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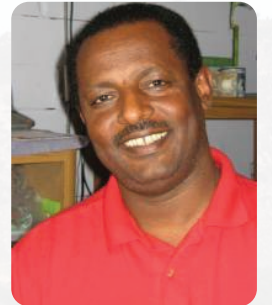
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INTRODUCTION FROM OUR COUNTY DIRECTOR

Dear Readers,



With the new year beginning with some extreme weather throughout the state, our county CE advisors, staff, and volunteers continued their efforts to extend research-based information to build sustainability and safety for our businesses, communities, lives and landscapes. As part of a cohort of UC ANR Advisors, Specialists and staff active in the statewide Food Safety Program, we help growers understand and follow standards of the Food and Drug Administration (FDA) and reduce the risk of microbiological contamination during growing, harvesting, packing and storing fresh produce. In response to the heavy rain and its potential effects on food safety, we shared [Guidance and Resources for Growers to Assess Crop Safety](#) after flooding events. Other events held by our advisors, program coordinators and representatives during this season were workshops and training opportunities on crop production, crop pest management, irrigation water management, weed management, organic materials waste management and fire safety issues. These events and workshops were designed to enhance the understanding of our clientele, and the farm community, to help them improve the sustainability of our agricultural industry, landscapes, and communities.

Articles contained in this issue are on (1) predatory mites and management strategies for agave crops, and (2) plants, pests, pesticides, and pollinators. There are also two briefs and updates on (1) the UCCE Master Gardener (MG) program, reporting that our MG volunteer program continues to thrive and deliver needed information on safe and sustainable home food and landscape gardening, (2) a brief update on the Expanded Food and Nutrition Education Program (EFNEP), its benefits for the low-income consumers and guidance on food safety. There's also a brief introduction to the fire program with request for survey participation.

We invite you to enjoy reading the articles and briefs contained in here. You will also receive further email notices on our programs, opportunities, and resources, if you choose to sign up for this quarterly newsletter and specific program news. To sign up for these [click here](#). As always, we thank you for the many ways you network with us and for the support you provide us towards fulfilling our extension and outreach efforts.

Oli Bachie, PhD
UC Cooperative Extension San Diego County Director

Can Predatory Mites Help As A Pest Management Strategy

Experiments to reduce mite infestation on agave and aloe

While we often think of mites only as pests, there are species of predatory mites that can predate on a range of plant pests including other mites, thrips, and whiteflies. Biocontrol agents like these represent an increasingly important tool in a well-rounded integrated pest management strategy that includes preventative measures such as scouting, sanitation, and exclusion combined with biological and chemical control. For example, the predatory mite *Amblyseius swirskii* has been shown to feed on whitefly eggs and larvae, thrips, and even pollen, and predatory mites in the genera *phytoseiulus* and *neoseiulus* are commonly and successfully used against Tetranychid mites (e.g. Two Spotted Spider Mite, European Red Mite, etc.) in strawberry and against thrips in greenhouse tomatoes.

Agave mites (*Oziella* sp.) and aloe mites (*Aceria aloinis*) are eriophyoid mites that cause aesthetic damage on ornamental agave and aloe and are important pests for the ornamental

industry in San Diego. Eriophyoid mites are whitish carrot-shaped mites that are almost impossible to see to the naked eye and are difficult to manage. They look different than most mites we are used to, and resemble a “worm” more than a “spider”. Although chemical control strategies are available for their management, it is common for growers to see symptoms develop on plants despite spraying a rotation of pesticides. To complicate the matter, infestations are difficult to identify early, because one needs a microscope and some training to be able to reliably recognize eriophyoid mites. Additionally, in the case of agave, the mites live in the core of the plant, and identification before symptoms appear is only possible by pulling apart and killing the plant to inspect the base of the leaves.

In October 2022 we ran lab and greenhouse experiments to determine whether the predatory mites *A. swirskii* and *Neoseiulus californicus* are effective in reducing eriophyoid mite infestations on agave and aloe. In a series of preliminary lab experiments and observations of predatory mites, we determined *A. swirskii* does feed on both agave mite adults and eggs (Fig. 1). Based on these results, we expect that *A. swirskii* will also predate aloe mites, although have yet to confirm this. Lab experiments with *N. californicus* were unfortunately inconclusive as most of the predatory mites were used up during greenhouse trials.

