



# Extension *Connection*

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# FROM: OUR COUNTY DIRECTOR

**Dear Readers,**

**T**he University of California Cooperative Extension (UCCE) San Diego advisors and community education specialists (CES) conduct applied research and extension education programs to address the high priority programs, crop productivities and solve local farming problems. The outcomes of these research and findings need to be delivered to the clientele, farm industries and stakeholders through various means, including local newsletter publications.



Accordingly, we envisioned the need for a local UCCE newsletter that could address local farms, research, and extension in agriculture, social settings and beyond. We are very excited to launch this newsletter (the first of its kind) named the Extension Connection. It will be published quarterly and may cover agronomic crops and weed management, small farms and farm economics, horticulture, viticulture, tree crops, pest management, agricultural land conservation, natural ecosystems, climate and climate smart agriculture, youth development, community nutrition and home gardening issues. San Diego County will benefit from a strong academic footprint from the recent release of additional farm advisor positions and bring more improvement to local food production and the lives of our communities.

Whether you are farm owner, farm manager, pest control advisor (PCA), teacher, volunteer, youth - whatever your role or communities - there is some information for you in this newsletter or in future issues, which you may find useful or interesting. We invite you to sign up / subscribe to our newsletter email listserv to receive future issues by clicking the link on the last page. While this is the first newsletter publication for UCCE San Diego in recent history, we anticipate upgrading the quality and contents of subsequent issues. Therefore, you are also encouraged to contact us with concerns or comments regarding the content, whether it be a question or correction or suggestion for future articles. Your input is welcome.

Enjoy reading!

A handwritten signature in black ink, appearing to read 'Oli Bachie'. The signature is fluid and cursive, written over a faint background of a leaf pattern.

Oli Bachie, PhD  
*UC Cooperative Extension San Diego County Director*

# Fertilizer Injectors and Fertigation for Nurseries and Greenhouses

Tips for improving nutrient management when applying liquid feed with fertilizer injectors.

Liquid feeding, or fertigation, is the practice of applying fertilizer through irrigation water. It is a common practice in intensive agriculture systems, like greenhouses and nurseries, because it allows nutrient application directly to the rootzone. Liquid feeding can provide uniform fertilizer application if the irrigation system distribution uniformity is high.



**Figure 1:** A Dosatron injector used for manual fertilizer application at a nursery

However, if water is over-applied, then excessive fertilizer runoff, leaching, and waste can occur, which is bad for the environment and for the grower's bottom line.

Many different types of fertilizer injectors, or proportioners, exist. All types include an injector and a stock solution tank, and the most sophisticated units also include a flow meter and mixing tank. Venturi-like injectors (such as Mazzei™ injectors) are very simple and inexpensive and have no moving parts. However, growers must consider that the injection ratio, or factor, is dependent on the inlet and outlet pressure of the injector, so the injection ratio changes with fluctuations in the irrigation system pressure. A changing ratio can result in variability of applied fertilizer concentration.

Positive-displacement dosing pumps (such as Dosatron, MixRite, or H.E. Anderson Series S) use water pressure to inject an amount of stock solution proportional to the amount of irrigation water. These are preferred since the injection ratio is independent of the water pressure in the irrigation system. Most models have a dial that allows the user to select the desired injection factor.

An injection ratio of 1:100 means that one gallon of stock solution will be diluted into 100 gallons of irrigation water. Such a ratio is convenient and commonly used in the industry. For manual applications with





**Figure 2:** Measuring Electrical Conductivity with a portable EC meter.

a portable injector, a very common practice is to make a stock solution by diluting one pound of fertilizer into one gallon of water and injecting this solution in a 1:100 injection ratio. Mixing a 13-2-13 fertilizer in this manner results in 156 ppm of nitrogen, 10 ppm of phosphorous and 129 ppm of potassium.

Measuring electrical conductivity (EC) before and after the injector is a simple way to check fertilizer injector performance. To assist growers, most fertilizer labels provide the EC of the target fertilizer concentration after dilution. Using the example above, one pound of 13-2-13 dissolved into one gallon of stock solution with an injection ratio of 1:100 would result in a fertigation EC of 1.2 dS/m. This value must be added to the EC of the irrigation water before injection. If the inlet EC is 0.8 dS/m, then the expected outlet EC is 2 dS/m (0.8 dS/m + 1.2 dS/m). It is

recommended to check the performance of fertilizer injectors regularly, particularly those with moving parts that can wear out over time.

