

LEADING THE WAY TO SCIENCE-BASED SOLUTIONS



UC COOPERATIVE EXTENSION IN ORANGE COUNTY

2015-2019
SUMMARY OF
ACCOMPLISHMENTS

University of California
Agriculture and Natural Resources

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ABOUT COOPERATIVE EXTENSION

Today, the Cooperative Extension (CE) system represents a national, publicly funded, nonformal educational system that links educational and research activities and resources of the U.S. Department of Agriculture (USDA), land grant universities, and county administrative units.

This educational system includes professionals in each of America's original land-grant universities created in 1862 (now in the fifty states, Puerto Rico, the Virgin Islands, Guam, Northern Marianas, American Samoa, Micronesia, and the District of Columbia); the historically black land-grant universities added in 1890; and tribal land-grant colleges added in 1994.

In California, CE is housed within University of California Agriculture and Natural Resources, a statewide division of UC (for more information on UC ANR, please visit ucanr.edu). CE is staffed by 115 CE specialists attached to campus departments and 175 CE advisors working out of a statewide network of county CE offices. CE advisors work closely with local clientele, communities, and partners to identify critical and emerging needs in agricultural, natural, and human resources in both urban and rural environments, and with campus collaborators to develop research-based approaches to solve local problems.

CE specialists are integrated into academic departments at UC Berkeley, UC Davis, UC Riverside, UC Merced, UC Santa Cruz, and UC Santa Barbara, where they conduct research and develop new science and technologies. CE specialists work to connect local CE advisors to the campus-based Agriculture Experiment Stations (Berkeley, Davis, and Riverside) and other resources to address a myriad of issues and needs throughout California.

University of California Cooperative Extension (UCCE) takes information developed on its campuses and research centers and makes it available to local communities. In addition, CE advisors conduct applied research of their own to address local issues.



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UCCE IN ORANGE COUNTY

Cooperative Extension exists across the United States as a result of a close partnership between the USDA, the state's land-grant university, and the county or local government.

Each partner plays a key role in providing funding and support for Cooperative Extension programs.

In Orange County, the partnership with the University of California, USDA, and the County of Orange was established in 1918. The University provides academic advisors and program support staff, who plan and conduct programs across the county for the benefit of its residents.

USDA provides program support dollars for the Expanded Food and Nutrition Education Program (EFNEP), a nutrition education program for youth and low-income families with children and a small portion of academic support.

The County of Orange prior to 1991 provided county offices, clerical support, travel funds, and other support staff. In order to provide critical services, the County of Orange and UCCE entered into Agreement No. D04-060 to support core programs for a period of 6 years in 2004. The agreement was extended for an additional 5 years in 2010 and again in July 2015 based on quality performance and the unique ability of UCCE academics and support staff to assist the County of Orange with mandated core program, specifically with the compliance of Orange County's NPDES permit. In addition, the agreement allows UCCE's extraordinary expertise, in areas related to pest management, exotic species control, facilitation of controversial topics, and extension education. Over the last 5 years of the agreement UCCE has leveraged the core funding from the Cooperative Agreement to secure an additional \$5.6 million of funding dollars to address specific local issues, such as the devastating damage caused by the invasive shot-hole borer to Orange County's urban forests and natural open space areas.

The relationship between the County of Orange and the University of California Cooperative Extension (UCCE) was initially established in 1918 to serve as a conduit for scientific research to flow from UC campuses to address local issues. Following Orange County's 1992 recession, UC Cooperative Extension worked to retool its academic research and extension efforts to better serve the remaining agriculture in Orange County as well as address urban and natural resource topics where UC has expertise, such as water resource efficiency, pest management, nutrition, youth development, invasive species, weed management, and education. A new formal relationship formed in the late 1990s with the development of a formal MOU that led to a 5-year cooperative agreement with a particular focus on protecting and improving water resources in Orange County. The agreement was renewed in 2015 for another 5-year period with annual reviews of performance.

UCCE academics and staff deliver programs independently and in close collaboration with several county departments and agencies, including OC Public Works (as well as OC Environmental Resources and OC Ag Commissioner), OC Waste and Recycling, OC Fire Authority, and OC Mosquito and Vector Control. UCCE brings resources to the County in the form of grant monies, a handful of academics tasked with research and extension specifically focused on Orange County issues, and the presence of the UC ANR South Coast Research and Extension Center (REC), a 200-acre research and extension center in Irvine.

