an endangered species listing occur in the future.

CAPCA's membership in the California Pollinator Coalition reflects the key role that PCA's play in pollinator protection. Recommending to growers and applying proven IPM practices can keep pollinators safe while still protecting the crop. It is a good reminder that these practices were developed from almond grower-funded research, demonstrating the importance growers place on IPM.

Key practices among these are using monitoring and threshold-based decision-making, rather than simply following a calendar to make decisions. Almond Board-funded UC Cooperative Extension research, for example, showed that skipping a May spray for spider mites on 80,000 acres for two years resulted in a whopping $2.2 million savings in miticide and application while still keeping mites in check.

Use of mating disruption reduces sprays needed to control navel orangeworm (NOW) sprays while keeping damage under the thresholds for premium quality nuts. Keep a look out for the second Navel Orangeworm Summit the Almond Board will host this May to share industry experience and new research about how to get the best value from NOW control.

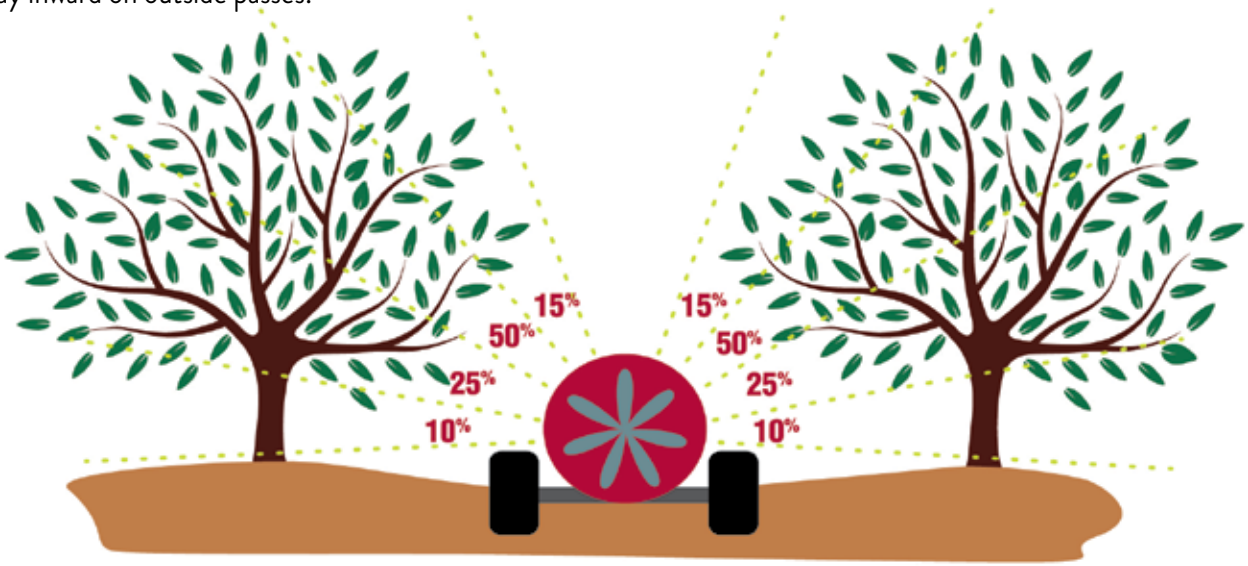


Increased fungicide use on almonds: California state data shows a steep rise in fungicide applications in the summer.

State data shows a steep rise in fungicide applications in the summer. Perhaps take a second look at effective IPM alternatives that can save money while keeping fungal diseases under control. Hull rot, for example, can be well managed by taking leaf samples in July to prevent overfertilization, a cause of hull rot, leading up to harvest. With fertilizer prices skyrocketing this year, using the right amount of nitrogen offers significant cost savings. The practice of deficit irrigation leading up to hull split can also help to reduce the risk of hull rot using cultural practices.

And reducing spray drift is critical year-round to protect sensitive habitat. This might be hedgerows planted outside the orchard or nearby waterways. As almond trees leaf out, air blast sprayers should be calibrated, not only reducing drift, but to ensure optimal coverage throughout the tree. Map out your route through the orchard to ensure that you only spray inward on outside passes.

PCAs can find the latest research and tools on **Almonds.com** and at frequent industry and UC Cooperative Extension events. Adding IPM tools into your practice will help us deliver benefits to biodiversity and even save some costs to the grower. That's good business for everyone. ■



Ideal spray coverage for almonds. Ensuring the product hits the target and the spray is as effective as possible helps reduce waste and provide benefits to the environment. If you divide the tree into quadrants, starting at the top, each quadrant should receive 15%, 50%, 25% and 10% of the volume, respectively. Using this breakdown gives 65% coverage in the top half of the tree and 35% in the bottom half. By default, 75% of the volume will be directed to the middle of the tree.

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Crystelle Turlo, Chief Operations Director

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2. The sponsor has not reported the Continuing Education hours. In this case, reach out to the sponsor and ask them to turn in their hours. Unfortunately, some sponsors may not be turning in their hours because they do not know how, or they do not understand the value of reporting their hours to the industry. Your contact with them helps the sponsor understand the importance of submitting the attendance reports.

CAPCA has created an easy way to know if a course will be reported on your Official CE report.

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* October issue fills quickly, first come, first served

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

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Pythium wilt of lettuce, biology and control

JP Dundore Arias, Plant Pathology Professor, CSU Monterey Bay, and Richard Smith, Farm Advisor, UCCE Monterey Co.

Photo 1. Collapse of outer leaves and upright inner leaves

Pythium wilt (*Pythium uncinulatum*) is now a serious soilborne disease affecting lettuce production in the Salinas Valley. This disease was first reported in California in the Coachella Valley in 1995, and in 2011 it was first found in one field in Monterey County but caused little crop loss. However, the incidence of Pythium wilt began to increase and in 2014 several fields were infected causing significant loss. In 2020 widespread outbreaks of Pythium wilt occurred causing severe crop loss in the northern part of the Salinas Valley. Significant crop losses continued in 2021 and the disease appears to be entrenched in the valley.