Our greenhouse experiment consisted of applying predatory mites to Blue Glow Agave plants that showed symptoms of Agave Mite. We had 5 treatments: 1) Untreated Control; 2) 20 *N. californicus* mites per plant; 3) 20 *A. swirskii* mites per plant; 4) 10 *N. californicus* and 10 *A. swirskii* per plant. These rates were based on the insectary dosage recommendations of 25-300 mites per m² per release for

A. swirskii and 25-125 mites per m² per release for *N. californicus*. Our final treatment was an “extreme” treatment where we applied about 10 mL of predatory mites and inert material per plant. This rate resulted in hundreds of predatory mites applied to each plant and is well above what the commercial producer would apply. The purpose was to simulate a “best-case scenario” to test whether any amount of predatory mites can reduce Agave Mite populations in infected plants.

After two weeks we destructively sampled all infected plants and used the number of Agave Mites present in the untreated control as a reference to compare the effect of the predatory mites in the other treatments (Fig. 2.). While *A. swirskii* appeared to reduce Agave Mite abundance, there was no significant reduction in the population of Agave Mite in any treatments, not even when an “extreme” quantity of predatory mites was released on the infected plants.

The experiment suggests that the predatory mites *A. swirskii* and *N. californicus* are not useful as a curative tool for existing Agave Mite infestations, perhaps because Agave Mite populations are deep in the core of the plant at the rosette leaf insertion where predators may not be able to reach. Nevertheless, predatory mites may successfully reduce populations of Aloe Mite that live on the leaf surface and are thus more exposed. We plan on conducting further trials to determine if predatory mites can be used to manage eriophyid mites on aloes.

The authors would like to acknowledge the generous contribution of Koppert for donating the predatory mites used in this experiment. We are equally grateful to Altman plants for donating the plant material used in this study and to Syngenta for the financial support.

This research was conducted at the Center for Applied Agricultural Research (CfAHR) in Vista.

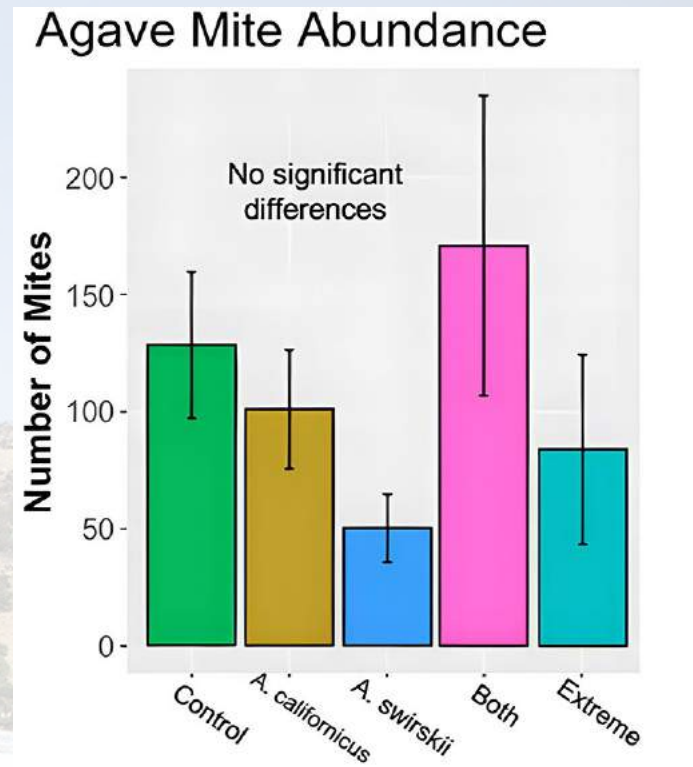


Fig. 2. Mean agave mite abundance 2 weeks after predator mites were applied. “Both” refers to 10 individuals of both predators species being added. “Extreme” refers to hundreds of each predator species being added. No significant differences were found between treatments.”