GRANTS AND IN-KIND SERVICES

UNIVERSITY OF CALIFORNIA

Academic Advisors Salaries and Benefits **\$ 2,320,834**

USDA

Expanded Food and Nutrition Education Program **\$ 1,359,668**

IN-KIND SERVICES ¹

UCCE Master Gardeners of Orange County **\$ 3,228,990**

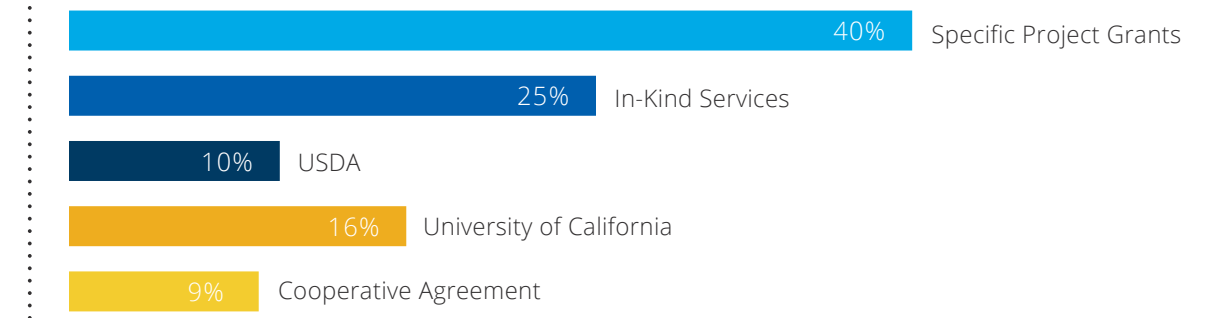
UCCE Master Food Preservers of Orange County **\$ 314,550**

SPECIFIC PROJECT GRANTS

PROGRAM & PROJECT	PARTNER	PERIOD	AMOUNT
Human-Wildlife Interactions			
Ground Squirrel Best Management Practices Web Site and Expansion of Passive Extension Capacities	California Department of Food and Agriculture (CDFA) Pest Prevention and Health Services	2015-2017	\$ 8,658
DPR School IPM Workshops	California Department of Pesticide Regulation (CDPR)	2016-2018	\$ 11,875
Can Rodenticide Toxicosis be Mitigated by Changes in Management Practices?	Pest Management Foundation	2017-2018	\$ 19,974
Investigation of Rodenticide Pathways in an Urban System Through the Use of Isotopically Labelled Bait	California Department of Consumer Affairs	2018-2020	329,749
Urban Forestry			
Coordination, Outreach, Education, and Engagement for Pest Management (ISHB and Emerging Pests)	USDA Forest Service	2019-2020	\$ 49,695
Invasive Forest Pests Education and Outreach	Cal Fire	2019	\$ 35,673
Polyphagous Shot Hole Borer Survey and Management; Gold-Spotted Oak Borer Survey and Management; Yellowjacket Monitoring and Management	OC Parks	2015-2020	\$ 1,280,000
Survey and monitoring of Invasive Shot-Borers and Gold-Spotted Oak Borer in Orange County	Orange County Fire Authority	2019-2022	\$ 85,729
CDFA Master Grant for ISHB Research ²	CDFA	2019-2022	\$ 3,182,500
4-H Youth Development			
IMAGINE Science!	Boys and Girls Club of Garden Grove	2016-2018	\$ 35,900

1. Based on national volunteer hour values (estimated by Independent Sector via Bureau of Labor Statistics) and number of volunteer hours reported by each program.
 2. Statewide Grant Awarded to UC IPM but expertise resides in Orange County where staff will be located and managed by UCCE Orange County Urban Forestry Advisor.

OUR FUNDING SOURCES



SPECIFIC PROJECT GRANTS (CONT.)