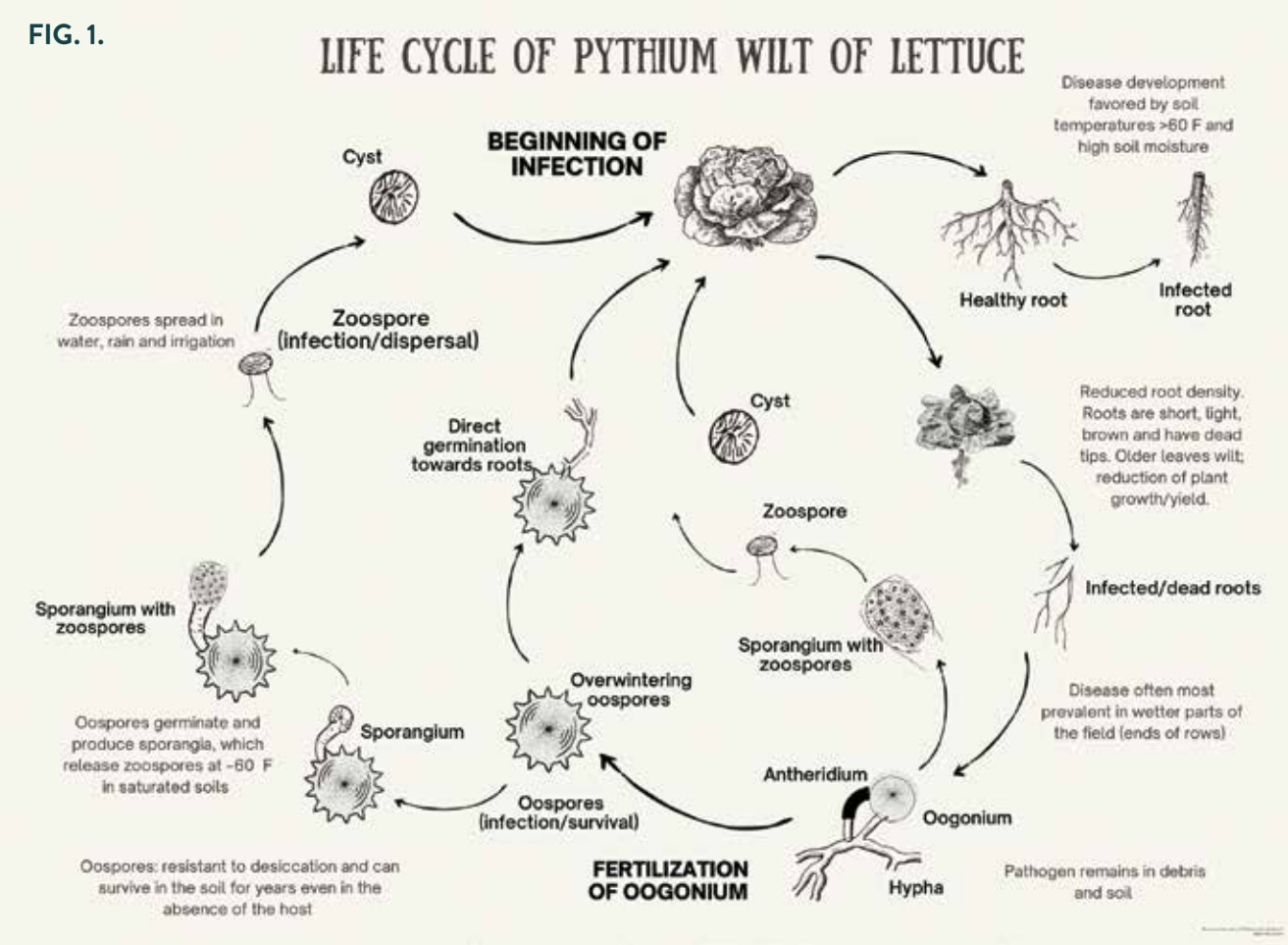
The main species of *Pythium* reported causing Pythium wilt of lettuce is *P. uncinulatum*. While other species of *Pythium* may also be associated with Pythium wilt disease, *P. uncinulatum* is most frequently encountered, and is likely the dominant species infecting lettuce across the Salinas Valley. Pythium wilt is not a seedling disease of lettuce, but rather infects older plants with above ground symptoms initially becoming evident on plants between the thinning and rosette stages. Initial symptoms of the disease are stunting of the plant and wilting of older leaves. As the disease progresses, the older, outer leaves turn yellow then necrotic and then collapse forming a ring around the younger leaves that remain upright and green (Photo 1). Eventually, the whole plant collapses and dies.

Upon examination of the roots, there is rot on the fine feeder roots and/or on the tap root (Photos 2 & 3). There is no other disease of lettuce that causes rotting on the roots which can help in the identification of the disease. However, other soilborne disease that have similar above ground symptoms include lettuce drop (*Sclerotinia minor*), and Bottom rot (*Botrytis cinerea*) which cause rotting of the crown of the plant which does not extend down to the roots. The wilt diseases, Verticillium wilt (*Verticillium dahliae)* and Fusarium wilt, (*Fusarium oxysporum* f. sp. *lactucae*), also cause collapse of the above ground parts of the plant, but do not cause rot on the roots or taproot. Viral diseases such as Impatiens necrotic spot virus (INSV) or *Lettuce necrotic stunt virus (LNSV)* may cause extensive necrosis on the leaves of lettuce but do not cause wilting.

The pattern of infection by Pythium wilt in the field can be distinctive. It tends to occur first at the bottom end of the field where the soil may remain wetter for longer periods of time which can favor the disease (Photo 4). However, in severe outbreaks, the disease eventually develops throughout the entire field (Photo 5).

Epidemiology. *Pythium uncinulatum* produces spiny oogonia enclosing the sexual spores called oospores (Figure 1). These thick-walled spores are produced in infected roots and surrounding soil and are likely responsible for the long-term survival of the pathogen in the soil, allowing

FIG. 1.



them to withstand extreme environmental conditions in the absence of susceptible host plants. Asexual spores called zoospores are produced from sporangia, and they are motile (swimming) which allows them to disperse in saturated soil and to be spread in irrigation water. Although the survival of *P. uncinulatum* sporangia and their ability to produce zoospores in the rootzone of infected plants is not well-understood, the zoospores are commonly found in wet soils and may explain why the disease is often associated with wetter portions of production fields. Infested soil from previous seasons and introductions to the field from contaminated equipment is likely the main source of the long-lived oospores, the primary inoculum. Currently, little is known about the factors that influence the longevity and production of both the overwintering oospores and motile zoospores.

While *Pythium* species are broadly known for having wide host ranges and documented as pathogens of a variety of horticultural crops, previous studies have noted that *P. uncinulatum* may be an exception. For example, one greenhouse study conducted in Japan reported strong specificity of *P. uncinulatum* to lettuce and other plants in the *Compositae* family, but not to other vegetable plants in the *Apiaceae*, *Brassicaceae*, *Cucurbitaceae*, or *Solanaceae* families. In a study from the Netherlands, *P. uncinulatum* was shown to be highly virulent on lettuce, while not or only weakly pathogenic on other crops.

Temperature appears to be a key environmental factor affecting the development Pythium wilt. In the 2020 Salinas Valley production season, Pythium wilt was most severe from August to October during the warmest months and coinciding with two hot spells. Disease incidence and severity in lettuce grown in the same infected fields the following spring during cooler weather in 2021 had little to no infection. Differences in soil temperature between the two crop seasons likely caused the observed differences in disease incidence.

Levels of soil saturation may also interact with the incidence of high temperatures because growers may apply extra water during these times which also may favor the dispersal of motile zoospores. The combination of high air and soil temperatures as well as saturated soil conditions may accelerate *P. uncinulatum* development and root infection of heat-stressed plants. Interestingly, although we have identified *P. uncinulatum* as far south as King City, currently there has been little documented losses due to Pythium wilt in the southern Salinas Valley which has warmer temperatures. It is not clear why this is the case.