Research has shown that 100 to 150 ppm of nitrogen is required for most herbaceous plants with few exceptions, and 50 ppm of nitrogen is required for woody plants. Similarly, research has shown that 20 ppm of phosphorus is sufficient for ornamental production. Nevertheless, many growers apply higher concentrations: 200 ppm of nitrogen in fertigation is not uncommon. For example, a common practice is to apply 1 pound per gallon of 20-10-20 at 1:100 dilution factor, which results in 240 ppm of nitrogen, 52 ppm of phosphorus, and 199 ppm of potassium. This practice probably results in over-application, which wastes money and is bad for the environment. Take the time to dial in your fertilizer injectors to optimize fertigation for your plants.



#### ABOUT THE AUTHORS

**Gerry Spinelli, PhD**

Production Horticulture Advisor  
(530) 304-3738 | [gspinelli@ucdavis.edu](mailto:gspinelli@ucdavis.edu)



**Bruno J. L. Pitton, PhD**

Staff Research Associate  
(530) 752-0397 | [bjpitton@ucdavis.edu](mailto:bjpitton@ucdavis.edu)



**Figure 3:** Ali Montazar visits an avocado grove in San Diego County to assist grower on irrigation and salinity management issues.

## Irrigation Tools and Strategies for Avocado Growers

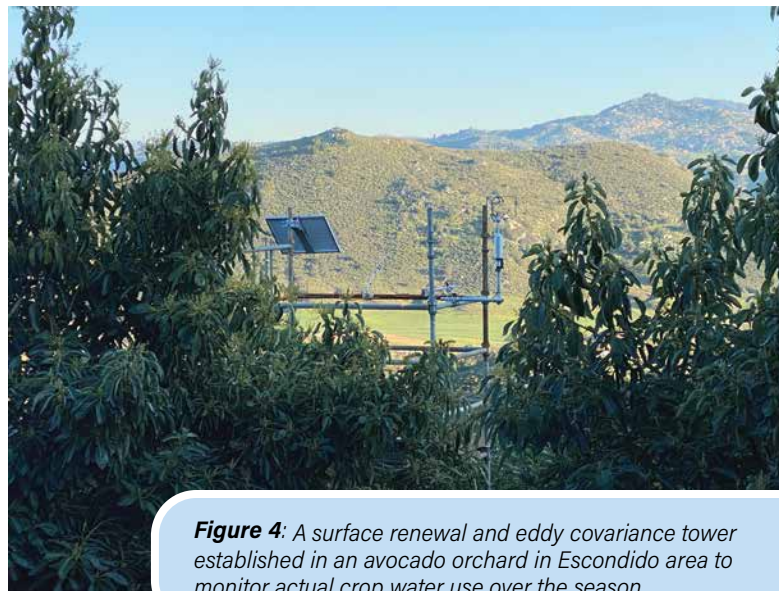
New project targets to develop irrigation tools and strategies for avocado growers in Southern California

Ali Montazar, UCCE Irrigation and Water Management Advisor, recently received an award from USDA-CDFG Specialty Crop Block Grant Program for his research to develop irrigation tools and strategies for avocado growers in Southern California.

Avocado is primarily grown in Southern and Central California. These regions face uncertain water supplies, mandatory reductions of water use, and the rising cost of water, and

efficient use of irrigation water is one of the highest regional conservation priorities. Not only is water the single most important input to avocado production, proper irrigation management is essential for proper tree nutrition and management of *Phytophthora cinnamomi*, avocado root rot. Avocado growers strive to be good stewards of the resources they use to produce this iconic California crop and are eager for new tools and resources to help them achieve their goals. As climate change continues, improved irrigation and

water use efficiency are critical tools in



**Figure 4:** A surface renewal and eddy covariance tower established in an avocado orchard in Escondido area to monitor actual crop water use over the season.

sustainable avocado production.

Currently, the research team is collaboratively working with the California Avocado Commission and several avocado orchards in San Diego, Riverside, and Orange Counties. In this project, a combination of field experiments, case studies, and a robust outreach program are used to develop and disseminate information and tools to growers and stakeholders. The project established surface renewal and eddy covariance monitoring stations in six avocado orchards in the Escondido, Temecula, and Irvine areas. Actual crop water uses are measured continuously in these orchards.