To watch a video of this project, click here: <https://www.youtube.com/watch?v=EMJ-MwOpuXY>

Fig. 1. *Amblyseius swirskii* predating on Agave Mite (*Oziella* sp.)

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Plants, Pests, Pesticides and Pollinators

Addressing two UCCE projects related to the protection of pollinators

Are pesticides killing bees? Are plants sold in nurseries and garden centers safe for pollinators? How to balance the need for pest control with the need to protect pollinators? What plants are most attractive to bees?

These are the questions we have been addressing in two projects related to the health and protection of pollinators funded by the USDA¹ and CDFA².

In 2016, our previous Nursery and Floriculture Farm Advisor, Jim Bethke (now Emeritus), obtained funding to collaborate in a multistate research effort to analyze the impact of horticultural pest management practices on bees and other pollinators.

As part of this project, we conducted greenhouse experiments to follow the dynamics of pesticide residue in the pollen and nectar of plants treated with different systemic insecticides (Fig. 1).

Systemic insecticides are designed for pest control at very low concentrations, but they will be translocated to different parts of the plants. We found that pesticide residue in leaves was significantly higher than in petals and nectar.

Leaves, nectar, and petals from plants treated with drench applications had higher pesticide residue concentrations than those

treated with foliar applications. However, pesticide residue decreases over time and the concentration of the active ingredients in the nectar collected from plants treated with foliar applications was generally below the limits of quantification by six weeks after treatment.



FIG. 1 A Antirrhinum majus 'Sonnet White' FIG. 1 B Salvia splendens 'Red Hot Sally II'

Fig. 1. Growth experiments to analyze residue of systemic insecticides in nectar, petals, and leaves of (a) *Antirrhinum majus* 'Sonnet White' and (b) *Salvia splendens* 'Red Hot Sally II'.

An additional objective of the project involved establishing observation gardens in different areas of San Diego and Orange County to compare the pollinator attractiveness of California native and non-native plants common in the ornamental landscapes of Southern California (Fig. 2).

Our study showed that plant species differ in the number of pollinating visitors they receive per minute. California native plants were visited by a greater diversity of pollinators than non-native plants, including a richer suite of native bees. However, honey bees showed no significant preference for either California native or non-native plants.

¹Protecting Pollinators with Economically Feasible and Environmentally Sound Ornamental Horticulture, funded by the Specialty Crop Research Initiative of the USDA's NIFA (Principal Investigator: James A. Bethke. Research Team: Lea Corkidi, Annika Nabors, Leah Taylor, Bryan Van der Mey, Marianne Whitehead).

²Promoting Pollinator Plant Awareness, Access, and Habitat Expansion to Benefit California's Nursery Industry, funded by CDFA (Principal Investigators: Christine Casey, Elina Nino, and Gerry Spinelli. Research Assistant Lea Corkidi. Student Assistants: Taylor Smith, and Gwen Wagner.



FIG. 2 A Tree of Life Nursery



FIG. 2 B Palomar College



FIG. 2 C The San Diego Botanic Garden

Fig. 2. Observation gardens established at (a) Tree of Life Nursery (b) Palomar College and (c) the San Diego Botanic Garden, to compare pollinator attractiveness of ornamental plants.

More information can be found on our website:
<https://ucanr.edu/sites/PollinatorAttractiveness/>

More recently, we have been collaborating with the UC Davis Bee Haven in a project to promote plants for bees². We will deliver educational programs to the horticulture industry about plants for pollinators and develop grower-friendly protocols to assess pollinator attractiveness of ornamental plants (Fig. 3). We anticipate that an informed horticulture industry will increase the sale of these plants to provide vital pollinator habitat in California.



FIG. 3 Nursery in California

Fig. 3. Comparing bee sampling methods at nursery sites to develop grower-friendly methods to assess pollinator attractiveness and facilitate bringing these plants to the market. Our first year's results indicate that quick 'snapshot' counts are more efficient than traditional timed counts to measure bee attractiveness.