Photo 2. Infection on tip of tap root

Photo 3. Infection on fine feeder roots

Management. Efforts to find a simple and reliable control measure for Pythium wilt have proven to be difficult. Laboratory evaluations indicate that mycelial growth was reduced 75% with increasing concentrations of mefenoxam at 1, 10, or 100 ug/mL compared to untreated media. These results indicate that mefenoxam is effective at inhibiting this pathogen. However, fungicide trials conducted in commercial fields in 2021 in which mefenoxam and other fungicides and biologicals were sprayed over the top of the plants and watered in with sprinkler irrigation showed a measurable but modest reduction in the percent of infected plants (Table 1). Admittedly, this may not be the most effective method of applying these materials because the material needs to move to all parts of the root system at an effective concentration to successfully inhibit this disease. In two other tests in which mefenoxam was injected into the drip system during an irrigation, again a measurable but modest reduction in Pythium wilt infection was observed.

Photo 4. Infection worse on the tail end of the field

Varietal resistance or tolerance to Pythium wilt shows promise for helping growers to cope with this disease. In informal evaluations in 2021 we observed the percent wilted plants in different varieties ranged from 1.5 to 47.6% of total plants. There were other soilborne diseases present at the trial site, so careful identification of Pythium wilt infected plants was necessary, and when taken into account, the romaine varieties Momentus and Copious had the lowest percent of Pythium infected plants indicating good tolerance to this disease. These results indicate the co-occurrence of Pythium wilt and other soilborne diseases and raises the question of whether they may interact while infecting a susceptible host. Clearly, more research is needed to better understand varietal tolerance of Pythium wilt and other associated soilborne diseases.

There are many aspects of Pythium wilt that need to be better understood. The impact of prior rotations, longevity of *P. uncinulatum* in the soil, alternate hosts to the disease, effective application methods for fungicides and biologicals and the impact temperature and soil moisture conditions all need further research. At present, varietal tolerance shows promise for reducing crop loss caused by Pythium wilt. The good news is that this tolerance is present in currently used breeding lines and hopefully it can be quickly incorporated into other commonly used lettuce types. ■

Table 1. Percent of plants infected with Pythium wilt on each evaluation date

Treatment		Trial 1[1]			Trial 2[2]	Trial 3[3]	
	Rate						
		Sept 20	Sept 27	Oct 4	Sept 28	Oct 21	Oct 26
Untreated	---	1.4	9.0	19.1	26.7	35.1	58.6
Propamocarb hydrochloride	2 pints/A	0.9	4.7	14.2	---	---	---
mefenoxam	2 pints/A	0.2	2.7	14.5	20.6	31.7	53.1
Aluminum tris (O-ethyl phosphonate)	5 lbs/A	0.0	3.3	14.0	---	---	---
Bacillus mycoides	4.5 oz/100 gal	1.2	4.0	12.7	---	---	---
Cyazofamid	2.75 oz/A	0.7	4.9	13.6	---	---	---
Pr>F treat		0.0993	0.0346	0.4652	0.0585	0.5576	0.0769
$LSD_{0.05}$		ns	3.8	ns	6.5	ns	6.9

1 – Material sprayed over top of bed (planting, thinning and rosette stages) and watered in with sprinkler irrigation

2 – Material injected into the drip system at the rosette stage

3 – Material injected into the drip system at thinning and rosette stages

Protecting Sacramento Valley waterways from pyrethroid exceedances

David Haviland, Katherine Jarvis-Shean, Rachael Long, and Franz Niederholzer, University of California Cooperative Extension

Protecting California's waterways from pesticides is the joint responsibility of all Californians. These protections need to be implemented within urban as well as agricultural environments because typical watersheds are influenced by hundreds, if not thousands, of individual point sources that are associated with homes, other residential buildings, farms and right-of-ways. While it is true that one individual point source can lead to contamination of a waterway, it is often the cumulative effects of numerous point sources that leads to exceedances of pesticides.

During the past two decades there has been a concerted effort to keep pesticides out of waterways in the Sacramento Valley. For many years the focus was on organophosphates. Significant amounts of research on reduced-risk pesticides chemistries, alternatives to dormant spray applications in orchards, improved application technologies, and the regulatory cancellation of many urban and agricultural organophosphate products have led to significant reductions in use. Between 2000 and 2019 there has been a steady decline in organophosphate use by farmers, ultimately leading to a 62% overall reduction in acres treated (Fig. 1) and 71% reduction in pounds applied (Fig. 2). When pesticide use data for 2020 and 2021 are released, it is anticipated that there will be further reductions due to the discontinued use of chlorpyrifos and other changes in grower practices.

As farmers have reduced their reliance on organophosphate insecticides for pest control, there has been a shift to other control tactics. This includes increased reliance on biological control, the adoption of innovative pest management techniques like mating disruption, use of resistant plant varieties, and shifts to a wide range of alternate pesticide chemistries. Most challenging for the topic of watersheds has been a shift towards increased use of pyrethroids (Fig. 1, 2). Similar to organophosphates, pyrethroids are broad-spectrum contact insecticides that control a wide range of agricultural pests.

Unfortunately, as the levels of organophosphate detections in waterways have gone down, the levels of pyrethroid detections have gone up. In general, the amounts found are low and within levels considered safe for aquatic life. Nevertheless, cases of exceedances do occur, and these cases need to be eliminated.

Between 2015 to 2019, Pesticide Use Reports from the California Department of Pesticide Regulation show that approximately 65,000 pounds of pyrethroid active ingredients were applied annually to 815,000 acres of farmland representing 104 different agricultural commodities in the Sacramento Valley. Approximately 80% of all usage was within four commodities: almonds, walnuts, rice, and processing tomatoes (Fig. 3). The overall piece of the pie that each of these commodities represents is due, in large part, to the acreages planted relative to other crops, and not necessarily due to high use on a per-acre basis. In almonds, for example, comparisons of acreages treated and

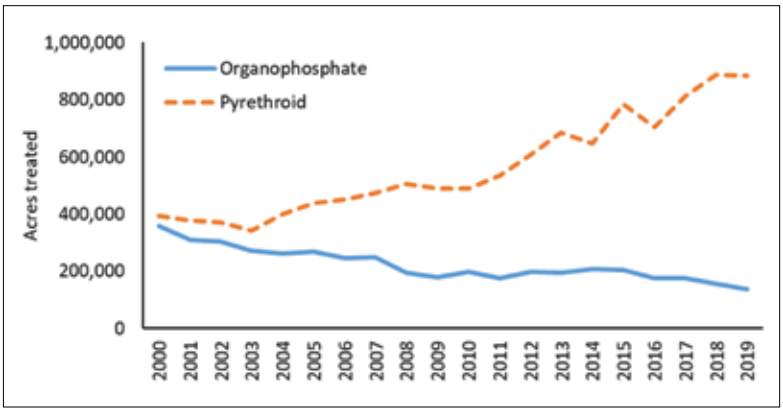


FIG. 1. Annual acres treated with organophosphate and pyrethroid insecticides in the Sacramento Valley from 2000 to 2019. Source: California Department of Pesticide Regulation Pesticide Use Report data.