Developing and adopting irrigation tools and information has a significant impact on water quality and quantity issues. This project may help bolster the economic sustainability of avocado production not only in the well-established production region of Southern California, but also in Kern and Tulare Counties where new avocado plantings are growing.



#### ABOUT THE AUTHOR

**Ali Montazar, PhD**

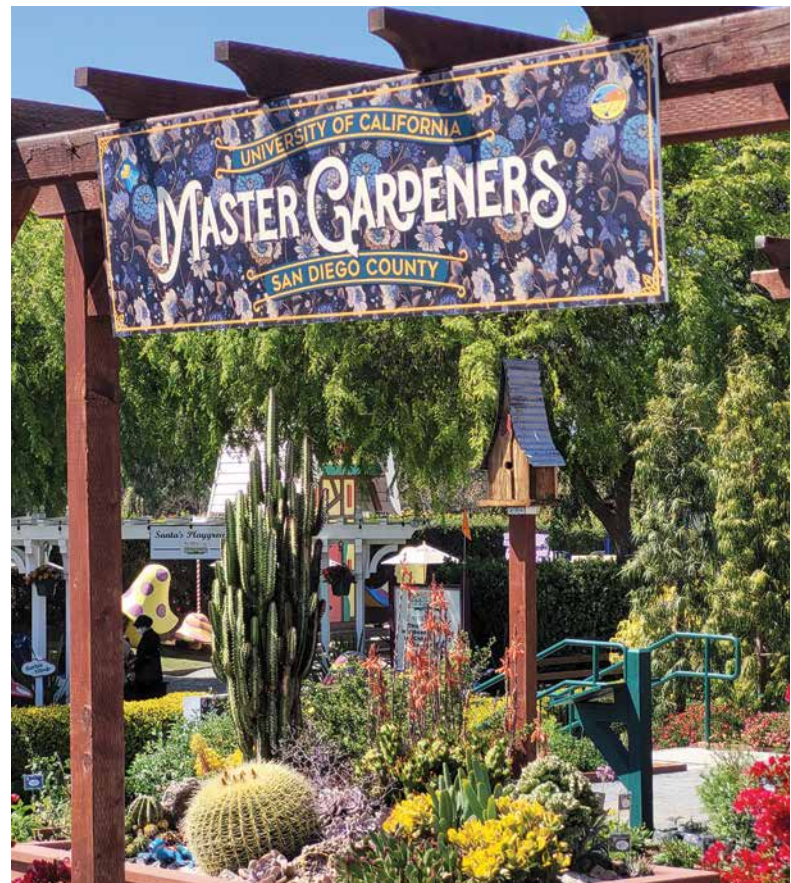
Irrigation & Water Management Advisor  
(442) 265-7707 | [amontazar@ucanr.edu](mailto:amontazar@ucanr.edu)

## Master Gardener Demonstration Gardens

Come visit the Master Gardener Demonstration Gardens, and be inspired to plant native plants.

It's spring time in the gardens. The Master Gardener team at Founders Plaza in Balboa Park is busy with garden clean-up, irrigation checks and dreaming of refreshing changes for the garden. You can visit the gardens any time, free to the public!

The demonstration garden at San Diego's County Operations Center (COC) is now in full spring bloom and open to the public. A bountiful garden is showcased



which also includes a container garden, rain barrel, worm bin and plants to attract pollinators.

Our demonstration garden at the Flower Fields in Carlsbad is sitting in the midst of colorful African daisies. Newly planted beds are growing rapidly, filling in and some plants are starting to bloom. Master Gardener docents are busy greeting guests, keeping an eye on the plants and just enjoying being surrounded by happy people and beautiful flowers.

A California Native Garden has been featured at the MG Demonstration Garden at the Flower Fields in Carlsbad since we started in 2014.



Sue Marchetti, a Master Gardener for 23 years, a member of the Native Plant society and a master composter, has been the force behind the garden. This year is the third version of the Native Garden. Sue has 14 different natives in the garden. Native plants are especially attractive in the springtime when they are coming out of dormancy, putting out new growth and blooming. In bloom now are the Beach Asters (*Erigeron glaucus* 'Wayne Roderick', Santa Barbara Ceanothus (*Ceanothus maritimus*) 'Valley Violet' and Cleveland Sage "Winifred Gilman' (*Salvia clevelandii* 'Winifred Gilman'.