More information can be found on our blog:
<https://ucanr.edu/blogs/blogcore/postdetail.cfm?post-num=55749>



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San Diego UC Master Gardener Annual Fall Plant Sale, 2022

The San Diego UC Master Gardener Program

News and Updates in San Diego County

For more than 100 years UC Cooperative Extension (UCCE) advisors and specialists have worked with communities across the state to address economic, agricultural, natural resource, youth development, and nutrition issues. For over 40 years of UC Cooperative Extension's history, UC Master Gardener volunteers have shared research-based home horticulture information with the public. The first UC Master Gardener Program started in 1980, with graduating classes in Sacramento and Riverside counties. Since these humble beginnings programs are now thriving in more than 52 counties across the state. San Diego's office was established in 1983, and we look forward to celebrating our 40th anniversary in 2023!

One of the least-known treasure troves of information in San Diego County is that over three hundred trained and certified Master Gardeners provide home gardening and pest control information throughout San Diego County, FREE to the public.

The mission of the UCCE is to conduct research on new pests, issues affecting the county, and to provide research-based information to the public.

Every other year, a new class of Master Gardeners is trained and certified. They join the other veteran Master Gardeners to provide quality science-based gardening education to the public. Inherent in the Master Gardener title lies the challenge to continue learning and to help other gardeners grow. This is a mission and devotion shared by every Master Gardener Program graduate. Our new training class started in January, adding 50 certified volunteers to our program.



How our program gives back:

The UC Master Gardener Program teaches people how to grow food and garden sustainably to protect California's natural resources. By customizing local gardening outreach to account for unique local landscapes and the diversity of California's residents, we strive to meet the needs of all the communities we serve.

- hosts hands-on educational workshops teaching how to garden sustainably to protect California's natural resources
 - answers questions by email or phone about how to grow fruits, vegetables, and flowers, and manage pests in the garden.
- (Call our hotline 7 days a week! 858-822-6910, or help@mastergardenerssandiego.org)
- provides trained presenters on home horticultural topics and pest management
 - hands-on demonstrations at school, community, and demonstration gardens
 - teaches horticulture skills to youth and adults in detention centers, seniors in memory care facilities, and veterans at military-serving organizations

... and so much more! We look forward to hearing from you!



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Who is EFNEP Within UC ANR

Learn about the Expanded Food and Nutrition Education Program

The Expanded Food & Nutrition Education Program (EFNEP) is a partnership of the University of California, the USDA, county governments, and California residents. This program is the main outreach and public service branch of UC's Division of Agriculture and Natural Resources for low-income families and youth. EFNEP is a federally funded program through the Department of Agriculture National Institute of Food and Agriculture (USDA NIFA). We remain at the forefront of nutrition education efforts to reduce nutrition insecurity of low-income families and youth today.

EFNEP focuses on reaching the poorest of the poor by working through families to address the health disparities associated with some of our most pervasive societal challenges such as hunger, malnutrition, poverty, and obesity. EFNEP provides practical, hands-on nutrition education that changes behavior.

Our bilingual community health educators bring no-cost comprehensive nutrition education classes in English and Spanish to schools and community partners throughout the San Diego region. Our curriculum is based on the latest research in nutrition and physical activity.

The purpose of sharing dietary guidelines with our community is to provide advice on what to eat and drink, to build a healthy diet that can promote healthy growth and development, prevent diet-related chronic disease, and meet nutrient needs. We share recipes and demonstrate practical physical activities.



EFNEP, celebrates Healthy Snack Day

Our trained and experienced nutrition educators offer our participants the opportunity to become better food resource managers within their homes and improve decision-making skills. Mothers and fathers adopt healthy eating behaviors as role models to their children with healthy food selections and increasing their daily physical activity with more confidence and becoming more self-reliant.

EFNEP youth curriculum is designed to address core standards for each grade. School-age students increase their knowledge of human nutrition, and awareness to increase the variety of foods within their daily diet and to select better snacks. Increasing daily physical activity is improving with fun demonstrations led by the youth educator.

