

# University of California Cooperative Extension Santa Barbara

Quarterly Report April—June 2019



**Annual Santa Maria Strawberry Field Day at Manzanita Berry Farms on May 14, 2019**

**Submitted by: Katherine E. Soule, PhD  
Director of UC Cooperative Extension  
Santa Barbara County  
July 30, 2019**

## UC Cooperative Extension Programs in Santa Barbara County

**PLANT SCIENCES AND HORTICULTURE** led by Mr. Mark Battany, Dr. Surendra Dara, Dr. Ben Faber, and Dr. Chris Greer specializes in the science and art of growing fruits, vegetables, flowers, and ornamental plants. Advisors conduct local field research to test new crops and varieties that are best adapted to local soil and water conditions and markets, implement improvements in cultural practices and pest control methods, and offer information that optimizes production, conserves natural resources, and protects the environment. Advisors are called upon regularly by growers and the general public to assist in enterprise planning and problem solving. Programs include the UC Integrated Pest Management and UC Master Gardener programs.

**YOUTH, FAMILIES, AND COMMUNITIES PROGRAMS** are led by Dr. Katherine Soule and Ms. Liliana Vega. The mission of the UC Youth, Families, and Communities Program in Santa Barbara County is to cultivate environments where local youth, families, and community members have access to science-based resources and knowledge in order to be the creators of a healthy, inspired, active, & connected Central Coast. Programs include: the UC CalFresh Nutrition Education, UC Master Food Preservers, and 4-H Youth Development programs.

**NATURAL RESOURCES, RANGE MANAGEMENT, WATERSHED, AND LIVESTOCK** led by Dr. Royce Larsen and Mr. Matthew Shapero, provides range and pasture livestock ranchers and producers with research-based information on ecosystem services, irrigated pastures, resource economies, livestock health, production and management, improvements, and watershed management and water quality issues on rangelands.

**FIRE ECOLOGY AND MANAGEMENT** led by Dr. Max Moritz, focuses broadly on scientific questions in fire ecology and management. Research includes analysis of where various fuel management techniques are likely to succeed and be sustainable, mapping of fire weather patterns, and quantifying linkages between fire and climate change. Outreach efforts emphasize fire-related policy decisions and education of the general public to live more safely on fire-prone landscapes.

## UC Cooperative Extension Advisors and Specialists in Santa Barbara County



**Royce Larsen, Ph.D.**  
805-434-4106  
[relarsen@ucanr.edu](mailto:relarsen@ucanr.edu)



**Max Moritz, Ph.D.**  
805-893-2125  
[mmoritz@ucanr.edu](mailto:mmoritz@ucanr.edu)



**Chris Greer, Ph.D.**  
805-781-5161  
[cagreer@ucanr.edu](mailto:cagreer@ucanr.edu)



**Surendra Dara, Ph.D.**  
805-788-2321  
[skdara@ucanr.edu](mailto:skdara@ucanr.edu)



**Katherine Soule, Ph.D.**  
805-781-5940  
[kesoule@ucanr.edu](mailto:kesoule@ucanr.edu)



**Liliana Vega, M.S.**  
805-781-4188  
[live@ucanr.edu](mailto:live@ucanr.edu)



**Ben Faber, Ph.D.**  
805-645-1462  
[bafaber@ucanr.edu](mailto:bafaber@ucanr.edu)



**Matthew Shapero, M.S.**  
805-645-1475  
[mwshapero@ucanr.edu](mailto:mwshapero@ucanr.edu)



**Mark Battany, M.S.**  
805-781-5948  
[mcbattany@ucanr.edu](mailto:mcbattany@ucanr.edu)



**Hiromi Peck**  
Publication Formatting



**Dayna Ravalin**  
Technical Editing



**Jerry Harris**  
Office Manager

## Administrative Accomplishments—Director, Dr. Katherine E. Soule

### The Challenge

Communities beyond the reach of the land grant campuses of the University of California present special challenges for outreach and extension. Cooperative Extension is the public education arm of the University of California's Division of Agriculture and Natural Resources. Cooperative Extension provides a direct link between all citizens of Santa Barbara County and the research, teaching and public service activities of the University.

Our mission is to extend research knowledge and information to empower people to improve and enhance their lives. We represent a unique partnership between the University of California, the County of Santa Barbara, and the United States Department of Agriculture.