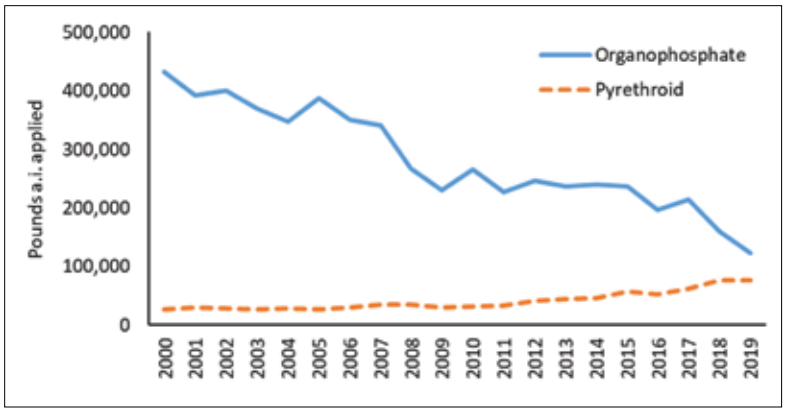


FIG. 2. Annual pounds of active ingredient (a.i.) of organophosphate and pyrethroid insecticides applied in the Sacramento Valley from 2000 to 2019. Source: California Department of Pesticide Regulation Pesticide Use Report data.

actual acres show that the average almond orchard is treated with a pyrethroid once every two years.

Farmers and pest control advisers currently have numerous tools to manage agricultural pests. These tools are commonly sorted into three buckets: cultural controls, biological controls, and chemical controls. The goal is always to rely on biological controls to the greatest extent possible, using cultural controls as needed to help prevent pest problems, followed by chemical controls as needed. When chemical controls are needed, the goal is always to use the least disruptive, yet effective chemical. On the sliding scale from least to most disruptive chemical controls are things like mating disruption, microbial and biological insecticides, selective insecticides, and then broad spectrum insecticides like pyrethroids.

Using almonds as a case study, pyrethroids are typically used during one of three treatment windows routinely referred to as dormant sprays (January), 'May' sprays (mostly in April and May), and hull split sprays (July and August) (Fig. 4).

Applications of pyrethroids during the dormant season are usually made for peach twig borer. This pest was historically considered one of the most significant in the region due to the damage that it caused by directly feeding on almond

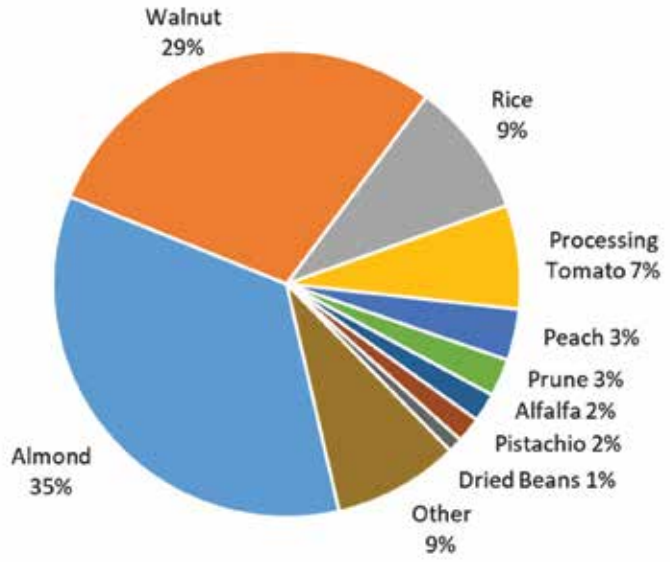


FIG. 3. Percentage of total pyrethroid use by commodity, 2015 to 2019, Sacramento Valley. Source: California Department of Pesticide Regulation Pesticide Use Report data.

kernels. That is no longer the case. As almond growers in the region have switched from flood-based to precision-based irrigation systems, increases in moisture uniformity during the period of shell expansion have led to a stronger shell seal. As a result, peach twig borer larvae are usually found feeding

on the inside of the hull, but outside of the shell where feeding is of no concern.

Additionally, reductions in organophosphate use over the past two decades have increased levels of biological control in almond orchards. For peach twig borer this includes multiple species of parasitoids and field ants. In particular, the native gray ant is known for plucking peach twig borer larvae from their overwintering site (called a hibernacula) to eat them. Faced with decreased issues from this pest, almond growers have already demonstrated significant reductions in dormant insecticide sprays, and in cases where peach twig borer treatments are still needed, most growers have shifted to the use of the microbial product *Bacillus thuringiensis* during bloom, or other reduced-risk larvicides in April or May according to monitoring and degree-day model calculations.

'May' sprays are the second timing window where pyrethroids are sometimes used in almonds. This timing can be for worm pests, such as peach twig borer or navel orangeworm, but is often used to control large bugs, such as leaffooted bug and stink bugs, that can cause significant damage to almond kernels by using their proboscis to probe into the nutmeat. This causes shriveled kernels or nut abortion while the meat is still developing or can leave the kernel misshapen or blemished (dark stain/brown spot) if feeding occurs after it has already formed. Unfortunately, this is a case where there are few alternatives to pyrethroids. Reliable cultural controls for this pest don't exist, biological control is limited to egg parasitoids that are often in low abundance, and trials using reduced-risk insecticides at best have found products that can control a percentage of adults on contact, but that do not provide any residual control against additional bugs that continue migrating into the orchard. Fortunately, on an annual basis the need for stink and leaffooted bug treatments is the exception to the rule, and growers can make treatment decisions on an as-needed basis, while taking care that any pyrethroids applied stay on site and do not drift into waterways.

Hull split is the third period of the year when pyrethroids are used in almonds. Some of these treatments may be for stink bugs, but the majority are for navel orangeworm. This pest is the most significant pest of both almonds and pistachios at a statewide level, and it also attacks walnuts. Larvae drill into the nutmeat where they become the primary cause of nuts being classified as 'inedibles', in addition to the risks that they cause due to their associations with *Aspergillus* sp. fungi that have the potential to produce aflatoxins.