PROGRAM & PROJECT	PARTNER	PERIOD	AMOUNT
Water Resources			
Monitoring Pesticides in Surface Runoff from Urban Orange County	CDPR	2011-2015	\$ 71,410
Disinfecting and Recirculating Irrigation Runoff using Combined Vegetated and Slow Sand Filters	CA Association of Nurseries and Garden Centers	2014	\$ 11,000
Reducing Pesticide Detections in Urban Creeks through Outreach to Pest Management Professionals	CDPR	2014	\$ 54,000
Microcalorimetry for Rapid Assessment of Specialty Crop Salinity Tolerance	CDFA	2014	\$ 8,370
Adoption of Water Quality Protective Mitigation Practices by Pest Management Professionals	CDPR	2016-2018	\$ 100,000
How can Pest Management Professionals Protect Water Quality?	County of Los Angeles, Ag Commissioner	2018	\$ 10,000
Clean Water3 - Reduce, Remediate, Recycle - Increasing Profitability in Specialty Crops	USDA Specialty Crop Initiative	2014-2019	\$ 162,853
Integrating Biochemical, Physiological, and Morphological Responses of Plants to Changes in Water Availability	Chapman University/ National Science Foundation	2015-2018	\$ 9,072
Contaminants of Emerging Concern (CECs): From Treated Wastewater and Biosolids to Fresh Produce	USDA National Institute of Food and Agriculture	2016-2019	\$ 61,157
Landscape Plant Performance: Water Use Assessments and New Cultivar Selections	CDFA Specialty Crop Block Grant - USDA	2017-2019	\$ 76,967
Evaluating Water-Usage Tolerances of Landscape Plants in Partial Shade	CA Association of Nurseries and Garden Centers	2018-2019	\$ 25,000
Urban Living Education Expo	Metropolitan Water District of Southern California	2018-2019	\$ 4,000
Project Grants Total (All Programs)			\$ 5,633,582

OUR UCCE TEAM

DIRECTOR

Dr. Darren Haver

UCCE OC County Director,
UC South Coast REC Director,
Water Quality/Water Resources Advisor

COMMUNITY OUTREACH & EDUCATION

Tammy Majcherek

UC South Coast REC Community Educator

Jason Suppes

UC South Coast REC Community Educator

Guadalupe Cabrera

Nutrition Educator

Hilda Perez

Nutrition Educator

Rita Jakel

4-H Community Educator

Randy Musser

Master Gardener Coordinator

Colleen Clemens

Master Food Preserver Coordinator

Monica Dimson

Media Communication Specialist

RESEARCH & SUPPORT

Dr. John Kabashima

Environmental Horticulture Advisor

Dr. Beatriz Nobua-Behrmann

Urban Forestry Advisor

Natalie Price, MPH, CHES

Nutrition, Family, and Consumer Sciences
Advisor

Dr. Niamh Quinn

Area Vertebrate Pest Advisor

Dr. Cheryl Wilen

Area IPM Advisor

Gabriel Verduzco

Staff Research Associate

Danielle Martinez

Staff Research Associate

SPECIAL PROJECT STAFF

Hannah Vasilis

Invasive Tree Pest Field Analyst and Survey
Coordinator, UC IPM Statewide Program

Randall Oliver

Digital Media Specialist, UC IPM Statewide
Program

OUR PARTNERS

- Altman Nurseries
- Anaheim YMCA
- Boy Scouts/Girl Scouts
- Cal State Fullerton
- California Department of Fish and Wildlife
- California Department of Food and Agriculture
- California Department of Forestry and Fire Protection (CAL Fire)
- California Department of Pesticide Regulation
- California Firewood Taskforce
- California Invasive Species Advisory Committee
- City of Irvine
- City of San Juan Capistrano - water district section
- El Toro Water District
- Green Thumb International
- Home Depot
- Irvine Company (Irvine Valencia Growers)
- Irvine Ranch Conservancy
- Irvine Ranch Water District
- Joann Fabrics
- Laguna Beach County Water District
- Los Angeles County Department of Agriculture
- Metropolitan Water District of Southern California
- Moulton Niguel Water District
- Municipal Water District of Orange County
- OC Farm Bureau
- OC Parks
- OC Produce
- OC STEAM Hub Communities of Practice (OCDE)
- Orange Coast College
- Orange County Department of Public Health
- Orange County education office and school districts
- Orange County Fire Authority
- Orange County Municipalities (NPDES Co-Permittees)
- Orange County Parks
- Orange County Public Works
 - OC Agricultural Commissioner
 - OC Watersheds
- Orange County Sanitation District
- Orange County Transportation Authority
- Orange County Vector Control
- Orange County Waste and Recycling
- Pacific Marine Mammal Center
- Pepperdine University



Megan Lulow (Irvine Ranch Conservancy) and John Kabashima (UC Cooperative Extension) lead a tree pest workshop hosted by OC Parks.