### Addressing the Challenge

As Director of Cooperative Extension in Santa Barbara County, Dr. Katherine E Soule maintained contact with the Agricultural Commissioner throughout the quarter. UC Cooperative Extension Advisors and staff were active in all program areas in the county during the quarter. Advisors were involved in extensive outreach and education efforts providing workshops and field meetings as well as reaching clients through social media. During the quarter, Dr. Soule met individually with the 3rd and 2nd District Supervisors to provide updates on UCCE activities in the County.

During the quarter, the UCCE office in Goleta was closed due to ongoing need for repairs. To better serve clientele in Santa Barbara County, Advisor Shapero relocated to the Agricultural Commissioner's Office in Buellton and the UC Master Gardener Program to their office in Santa Barbara. The remainder of the UCCE team will be relocated to Santa Maria; however, the process to secure a location and lease is ongoing. We hope to be in a new office space by mid-Fall.

UC personnel collaborated with the Santa Barbara County Cattleman's Association, Cachuma RCD, Santa Barbara Range Improvement Association, Farm Service Agency, Santa Maria Bonita School District, THRIVE Santa Maria's Healthy School Pantry, Santa Barbara County Public Health Department, Mesa Harmony, Trinity Gardens, Farmer's Markets, Santa Maria Parks and Recreation, Santa Barbara County School Districts, the Santa Barbara Botanic Garden, Santa Barbara County Fire Safe Council, UC and CSU researchers, and the USDA, among others to support programs.



Increasing collaborations between the Agricultural Commissioner Department and UC Cooperative Extension in Buellton (Photo Credit: Agricultural Commissioner Department, 2019)

### Public Value

The University of California Cooperative Extension programs in Santa Barbara County:

- Ensure that science-based information developed by the University of California is available to all the people of Santa Barbara County through outreach and education provided by UCCE programs.
- Narrow the gaps in information needed by county agencies and constituents to inform policy and decision-making through local research into questions and issues unique to Santa Barbara County.
- Bring together the resources and expertise of the University of California and local partners to develop solutions to local problems.
- Provide research and information to local partners on practices or programs that reduce costs or increase benefits for the people and environment of Santa Barbara County.

## Integrated Pest Management — Advisor Dr. Christopher Greer

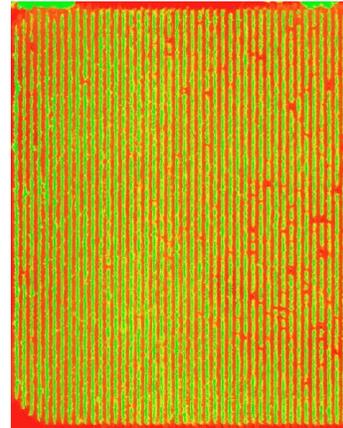
### The Challenge

Growers of agricultural crops throughout California face ever increasing challenges related to pest management through the introduction of invasive pest species, increased production costs, changing federal and state laws and regulations, and consumer preferences. Ecosystem-based strategies for agricultural pest management that are developed and validated through local field research and evaluation, disseminated through effective educational opportunities, and adopted on a regional or areawide scale are essential to maintaining economic viability of agricultural crops. Integrated pest management is a decision-making strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and nontarget organisms, and the environment.

### Addressing the Challenge

During the quarter, Advisor Dr. Chris Greer continued to develop his integrated pest management program with an emphasis on plant pathology. Efforts have focused on planning and initiating research projects, developing a better understanding of local needs, and developing resources and skills needed to address critical issues. Activities have included:

- Presented on “Management of Strawberry Fruit and Foliar Diseases and Aerial Imagery for Monitoring Crop Health” at the UCCE 2019 Annual Strawberry Field Day in Santa Maria.
- Completed several drone flights to capture multispectral imagery of multiple crops (strawberry, grape, citrus, and avocado) in preparation for use in research projects. Invested time in learning software applications for image stitching and Geographic Information Systems. Drone and multispectral camera allow for high-resolution images used in calculating plant indices such as NDVI (normalized difference vegetation index), a simple graphical measure of plant health.
- Began USDA funded research collaboration with USDA, UC, CSU and other partners on a project to develop a site-specific soilborne pest management system that includes fumigant application rates based upon disease risk factors of the field coupled with crop rotation practices to increase pest management efficiency with the ultimate goal of reducing the need for pre-plant fumigation. This area wide project encompasses the coastal area from Watsonville to Oxnard with Dr. Greer overseeing the day-to-day operations of the Santa Maria trial locations as well as the multispectral imagery.



NDVI (normalized difference vegetation index) image created by measuring the difference between near-infrared (which vegetation strongly reflects) and red light (which vegetation absorbs) for each. In this graphical depiction of the data for each pixel, the green color indicates healthy plant tissue, yellow and orange indicate stressed plant tissue, and red indicates dead or non-plant material.