Almond farmers battle navel orangeworm each year using an integrated approach that includes sanitation, timely harvest,

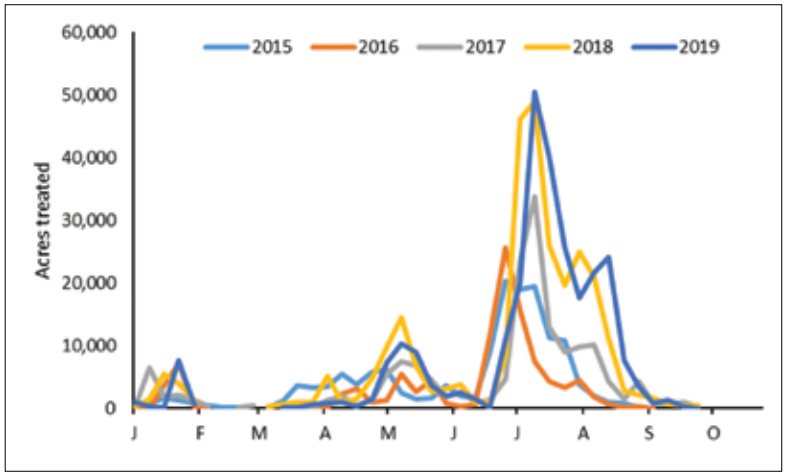


FIG. 4. Almond acres treated weekly with pyrethroids, 2015 to 2019, Sacramento Valley. Source: California Department of Pesticide Regulation Pesticide Use Report data.

mating disruption and insecticides. Winter sanitation serves as the backbone of the program by removing larvae from the orchard by destroying nuts remaining in the tree after harvest, and by preventing spring survivors from being able to find places to lay eggs. Timely harvest helps by removing nuts before they can be attacked, and by removing second or third-generation larvae from the orchard before they can contribute to the third and fourth flights of adults. Mating disruption is a relatively new technique that has proven to consistently provide approximately 50% reduction in damage when deployed using aerosol canisters or MESO emitters. Lastly, the fourth technique for controlling navel orangeworm is insecticides. This is typically done using products containing methoxyfenozide or chlorantraniliprole, both of which are selective and classified as reduced-risk pesticides by the U.S. Environmental Protection Agency. By using an integrated approach to navel orangeworm management, almond growers can typically avoid the need to use pyrethroids while controlling this pest.

Almonds represent just one example of the many California commodities where pyrethroids still play an important role in pest management, but where shifts away from pyrethroids can occur over time. As more integrated pest management programs are implemented, growers typically see an increased abundance of biological control organisms and an increase in overall sustainability. Decreased reliance on pyrethroids, and on-farm efforts to prevent off-site movement of pyrethroids in cases where they are still needed, are effective ways for farmers to participate in the shared role of all Californians to protect the quality of local waterways. ■

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The term biostimulant appeared for the first time in 1997 in an online publication, where scientists from the Virginia Polytechnic Institute and State University named biostimulant the "material that, in minute quantities, promote plant growth"[1]. After almost a quarter of a century, the USDA draft definition evolved to "substance(s), microorganism(s), or mixtures thereof, when applied to seeds, plants, the rhizosphere, soil or other growth media, act to support a plant's natural nutrition processes independently of the biostimulant's nutrient content, thereby, improving nutrient availability, uptake or use efficiency, tolerance to abiotic stress; and consequent growth, development, quality or yield"[2].

> When we talk about biostimulants, we refer to a group of substances that include biological or naturally derived additives, including but not limited to bacterial or microbial inoculants, biochemical materials, amino acids, humic acids, fulvic acid, seaweed extract and other similar materials[3].

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Insecticide options for protecting palms from South American palm weevil in California

By Ivan Milosavljević[1], Erik M. Lindberg[2], David Anderson[2], Ricardo Aguilar[3], Brian Bruce[2], Sam Drahn[2], Gregory Johansen[4], and Mark S. Hoddle[1]

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FIG. 1. An adult female Rhynchophorus palmarum, the South American palm weevil. Photo by Mike Lewis, Center of Invasive Species Research, University of California, Riverside

Since its establishment in San Diego County, CA, in 2014, the South American palm weevil (SAPW), *Rhynchophorus palmarum* (L.) (Coleoptera: Curculionidae) (Fig. 1), has killed ~20,000 ornamental Canary Islands date palms (*Phoenix canariensis*) in San Diego County. This invasive palm pest is native to parts of Mexico, the Caribbean, and Central and South America. Concealed weevil larvae feeding in the palm heart, or the apical meristematic region of the palm are responsible for palm death if they are not controlled. SAPW is a significant pest of concern for homeowners, parks and recreation staff, and landscape managers because of the risk this pest poses to ornamental palms as it continues to spread in San Diego County. This weevil also presents an unprecedented threat to growers of edible dates (*Phoenix dactylifera*) in the Coachella Valley. Fortunately, at this time there have been no reports of SAPW populations in the Coachella Valley or any other areas outside of San Diego County (Hoddle and Hoddle 2017). A major obstacle to managing SAPW in California is the limited information available on the efficacy of insecticides for controlling weevil infestations inside of palms. This article provides an update on the current state of knowledge about insecticide options for controlling SAPW in California.

What species of palms does the SAPW attack?

In San Diego County, SAPW has shown a very strong preference for attacking Canary Islands date palms to the almost complete exclusion of other palm species (Hoddle and Hoddle 2017; Milosavljević et al. 2019). In its native range, SAPW has also been documented infesting and killing açaí palms (*Euterpe oleracea*), African oil palm (*Elaeis guineensis*), coco de palmito (*Euterpe edulis*), coconuts (*Cocos nucifera*), edible date palms (*Phoenix dactylifera*), and sago palms (*Metroxylon sagu*). In mid-2020 through early 2021, at Balboa Park in San Diego, the first confirmed reports of SAPW killing Guadalupe palm (*Brahea edulis*), Chilean wine palm (*Jubaea chilensis*), Senegal palm (*Phoenix reclinata*), and Bermuda palmetto (*Sabal bermudana*), were made (Hoddle et al. 2021a). As of the beginning of 2022, there have been an increasing number of reports of weevils killing *Bismarckia nobilis* in San Diego County.

How does the SAPW kill palms?

Infestations of SAPW larvae feeding in the crown can result in palm death if the infestation is not treated with insecticides. The apical meristem produces new fronds and extensive feeding damage to this area can kill the palm as it is unable to continue growing. Once the apical meristem is heavily damaged, the crown may tilt, appear collapsed, and in some instances the crown may become detached from the trunk and drop to the ground. Advanced stages of damage to the central crown region results in the palm trunk being ringed by a halo of green fronds (Fig. 2) that eventually turn brown and fall to the ground. When weevil infestations are heavy, the bases of fronds where they attach to the trunk are often extensively tunneled and within these tunnels larvae will spin fibrous cocoons within which they pupate. Basal sheaths, a fibrous material found at the base of palm fronds, will have holes caused by SAPW larvae that have tunneled into the frond bases. Occasionally,

FIG. 2. Ornamental palms killed by SAPW in San Diego County: **A)** Canary Islands date palms killed by SAPW in Bonita, CA in Feb 2019; **B)** the same palm trees from panel A) one year later in Feb. 2020; **C)** Guadalupe palm, *Brahea edulis* (yellow arrow), killed by SAPW in Balboa Park, San Diego, CA. Photos by Ivan Milosavljević, Dept. of Entomology, UC Riverside