- Project Access
- Rancho Santa Margarita Water District
- Tractor Supply
- University of California, Irvine Water-PIRE (Partnerships for International Research & Extension)
- University of Arizona
- University of California Statewide Integrated Pest Management Program
- University of California, Davis
- University of California, Riverside
- University of Utah
- University of Wisconsin
- US Forest Service
- USDA National Wildlife Research Center
- Ventura County Agricultural Commissioner
- Village Nurseries
- Washington Department of Agriculture
- Western Chapter of International Society of Arboriculture
- Western University of Health Sciences

SOUTH COAST RESEARCH & EXTENSION CENTER

ABOUT

South Coast Research and Extension Center (South Coast REC) was established by the University of California in 1956 as a representative site for agricultural and horticultural research in California's south coastal plain-temperate climatic zone.

UC South Coast REC serves as a regional field laboratory for scientists to conduct agricultural, horticultural, and natural resources management research and extend research-based information to a wide spectrum of audiences. The Center provides land, irrigation water, labor, equipment, and other facilities, and it serves as a repository for germplasm collections of many subtropical plants.

The urban character of UC South Coast REC affords a unique opportunity for UC scientists to analyze many public policy issues in the agriculture-urban interface debate. New research emphasis at UC South Coast REC will be directed to elucidate impacts of production practices on air and water quality and land use, and to develop production methods to mitigate potentially adverse environmental degradation. Another potential area of research focus will be the development of new alternative high-value or industrial use crops through classical breeding and biotechnological approaches.



◀ A UC Master Gardener instructs two young visitors at a Potato U-Pick event at UC South Coast REC.

◀ Opposite: Students from Oceanview School District planting pumpkins during a field trip to UC South Coast REC.

HIGHLIGHTS

- **Youth education and opportunities**
- We entered the fifth year of the GROW program, a joint collaboration with the OC Farm Bureau to expose as many as 100 high school youth annually to the wide range of career and education pathways in agriculture and natural resources.

- **Community field days**
- We hosted family-friendly community field days extending best practices and science-based solutions to Orange County and beyond, covering topics such as integrated pest management, water conservation, food and green waste, and food security.

LOOKING FORWARD

- **Community College Partnerships**
- We have initiated a partnership with Orange Coast College, Santa Ana Colleges, and the North Orange County Community College District on several drone and remote sensing themed expo, conference, and vocational certificate programs aimed at introducing local under served youth to community college pathways leading to careers in Unmanned Aerial Vehicles (UAV), remote sensing technologies, agriculture, and natural resource management.

- **Hub for Urban Living**
- We have begun development of the Hub for Urban Living, which focuses on building up our capacity to provide science-based research and practices to the local community through educational programs and demonstration projects. Read more about this project on pages 26-27.

4-H YOUTH DEVELOPMENT



Head, heart, hands, and health

ABOUT

4-H Youth Development promotes hands-on learning and is based on parent and volunteer participation. 4-H welcomes youth ages 5-19 (and adult volunteers) from all backgrounds in all locales regardless of race, religion, color, national origin, sex, marital status, sexual orientation, age, veteran status, medical condition or disability.

4-H Clubs are run by youth, with the help of adult advisors. Club projects focus on anything from art to zoology and help members build skills they can use the rest of their lives. 4-H educational experiences are built around life skills that center on positive self-esteem, communication, and decision making.

COLLABORATORS

- California Department of Food and Agriculture
- OC Farm Bureau
- OC STEAM Hub Communities of Practice (OCDE)
- Project Access
- School districts and Orange County education office
- Tractor Supply & Joann Fabrics corporate sponsors
- University of California, Davis



◀ 4-H club members take part in egg judging at the La Habra Citrus Fair.

▶ Opposite: Project Access students in the 4-H Robotics after-school program.

HIGHLIGHTS

Improving our reach

With grant support, 4-H was able to increase participation of Latino youth by more than 2000%, utilizing afterschool sites in predominantly low-income communities to deliver high-quality, hands on STEM education.

New community service initiative

The members of our new community service project, the Gleaning and Giving team, glean produce at UC South Coast REC to be donated to local food pantries.

Poultry workshops

We worked closely with CDFA and UC Davis to host Newcastle Disease Informational workshops for residents of Southern California who keep poultry.

A UCCE team effort

We collaborated with other Orange County UC programs to coordinate a Nutrition Education festival for several hundred youth and adults.

New ways to engage

4-H has expanded delivery modes to include in-school clubs and programs.