Sue has also planted Acton Brittlebush (*Encelia actoni*), Desert Penstemon (*penstemon baccharifolius*), Desert Marigold (*Baileya multiradiata*) and Coast Sunflower (*Encelia californica*). These will be blooming soon. She reminds us that even when dormant, they are a good source of food for birds when seed pods become available.

Once established, natives require very little water. Newly planted natives should have their root balls watered frequently during the first week after planting. The planting area should be kept slightly damp, not waterlogged. It is best to water early in the morning when it is cool. If the irrigation has a timer, set it to water between 2 -4 in the morning.



#### ABOUT THE AUTHOR

**Leah Taylor**

Master Gardener Coordinator

858-822-6932 | leataylor@ucanr.edu



# 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

Meet Eric Middleton, PhD, an entomologist with a passion for integrated pest management (IPM) and regenerative agriculture. He grew up in Salt Lake City and studied biology at the

University of Utah. He headed to Minnesota for graduate school where he earned his PhD in entomology. While there, he researched floral plantings established around agricultural fields and the impacts they had on pollinators, insect predators, and biological control of Colorado potato beetle.

He did a postdoc at the University of Florida and studied IPM of hibiscus mealybug, a newly invasive pest of citrus in the state. He investigated methods to prevent the spread of hibiscus mealybug, tested predators which could be used as biological control agents and ran insecticide experiments to determine their efficacy against hibiscus mealybug.

In his free time, he enjoys gardening, hiking, climbing, and being outdoors. Eric also loves obstacle courses and competed on the TV show American Ninja Warrior for the past 7 years. Eric is happiest when he's thinking about bugs, working in a garden, or climbing around on something.



## Meet the Office Manager

Sue began her UCCE ANR career in 2007 with UCCE San Luis Obispo County. She was hired as an Administrative Assistant 3 and within the first year she was promoted to office manager.

In 2011, UCCE Santa Barbara merged with San Luis Obispo County, and she became the office manager for both offices until she left in July 2015.

In 2015, her husband transferred to San Diego and serendipitously UCCE San Diego had an open position. Sue came to work at UCCE San Diego office as an Administrative Assistant 3 in August 2015. In 2020, during the pandemic, she worked with UCCE San Bernadino as their part time office manager, she did this for nearly a year until they found a permanent replacement. Sue has been promoted to the Administrative Officer 3 for the San Diego office and will take over the office manager duties on July 1st, 2022.

Sue lives in Escondido with her husband, they have two dogs, Zeke a terrier mix and Zoey an Australian Shepherd. They all love swimming in their pool, BBQing and hanging out in their back yard in the beautiful Southern California sun!



### NEED TO GET IN TOUCH?

Visit our office directory and find all of our office advisors and staff.



2022

# CALENDAR

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




## JUNE

### ASK A MASTER GARDENER




-  June 8th – July 4th
-  San Diego County Fair

## JULY




### FERTILIZERS & PLANT NUTRITION WORKSHOP

-  English: July 12th
- Spanish: July 13th
-  CfAHR - In Vista
-  [ucnfa.ucanr.edu](http://ucnfa.ucanr.edu)

### WESTERN TREE MANAGEMENT SYMPOSIUM

-  July 14th
-  Huntington Gardens
-  [Streettreeseminar.com](http://Streettreeseminar.com)

### ASK A MASTER GARDENER




-  July 16th
-  Succulent Swap Meet at the Escondido Public Library
-  [mastergardenersd.org/calendar/viewevent.php?id=1109&month=7&year=2022](http://mastergardenersd.org/calendar/viewevent.php?id=1109&month=7&year=2022)

## SEPTEMBER

### MASTER GARDENER OPEN HOUSE

-  September 7th
-  War Memorial Building at Balboa Park

### MASTER GARDENER FALL PLANT SALE

-  September 24th
-  Casa Del Prado at Balboa Park
-  [mastergardenersd.org/calendar/viewevent.php?id=1105&month=9&year=2022](http://mastergardenersd.org/calendar/viewevent.php?id=1105&month=9&year=2022)



**We hope you have enjoyed this first 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**



Please consider subscribing to this quarterly newsletter and following us on social media!

**SUBSCRIBE**



Credits: Ben DiAnna [design], Rob Padilla [production], Annika Nabors [editing]

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