EFNEP has been serving San Diego for the past 50 years improving the quality of many lives. Learn more by reviewing our mission and vision offered by our EFNEP team.

Visit the San Diego EFNEP website:
<https://ucanr.edu/sites/SD-NFCS/>



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LET US KNOW YOUR THOUGHTS ON WILDFIRE!

We invite **all California residents and natural resource professionals** to take this 15 minute Wildfire Preparedness & Impacts Survey:
https://bit.ly/UCCE_Fire_Survey!

Complete the survey by March 31, 2023 and be eligible to win a \$20 prepaid VISA giftcard!

UC Cooperative Extension has expanded their team of fire advisors and staff and they want to hear from you! Results will help develop educational resources and workshops about wildfire preparedness and guide scientific research aimed at reducing California's vulnerability to wildfires. Participation is voluntary and anonymous.

Contact Luca Carmignani, Fire Advisor for UCCE San Diego at carmignani@ucanr.edu, for any questions about the survey. Let's work together to address this important issue!

MEET THE TEAM

Get to know the people behind Cooperative Extension San Diego! Each issue we like to highlight some members of our amazing team.

Meet our Advisors



Stephanie Mar
Asst. Organic Waste Management Advisor

Stephanie Mar joined UC Cooperative Extension on Oct. 03, 2022, as the Assistant Organic Materials Management Advisor, to develop a research and extension program on diverting organic wastes from landfills into productive alternative markets.

Before joining ANR, Stephanie attended the University of North Carolina at Chapel Hill, where she earned a dual master's degree in public health (focused on environmental science and engineering) and in the city and regional planning (focused on land use and environmental planning).

Her work has concentrated on wastewater infrastructure, biosolids management, and watershed protection, so she is excited to incorporate compost, soil health, and food waste recovery into a program that is geared toward developing an organic waste circular economy.

Her other research interests include spatial analysis, policy design, and environmental justice. Stephanie is based at the South Coast Research and Extension Center and serves Los Angeles, Orange, and San Diego Counties. She can be reached at samar@ucanr.edu.

Meet our Staff



Lea Corkidi
Staff Research Associate II

It is easy to track Lea's academic career - just follow the life cycle of a plant. It started with a study of seed dispersal by birds, continued with research on how light and temperature influence the germination of weeds distributed in corn and coffee plantations, and then focused on plant growth responses to biotic and abiotic stress. Her research has involved studies on the interactions between plants and soil microorganisms, plants and pollinators, and plants and insect pests.

Lea studied Biology in Mexico City, her major was in plant ecology, but her professional development has also been closely related to the field of Horticulture. She started doing applied research in plant production systems at Tree of Life Nursery in 2000. For the last nine years, she has been part of the research team of our Nursery and Floriculture program and has collaborated on studies about different aspects of propagation, nutrient, and pest management of California native and non-native plants.

Lea was recently the project manager of a multistate research effort to investigate the impact of horticultural pest management practices on pollinators, and she is currently participating in a project to promote habitat for bees. She will be developing educational resources in English and Spanish on "bee-friendly" plants and grower-usable protocols to evaluate nursery crop pollinator attractiveness.

2023

CALENDAR

Stay up-to-date with seminars, webinars, trainings, events, and more!

MARCH

LAST WEDNESDAY MEETING

- 📅 March 29th (also April 26th and May 31st)
- 📍 San Diego County Farm Bureau, Virtual
- 🔗 [Link to event page](#)

MAY

PSA GROWER TRAINING

- 📅 May 15-16th
- 📍 Online/Virtual
- 🔗 Registration link coming soon

IPM FOR LANDSCAPE PROFESSIONALS

- 📅 May 24th
- 📍 Balboa Park Club
- 🔗 Registration link coming soon

APRIL

UC MASTER GARDENER SPRING SEMINAR

- 📅 April 19th
- 📍 San Diego County Farm Bureau, Virtual
- 🔗 [Link to event page](#)



We hope you have enjoyed this issue of the Extension Connection!

We will continue bringing you the latest news from UC Cooperative Extension San Diego, and we would also like to hear from you.

What Do You Think?
TAKE OUR SURVEY



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