MASTER GARDENERS

Advice to grow by



ABOUT

The University of California Cooperative Extension (UCCE) Master Gardeners of Orange County are a dedicated group of trained volunteers who extend research-based, scientifically accurate information about home horticulture, pest management and sustainable landscaping to Orange County residents.

Master Gardeners help people to:

- Succeed at food gardening - growing their own food, learning where food comes from and getting exercise.
- Learn about the safest and most effective ways of dealing with pests and plant diseases.
- Maintain their landscapes more sustainably - choosing climate appropriate plants, using water resources appropriately and reducing yard and food waste.



WHERE WE WORK

We reach out to Orange County communities in a number of ways:

- Our **Speakers Bureau** presents at OC Public Libraries, garden clubs, and many venues like the Community Center in San Jan Capistrano.
- Information booths during **events** like the OC Fair, Green Scene at the Fullerton Arboretum, Black History Cultural Faire in Anaheim, and the Water Festival in Rancho Santa Margarita.
- Educate at **demonstration and school gardens** such as at the Santa Ana Zoo, Irvine Ranch Historic Park, and the Giving Farm at Westminster High School.
- Answer questions through a **hotline** and offer **online** gardening resources.

- ◀ Master Gardener volunteers offer gardening and pest management advice at local events.
- ▶ Opposite, above: Master Gardener workshops present gardening methods based on UC research.
- ▶ Opposite, below: A young family examines seed samples at Imaginology at the OC Fairgrounds and Event Center.

OC MASTER GARDENERS 2015-2019



275

ACTIVE VOLUNTEERS



111000+

VOLUNTEER HOURS PROVIDED



4000+

HOTLINE QUESTIONS ANSWERED



SPEAKERS BUREAU 2015-2019



700+

PRESENTATIONS



NUTRITION EDUCATION PROGRAM

Community-based intervention that achieves results



ABOUT

The Nutrition Program partners with agencies and non-profits to address nutritional issues impacting local communities. Our research is complemented by two major outreach programs:

Expanded Food and Nutrition Education Program (EFNEP): a USDA-funded program that offers nutrition education to limited-resource families and youth. UCCE nutrition educators are bilingual and have a great understanding of the multiple cultural and social factors that influence the dietary habits in communities they serve, and are thus able to address these practices and suggest healthier alternatives.

Master Food Preservers: a volunteer-based program aimed at assisting Orange County residents with home food preservation, safety, and food waste reduction. Master Food Preservers materials are based on the most current, UC research-based information.

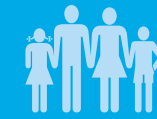
OUR AUDIENCE

- Parents of low-income families (85% of whom live below the federal poverty level) with children under 18-years-old at target schools
- K-12 students from low-income families
- Public health and non-profit agencies who serve the general public



Nutrition Educator Guadalupe Cabrera (left) with Orange Coast College interns at Olivewood Elementary in Lake Forest. EFNEP's partnership with Orange Coast College has given student interns experience in community nutrition, nutrition education, and advocacy for nutrition programs, especially in underserved populations.

OC EFNEP 2014-2019



2500+
PARTICIPANTS



88%
ADULT AND



\$54
AVERAGE SAVINGS²



61%
INCREASE IN PHYSICAL ACTIVITY²

500+
FAMILIES ENROLLED¹

76%
YOUTH PROGRAM GRADUATION RATES¹

¹ ANNUAL AVERAGES
² REPORTED BY EFNEP FAMILIES

OC MASTER FOOD PRESERVERS 2015-2019



40
ACTIVE VOLUNTEERS



10800+
VOLUNTEER HOURS

HIGHLIGHTS

Learn-At-Home curriculum

This recently launched statewide pilot program connects UCCE EFNEP educators to community members who cannot attend typical program hours.

Local collaborations

Through our strong partnership with the Department of Public Health, we created a Food Waste Task Force, and also collaborated with the Waste Not Orange County Coalition to increase the program's footprint in Orange County.

OCC Intern Program

Our new partnership with Orange Coast College (OCC) prepares students to enter the workforce upon graduation by enabling them to explore a career path, build a network of contacts, learn the job duties that might be encountered in the nutrition education field, and gain confidence in applying what they have learned in a safe environment.

HUMAN-WILDLIFE INTERACTIONS



Supporting human-wildlife conflict resolution

ABOUT

In Southern California, human-wildlife conflicts include increasingly critical issues, such as negative impacts of wild or feral mammals and birds in agricultural production, food safety, public health and safety, forestry, and natural resource conservation. The Human-Wildlife Interactions program facilitates the exchange of information among UCCE advisors, campus-based academics, and community stakeholders.