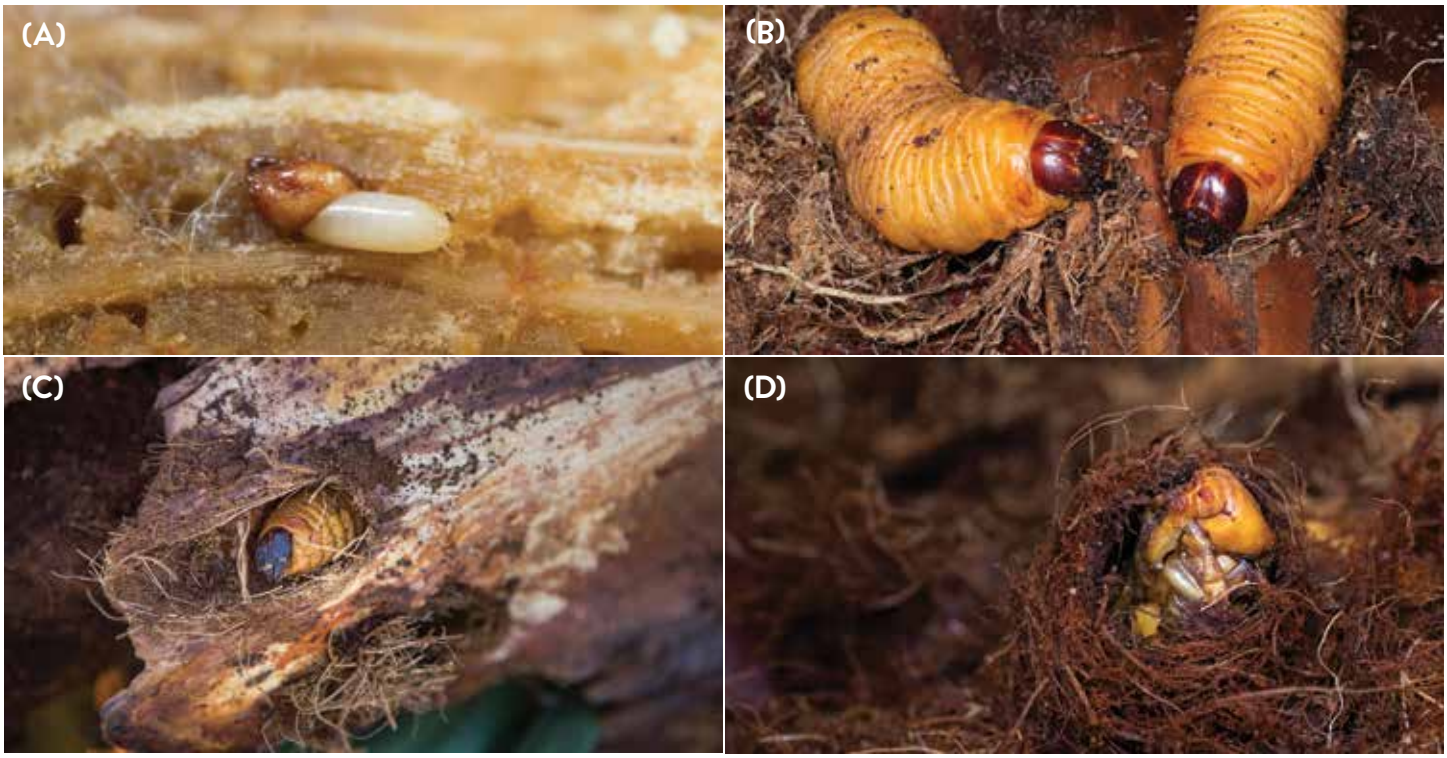

FIG. 3. Immature stages of SAPW. **(A)** egg, **(B)** feeding larvae, **(C)** a larva that has tunneled into the frond base that is getting ready to pupate, and **(D)** pupa partially removed from its fibrous cocoon. Photos by Mike Lewis, Center of Invasive Species Research, UC Riverside

FIG. 4. **(A)** Soil injecting a systemic insecticide. **(B)** Applying a systemic insecticide to a palm trunk. **(C)** Trunk injection of insecticides. **(D)** Applying a contact insecticide to palm foliage. Photos by Ricardo Aguilar, Aguilar Plant Care, and Mike Lewis, Dept. of Entomology, UC Riverside

pupal cases will drop from heavily infested palms and accumulations on the ground can be observed beneath affected palms (Fig. 3). A single infected palm can result in the production of hundreds of weevils. Detection of weevil infested palms at the early stages of attack can be difficult to identify because larvae are hidden inside the palm crown which is often a considerable distance above the ground making visual observations difficult.

What options do I have for treating my palm trees?

Systemic insecticides are the most effective tool available for protecting and potentially curing palms of SAPW infestations. Systemic insecticides (primarily neonicotinoids) are translocated within the palm and accumulate in the meristematic tissue where weevil larvae feed. Systemic insecticides can be applied as soil drenches, soil injections, trunk sprays or paints, trunk injections, or as drenches applied to the crown (Fig. 4). Systemic insecticides applied as crown drenches can potentially cure heavily infested palms allowing meristematic tissue to recover and new frond production to begin (Fig. 5). Because systemic insecticides have varying translocation speeds due to differences in water solubility a combination of slow- and fast-moving materials may need consideration. Contact insecticides applied directly to crown foliage may kill adult weevils that are looking for palms to feed and lay eggs on.

An initial treatment program designed either to prophylactically protect or to cure weevil infected palms may require a combination of contact insecticides to kill adult weevils flying into the crown and systemic products that translocate and accumulate in the crown. Once systemic products begin accumulating in the crown a maintenance program may only need periodic applications of systemic products to maintain lethal concentrations in the crown. Developing an insecticide treatment program should be made in consultation with a professional arborist who has experience with SAPW biology and management. Our research (see below) suggests that two or more applications of systemic insecticides per year may be needed to protect palms from weevil attack. Once a treatment program is started, a commitment to long-term treatments will be needed because once applications cease material concentrations will decrease and palms will again be vulnerable to weevil attack (Fig. 5). A major concern about heavy repeated use of a very limited number of products will be the likely and inevitable development of resistance by SAPW to efficacious insecticides.

Testing of several insecticides for SAPW control has recently been completed. Field trials in San Diego County testing insecticides for protection of Canary Islands date

FIG. 5. (A) Canary Islands date palm showing advanced crown damage caused by weevil feeding. **(B)** Following a two-year application program of systemic insecticides, the palm recovered. **(C)** Upon cessation of treatments, weevils very quickly attacked and killed the palm. **(D)** The palm was removed when we examined it in February 2022. Photos by Mark Hoddle, Dept. of Entomology, UC Riverside

palms from lethal SAPW attacks fall into four categories based on active ingredient(s) and timing of applications: (1) bark sprays of dinotefuran, applied every 4 months, (2) soil injections of dinotefuran, applied every 4 months, (3) soil injections of imidacloprid and crown sprays of dinotefuran, both applied every 6 months, and (4) soil injections of imidacloprid and dinotefuran combined, applied every 6 months. In these field trials, palm trunk diameter ranged from 25 to 28 inches DBH. Visual examination of the palm crowns every 4-6 months indicated that palms in the four treatment categories outlined above remained healthy for three years despite high weevil pressure which was measured with trap catch data and monitoring death rates of adjacent similarly sized untreated palms.

When should you begin treating your trees?

If palms of concern are in areas with SAPW activity it is probably best to consider commencement of treatments in advance of damage symptoms becoming obvious. In comparison to bucket traps, Picusan traps loaded with commercially available SAPW aggregation pheromone and fermenting bait are very efficient at capturing weevils and their use should be considered for monitoring weevils (Milosavljević et al. 2020a-c). Capture of weevils in traps is a very strong indication that there is weevil activity in the general area, and if necessary, control options should be considered to protect palms.

Early SAPW infestations prior to damage becoming obvious are difficult to detect in tall landscape palms, and consequently, treatment programs may be needed prophylactically to prevent weevil attacks or to kill off early-stage infestations. It is important that arborists and individuals working in palm canopies be vigilant for obvious visual signs of weevil activity (e.g., tunnels in fronds, flying adult weevils, or pupal cases lying under palms). In some instances, cutting a "window" (i.e., removal of palm fronds) to permit access to the crown may be needed to verify if palms are infested. Windows may also be useful for making crown drench applications easier to apply. Fronds emerging from the central crown region that are damaged and look as if they have had the terminal ends clipped off, or leaflets attached to the rachis have notches or are missing, may indicate weevil feeding damage. However, in some instances, this type of damage may have been caused by rodent feeding and did not result from weevil activity. It can be very hard to differentiate whether weevils or rodents damaged fronds.

Adult weevils are strong fliers and laboratory studies suggest that weevils can fly an average of 25 miles or more a day (Hoddle et al. 2020; 2021b). Despite these strong potential flight capabilities, weevil spread has been very slow throughout San Diego County. One possible reason for slow spread is the high abundance and diversity of ornamental palm species, especially the highly preferred host, Canary Islands date palms, growing in residential, recreational, commercial, and riparian wilderness areas. Weevils don't have to fly very far to find their next host, but should they find themselves in areas lacking palms they may have the capacity to fly long distances to find their next feeding and breeding palm. These long-distance flights, should they occur, may result in new infestations a long way from the leading edges of the weevil invasion. Consequently, until there is confirmed SAPW activity within a mile or two of a particular area, there may not be an urgent need to treat palms. However, a good

insurance policy against unexpected weevil attack would be the deployment and regular checking of Picusan traps that are placed about 0.5 miles away from an area of concern. If weevils are detected at this distance from palms that are under consideration for protection, then initiation of treatment programs may be needed before weevils get close enough to find these potential hosts. SAPW can also be moved accidentally by humans over long distances inside infested palms (Milosavljević et al. 2019). Movement of live ornamental palms out of infested areas should be avoided to reduce the chances of unintended weevil introductions into new areas. ■

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Look to potassium to combat tree stress

Abe Isaak, AgroLiquid Agronomist

Potassium (K) is vital for many processes in a plant. When the weather turns hot the tree needs potassium to regulate its temperature, as potassium regulates the stomata opening and closing, and therefore plant respiration. If the tree is running short of the nutrient, it will turn to the soil to pull the needed potassium.

Preventing Damage from Sodium

Sodium burn starts when the weather turns hot, usually beginning in May and worsening through the summer months. Plants start to become stressed at 85 degrees. The plant will pull potassium from the soil to help regulate its respiration by opening and closing the stomata of the leaf. In the soil, if the there is more sodium by percentage than potassium the tree will grab the sodium and available chloride from the soil first. If that happens, within a few days the tree will start to lose its vigor, and the leaves will start to droop and show signs of wilt. If left unchecked the edge of the leaves will show signs of burn and in severe cases can begin to defoliate. The key is to make sure the tree takes up potassium instead.

This is part of the reason we are so dependent on rainfall. Natural precipitation does two things for our crops. First, it starts the leaching of sodium from the root zone in the winter and spring, and second, rainfall provides clean irrigation water during the summer to continue the leaching process during the growing season.

Another way to get your potassium levels up in the plant is with foliar applications. This should start in the fall with a good post-harvest application, followed by several more starting at bloom by adding potassium to passes for other applications such as fungicides and pesticides if compatible. Of course, always follow label recommendations when applying any ag product.

An Example

Soils in Kern County can have sodium levels as high as 15% to 18%. Numbers like this result in damage to tree health and the effect on yield is substantial. In one example, the grower was applying two tons per acre of 95% gypsum and still wasn't seeing the needle move on sodium in the soil. By applying 5-10 lbs/A of soluble liquid calcium to the soil in winter through the drip system, we were able to get the sodium percentage down below 8% in less than a year. This is still very high, but when combined with keeping potassium levels higher in the tree, the grower was able to return production to over 2,500 pounds per year in his almonds.

In addition, the grower filled his soil profile with pump water just before a rain event. This was to prevent the soil from absorbing the rainwater, instead, letting it leach through the soil profile, taking the sodium with it. The soluble calcium increased the cation exchange in the soil, knocking the sodium off the clay particle and putting it into solution so it could be leached out of the root zone with the rainwater. This takes time, but the situation didn't happen overnight, and the soil won't get out of this condition in a day.

Making Choices for K

There are several factors to consider when choosing a potassium source. Using a soluble form of potassium is very important, as is being soil-applied if you are trying to counteract sodium levels (more about that later). However, keep in mind that high pH soils will limit the ability to increase the percentage of plant-usable potassium in the soil with commercial K products. You can increase potassium levels in the plant with foliar applications. Ideally, this begins in the fall with a good post-harvest application, followed by a spring application at bloom and adding potassium to fungicide or pesticide passes made throughout the growing season. Of course, you must always consult all relevant

manufacturer/supplier information and perform a jar test to ensure compatibility prior to mixing products.

How do you know if you need to add these potassium sprays and how much should you apply? This is where using tissue testing is very important. Late-season tissue tests from the previous year are good guides. A tissue test taken in the spring when the leaves have fully developed will help determine your potassium levels. A level of 2.2% in the tissue sample is the minimum you want to see; an ideal potassium range would be 2.8% to 3.1%. A potassium level within this range will help deal with sodium in the plant and to provide for the crop needs. A quick rule of thumb is to look for a potassium level that is 80% of nitrogen. As an example, if nitrogen is at 3.5%, we would like potassium to be at 2.8%. A hungry tree will not care what it drinks to meet its need; a tree that is not starving will be much more selective in what it takes in.

It is important to note tissue tests are a snapshot of where a nutrition program currently stands, not necessarily where it is going. If tissue test results look good and the numbers are where you want them, don't let up! Stay on top of the situation. The best way to deal with damage from sodium is before you see it in the plant. ■

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CAPCA CENTRAL COAST

Central Coast Chapter

May Event for Students: On Wednesday, May 11th Central Coast Chapter will be hosting "Evening with PCAs" for Cal Poly Crop Science students. It will be an event where students rotate around to tables with PCAs from different areas of our industry and ask questions about their careers plus get great advice!

Local Sponsorship: Central Coast Chapter is sponsoring the Youth Trap Shoot team in Santa Maria and will have their Chapter logo on the team jerseys.