OUR AUDIENCE

- Pest management professionals
- Wildlife managers, including police departments, city management, animal control, homeowner associations, etc.
- UCCE Master Gardeners
- The general public

COLLABORATORS

- Cal State Fullerton
- Pepperdine University
- University of California, Davis
- University of California Statewide Integrated Pest Management Program
- Orange County Vector Control
- Los Angeles County Department of Agriculture
- USDA National Wildlife Research Center
- University of Wisconsin
- University of Arizona
- University of Utah
- Washington Department of Agriculture
- Western University of Health Sciences



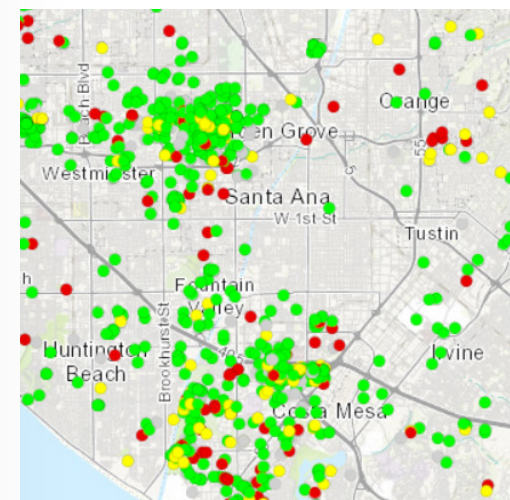
HIGHLIGHTS

West Coast Rodent Academy (WCRA)

We are a founding member of the WCRA, which provides pest management professionals with a better understanding of rodent ecology and IPM techniques. In collaboration with our partners, we have hosted several workshops featuring lectures, hands-on activities, and break out sessions.

Coyote Cacher

Our new website monitors and maps coyote encounters so that users can stay informed of local activity. Visitors can add encounters or sign up for email alerts at: ucanr.edu/sites/CoyoteCacher.



Ground Squirrel BMPs

We launched a research-based, peer-reviewed web resource for ground squirrel best management practices in California, accessible at: www.groundsquirrelbmp.com.

- ▲ A California ground squirrel in an agricultural field at UC South Coast REC.
- ▲ The Coyote Encounters Map on the Coyote Cacher website. Different colors signify the alert level, where green indicates a sighting or a missing pet, and red reports an attack, chase, or bite by a coyote.

Research and Publications

Active research topics in our program include coyote behavior and rodenticide use. From 2014-2019, our work was included in various publications, including *UC IPM Green Bulletin*, the *Proceedings of the 27th Vertebrate Pest Conference*, and the peer-reviewed *Human-Wildlife Interactions* journal.

INVASIVE PESTS



Solve your pest problems with UC's best science

ABOUT

At UC Cooperative Extension, we often take an integrated pest management (IPM) approach to invasive pest issues. IPM is a process used to solve pest problems while minimizing risks to people and the environment. It can be used to manage all kinds of pests anywhere—in urban, agricultural, and wildland or natural areas. The work of UC IPM is based on scientific research and focuses on long-term prevention of pests or their damage by managing the ecosystem. Regular monitoring and accurate pest identification help determine whether action is needed, and, when it is necessary, IPM programs combine several management approaches for greater effectiveness.



HIGHLIGHTS

IPM training and outreach

Dr. Cheryl Wilen has helped present multiple IPM and pesticide safety workshops open to landscape professionals, pest management contractors, school staff, and other members of the community. She also regularly contributes to the UC ANR blog *Southern IPM Activities*.



A statewide summit

Dr. John Kabashima (UCCE Advisor, Emeritus) continues to lead regional efforts to manage the invasive shot-hole borers (ISHB), a tiny exotic beetle that has had a substantial impact on urban, native, and agricultural trees in Southern California. In 2018, Dr. Kabashima spearheaded the "Invasive Species Summit," an effort to raise awareness among state legislators as well as assemble consensus recommendations. The summit led to the development of two state bills and a legislative allocation of \$5 million for the management and detection of ISHB. Dr. Kabashima served on the joint committee (of Cal Fire and the California Department of Food and Agriculture) that developed the plan for the funds' dissemination.

Snails and slugs education

Until recently, Southern California populations of the Italian white snail (or white garden snail) have mostly been found in neglected fields. But now, this invasive snail is increasingly found infesting fruit tree orchards, avocado groves, and home landscapes. The snails are small and difficult to detect, and also attach to many surfaces (e.g. truck beds), which means they may infest new areas fairly easily. Dr. Cheryl Wilen collaborated with other experts to present a free Snails and Slugs webinar, which featured an overview of biology, management, and current research.

Western Plant Board tour

Dr. John Kabashima was invited to participate in the Western Plant Board's 100th anniversary meeting in San Diego, as well as conduct a tour of the ISHB management program at Disneyland. The Western Plant Board consists of the 14 western states and Guam that are members of the National Plant Board, a non-profit organization of the plant pest regulatory agencies of each of the states, and the Commonwealth of Puerto Rico and Guam.

- ◀ Dr. John Kabashima leads an arthropod break-out session at the Invasive Species Summit in Sacramento.
- ▶ Italian white snails (with a quarter for scale) are no bigger than a nickel when full grown. They are easiest to spot during during the day or in warmer temperatures, when large numbers of snails tend to congregate on fence posts, walls, or vegetation.

URBAN FORESTRY



Protecting our trees from invasive pests

ABOUT

Invasive tree pests are threatening the integrity of the urban forest in Southern California. Particularly, two species of invasive beetles (the invasive shot-hole borers and the gold-spotted oak borer) are affecting thousands of trees in urban landscapes and adjacent natural areas. The Urban Forestry program aims to prevent pest problems and control current infestations in Orange County. We also collaborate with other counties in an effort to stop the spread of these dangerous pests to new uninfested areas.

We provide guidance to public and private entities on how to implement integrated pest management programs to deal with tree pests. We work together with landscape managers to find solutions that minimize the use of pesticides while providing effective management.



OUR AUDIENCE

- Private and public landscape managers
- Professional arborists and tree workers
- UCCE Master Gardeners
- The general public

COLLABORATORS

- California Department of Fish and Wildlife
- California Department of Food and Agriculture
- California Invasive Species Advisory Committee
- California Firewood Taskforce
- CAL Fire (California Department of Forestry and Fire Protection)
- City of Irvine
- Irvine Ranch Conservancy
- Orange County Fire Authority
- Orange County Parks
- Orange County Public Works
 - OC Agricultural Commissioner
- Orange County Transportation Authority
- Orange County Waste and Recycling
- University of California, Davis
- University of California, Riverside
- University of California Statewide IPM Program
- US Forest Service
- Ventura County Agricultural Commissioner
- Western Chapter of International Society of Arboriculture

◀ ISHB is a tiny beetle, but the winding tunnels it creates can cause serious structural damage to tree trunks and branches.



Gabriel Verduzco and Beatriz Nobua-Behrmann inspect an Australian pine tree for ISHB at Mile Square Golf Course in Fountain Valley.

HIGHLIGHTS

Regional and statewide collaboration

We worked with the California Invasive Species Advisory Committee to design a statewide action plan to control and contain invasive shot-hole borers (ISHB). We are collaborating with other affected counties (e.g., San Diego, Los Angeles, Ventura) to implement a coordinated ISHB response. Statewide coordination of ISHB trapping and outreach efforts are based at UCCE Orange County.

Pest management research

Our active research projects for invasive tree pests include: testing the efficacy of chemical and biological controls; investigating new control methods that reduce the amount of pesticide used; and testing the effectiveness of IPM programs that integrate cultural practices, chemical, and biological control.

Addressing wildfire risk

Increased fuel loads from infested dead/dying trees are raising wildfire risk in Orange County. We assist Orange County Fire Authority's fuel reduction efforts by identifying dying infested trees, monitoring infested areas, and providing advice on tree pest mitigation.



ISHB online course

We launched a free online training for ISHB identification and best management practices, targeted towards Master Gardeners, tree workers, and the general public (access: ucanr.edu/sites/pshb/For_More_Information/Trainings/).

OC Parks monitoring + management

We conduct regular tree surveys in 45 Regional Parks and open areas. We assess the trees for invasive pest infestation and provide management recommendations specific to each park.