Central Coast Chapter began donating to their youth league after a Central Coast CAPCA member mentioned how the whole team and all their events run on donations. They have been kind enough year after year, whenever asked, to allow the Chapter use of their large community hall for CAPCA CE meetings, free of charge! The Chapter in turn donates to the team (many are disadvantaged young teens from Santa Maria, CA). The youth league teaches anyone who is interested how to shoot safely and how to improve at trap competitions. The teens on the team are not charged for anything; all targets, ammo, jerseys, and competitions are free to them, thanks to community donations.

CAPCA VENTURA

Ventura Chapter

Ventura Chapter monthly Board meeting: The Chapter is currently engaged in supporting Spray Safe Ventura 2022, as well as finalizing the Annual Scholarship golf tournament event. The Chapter wishes to thank the great group of agriculture business professionals volunteering on behalf of the membership.

L-R: Chuck Nunes, Patricia Dingus, Cornelio Blanco, Blair Benchwick, Ted Swartzbaugh, Rick Harrison, Kyra Rude, Lisa Fox, Sunny Brucker. Not pictured: Michelle Hasse, Angela Veroni

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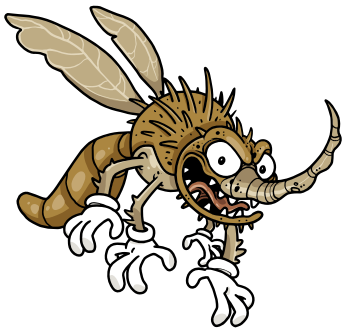

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https://capca.com/chapter-news/capca-central-valley-bug-shooters-sporting-clays-trap-shoot/

In Memoriam
Michael J Kropp, Sr.

CAPCA and our industry recently lost a colleague, advocate, and friend. On December 22, 2021, Michael James Kropp, Sr. passed away after a courageous and long, hard-fought battle with colon cancer. Throughout his treatment, Michael received tremendous support and encouragement from countless friends, associates, and especially his family … his wife Mary Beth, and his two sons Michael Jr. and Alex.

An active CAPCA member since 1997, Michael served as the Woodland Chapter Director on the CAPCA Board from 2009 to 2013, as a member of the Government Relations Committee, and as the CAPCA Conference Chairman in 2013. Michael played an active role in support of our industry, most recently serving as the Chairman of the Board of Primera, a Pro Markets purchasing group, and as an Executive Board Member for RISE (Responsible Industry for a Sound Environment). Prior to joining Wilbur-Ellis, Michael was a senior sales representative for BASF for nine years. Michael was a veteran of the US Navy, and earned a BA in Environmental Technology/Geography and a BS in Plant Genetics/Plant Science, both from the University of California, Davis.

Apart from our Industry, Michael had a long history of community service with various youth sports and charitable organizations, including as a homeless shelter volunteer for the Sacramento Food Bank and Family Services. Donations to **champions-of-hope.funraise.org/fundraiser/bigmike** will help Michael's family continue his legacy and fight for a cure to end colorectal cancer.

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

Horticulturalist / Permanent Crop Specialist – Fresno, CA

Westchester Group Investment Management

Description: WGIM is seeking a Horticulturalist with experience in permanent crop production and management, especially within tree nut industries. Responsibilities include interacting with farm managers to maximize efficiency and productivity, evaluating cultural practices, identifying and implementing projects to minimize farm operating costs and increase crop yields, reviewing farm level budgets, etc.

Duties, Qualifications & Requirements: Essential Functions: Drive innovation to improve property performance (Evaluate and implement new technologies and farming practices, Monitor water usage, Negotiate favorable supply arrangements with vendors); Operational oversight (Review farm operations and cultural practices, Analyze and report on budget variances); Support asset management team on acquisitions and sustainability projects. Qualifications: Bachelor's Degree in Crop Science, Agronomy, or related subject; Minimum five years working in agricultural production, farm advising, farm management or similar field; PCA/CCA Preferred.

Apply: For more info, see full job description on LinkedIn.
To apply, submit resume and cover letter to horticultural.career@wgimglobal.com

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Pest Control Adviser – Modesto, CA

Ratto Bros.

Description: The PCA will provide pest control and technical support for all ranches. Time will be spent out in the field monitoring crops and fulfilling office functions. Functions include but not limited to data input, tank mixing through the company database, personnel organization for the company Spray Team, Chemical Purchasing and other tasks as needed.

Duties, Qualifications & Requirements: Experience in fresh vegetables is a must. Candidates should have at least 5+ years of experience. Strong work experience, which includes a demanding professional work environment. A valid driver's license that is acceptable to insurance carrier, intermediate computer skills and the ability to work a full agricultural schedule. Spanish is a plus. BA/BS degree in Agriculture, Science or related field. Current PCA license.

Apply: To apply, please send your email to HR@rattobros.com

Senior Specialist, Pest Management - Central California

The Almond Board of California

Description: This position serves as the technical expert for ABC on management of pests bridging our research and outreach teams to engage our industry on development and implementation of pest management strategies. This role requires excellent communication and interpersonal skills, a strong understanding of research, and the ability to translate data effectively with growers, PCAs and industry members.

Duties, Qualifications & Requirements: Serve as a primary resource on pest management issues for ABC, engage industry on development and implementation of pest management strategies, identify opportunities from research to communicate new findings and best practices to growers and PCAs, identify opportunities to collaborate with UC ANR and CAPCA to amplify ABC outreach. Requirements-Master's degree in an area of science related to entomology or pest management, with at least two years of research experience acquired as part of education or work experience, and at least two years of grower-related field experience.

Apply: Please email your resume to careers@almondboard.com or apply at https://www.almonds.com/seniorspecialistpestmanagement

Territory Sales Manager – Central Coastal California

UPL NA

Description: The Territory Sales Manager will manage necessary sales activities involving external customers within a specific, assigned geographic area by applying strategic sales tactics to achieve budgeted sales and profit objectives in alignment with company objectives. This territory consists of the Central Coast counties of California requiring the TSM residing within the territory.

Duties, Qualifications & Requirements: BS/BA college degree required with a preferred focus in Agro Science or Business; Minimum of 5 years sales experience with territory responsibilities required with a working history in the Agricultural Chemical or related Agriculture Industry preferred. Previous experience working with distributors, retailers, agricultural consultants, and key growers to accomplish territory objectives required. PCA License required, CCA License optional.

Apply: Please apply online through https://careers.upl-ltd.com/job/FIELD-Territory-Sales-Manager-Cali/586059210/

Technical Specialist – CA & AZ

SePRO Corporation

Description: We are seeking an outstanding team player who thrives on new business development activities to help us deliver on our commitment to protect crops and food sources. The ideal candidate will have experience in new product launches with unique value propositions and a track record of meeting or exceeding sales goals.

Duties, Qualifications & Requirements: Create and pull-through sales demand for new and existing products for permanent and vegetable crops; Coordinate and conduct market development product demonstrations for growers; Become the SePRO Ag "Market Ambassador" to educate and support key audiences. Bachelor's degree in Ag, Business or related field; 5+ years of experience selling crop protection chemistry; Current PCA license. Experience taking new products to market; Excellent communication skills; Strong organizational and time management skills; Strong technical acumen.

Apply: Apply at https://sepro.com/Careers

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