WATER RESOURCES



Protecting water resources through better water management

ABOUT

Over the last 20 years, UCCE's water resources program in Orange County has been directed by advisor Darren L. Haver, PhD. The program addresses critical issues related to conserving water in the landscape as well as protecting surface water quality through both research and extension activities. The program partners with both public and private entities in an effort to protect water resources while still recognizing the barriers these entities face as they seek science-based solutions. Research and extension in water resources has addressed watershed management, increasing the use of recycled water in both landscape and food production systems, improving irrigation efficiency with the main goal of reducing or eliminating surface runoff, identifying and mitigating the presence of pollutants, particularly pesticides, in surface runoff, and working to establish more sustainable water friendly public and private urban spaces.



PARTNERS

- Altman Nurseries
- Anaheim YMCA
- Boy Scouts/Girl Scouts
- California Department of Pesticide Regulation
- City of San Juan Capistrano – water district section
- El Toro Water District
- Green Thumb International
- Home Depot
- Irvine Company (Irvine Valencia Growers)
- Irvine Ranch Water District
- Laguna Beach County Water District
- Metropolitan Water District of Southern California
- Moulton Niguel Water District
- Municipal Water District of Orange County
- OC Parks
- OC Produce
- OC Watersheds
- Orange County Municipalities (NPDES Co-Permittees)
- Orange County Sanitation District
- Pacific Marine Mammal Center
- Project Access
- Rancho Santa Margarita Water District
- UCI Water-PIRE (Partnerships for International Research & Extension)
- Village Nurseries

Opposite:

- ▶ UC Davis graduate student Bridget Giffei sizes up the 2-year growth of *Grevillea* species in the UC Landscape Plant Irrigation Trials.
- ▶ View downstream of residential runoff outfall sampling site in South Orange County.



KEY ACTIVITIES

- Facilitation of the Aliso Creek Collaboration Group
- Liaison between Orange County agricultural community, municipalities, county government, and state regulators (Regional Water Quality Control Boards)
- Technical support on issues related to pesticide and fertilizer use and mitigation and implementation of integrated pest management to reduce water quality impacts
- Technical support provided to water districts on issues related to recycled water use on landscape health

HIGHLIGHTS

Recycled water research

Our large, ongoing field trial at UC South Coast REC evaluates the performance of landscape plants under three irrigation treatments utilizing tertiary-treated recycled water.

Outcome: Ensures that high quality urban landscapes less dependent on water, especially during droughts, will be the predominant type of landscape found on both public and private lands.

Pesticide monitoring

Working closely with the California Department of Pesticide Regulation and in partnership with the County of Orange's OC Watersheds, the City of Laguna Niguel, and the City of Aliso Viejo, we have assisted in monitoring pesticides in surface runoff from urban residential neighborhoods to identify their presence and, more importantly, methods of mitigating this presence through various extension activities.

Outcome: Reduce or eliminate toxicity in surface waters attributed to pesticides utilized by both professionals and homeowners while still addressing the need to control pests, especially invasive species responsible for significant impacts on healthy natural and built landscapes.



Looking forward...

UC SOUTH COAST REC'S HUB FOR URBAN LIVING

Live, work, grow, and thrive

ABOUT

Development has begun on the Hub for Urban Living, which will be hosted by UC South Coast REC and focus on extending UC science to the local community. We recently secured state funding for a new education center (including an auditorium and classrooms) that will serve as the center of the Hub. Concepts for the Hub for Urban Living include:

- Small-scale park landscape where state, county, and municipal park managers can learn best practices in integrated pest management, irrigation, turfgrass management, and arboriculture
- Installation and testing of low impact development structures (e.g. bioswales)
- Integrated pest management training facility for structural and landscape pest control
- Compost and green waste reduction area
- Controlled environment agriculture in addition to agriculture in urban environments
- Agriculture and natural resources innovation laboratory
- Biomass building products
- Wildfire protection

CURRENT & POTENTIAL PARTNERS

- California Association of Pest Control Advisers
- California Department of Food and Agriculture
- CalRecycle
- Community Colleges
- Department of Pesticide Regulation
- Irvine Ranch Water District
- LA Ag Commissioner
- Municipal Water District of OC
- OC Health Care Agency
- OC Operations and Maintenance (Flood Control)
- OC Parks
- OC Public Libraries
- OC Waste and Recycling
- Orange County Animal Control
- Orange County Public Works
 - OC Ag Commissioner
 - OC Watersheds
- Orange County Sanitation District
- Orange County Vector Control
- Regional Water Quality Control Boards
- Southern California Coastal Water Research Project
- Structural Pest Control Board
- UC Irvine
- US Department of Agriculture
- Various municipal law enforcement agencies
- Additional water districts





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