### Public Value

In Santa Barbara County, the University of California Integrated Pest Management Program helps residents, growers, land managers, community leaders, and professional pest managers prevent and solve pest problems with the least unintended impacts on people and their surroundings, which can lead to:

- Increased ecological sustainability of agriculture, contributing to improving air, soil, and water quality while ensuring the viability of the agricultural industry.
- Improved food security, leading to increased access to abundant, affordable, safe, and healthy food.
- Increased agricultural efficiency and profitability, improving yield, as well as reducing inputs, thus increasing economic return.

## Watershed, Natural Resources, and Rangeland Management—Advisor Dr. Royce Larsen

### The Challenge

There are close to one million acres of native pasture and forestlands in Santa Barbara County, which are collectively referred to as rangelands. Comprising approximately half of the acreage of the County, these lands provide opportunity for multiple purposes. Rangelands serve as watersheds to capture, store, and release water for downstream uses; they provide forage for grazing by livestock; and their diverse plant communities provide habitat for many species of wildlife and recreational uses. The UC Cooperative Extension Watershed and Natural Resource Program provide educational programs to inform people who own and/or manage the land and the animals grazing these lands. This work also includes applied research to develop new knowledge to effectively and efficiently manage rangelands and livestock in today's competitive and regulatory environment.



**Vegetation samples are prepared for NIRS by grinding them in a wiley mill grinder. They have ground so they will pass through a 1 mm screen to provide a sample that can then be scanned.**

### Addressing the Challenge

Advisor Larsen helped collect forage samples for the Forage Production Project, and the Healthy Soils Project. I helped plan and present at a workshop, Assessing & Managing California Rangeland Health and Soils held on June 3, 2019. This workshop was held as part of the Healthy Soils Project, and involved UC Cooperative Extension, Community Environmental Council, Chachuma RCD and California Climate Investments.

The vegetation samples for both of these projects have been collected. I am currently processing the samples, using the USDA ARS lab at Utah State University Campus. The preparation work involves grinding the samples in preparation of scanning by a Near Infrared Scanner (NIRS), that will give nutrient values which include: crude protein, fiber, ash, fat, lignin, carbohydrates, calcium, phosphorus, potassium, magnesium and starch. The results from the scanning will be used to test if the addition of compost increased nutrient levels over the control, which was no compost added to the site.

### Public Value

The University of California Watershed/Natural Resource program in Santa Barbara County focuses on developing and extending research based information to help ranchers, managers and owners of rangeland manage their land in a sustainable and productive manner. The livestock industry is an important economic part of agriculture in the County. Research and education helps sustain the livestock industry in Santa Barbara County through:

- Improving rancher sustainability by improving their practices which sustain their production, lands, and families.
- Promoting best management practices for helping ranchers survive through the drought.
- Providing research data demonstrating severity of the drought on forage losses, in order to help ranchers obtain financial help through USDA programs designed for drought relief.

## Livestock & Range—Advisor Matthew Shapero

### The Challenge

Rangelands in Santa Barbara County support a host of ecosystem services (water storage and filtration, wildlife habitat, carbon storage, scenic viewsheds), as well as provide the primary forage base for the county's thirty-million-dollar livestock industry. For generations, ranchers have worked to sustainably manage these rangeland ecosystems while providing a quality, safe agricultural product. Increasingly, however, the county's livestock industry faces new sets of ecological, economic, and regulatory challenges that complicate this work. The ultimate goal of the UC Cooperative Extension Livestock & Range program is to assist producers and rangeland managers alike to successfully navigate these challenges. The Livestock & Range program will provide relevant, science-based information and will develop an applicable and progressive research program to respond to the questions and needs of local clientele.

### Addressing the Challenge

During the second quarter of 2019, Advisor Shapero was most active with field-based research. Spring requires extensive rangeland monitoring on seven sites throughout Santa Barbara County, cataloguing forage quantity, quality, and composition. Data from this work serves as the basis for his annual forage report to the Farm Service Agency. Relatedly, Advisor Shapero co-lead the efforts at the Chamberlain Ranch to detect the benefits related to compost application on rangelands in the county. Forage production data was collected in the Spring and shared at a workshop hosted by the Community Environmental Council in June. Advisor Shapero also brought to Santa Barbara County a Western-US-wide research project examining the future impacts of climate change to the ranching industry. He helped convene a panel of ranchers to discuss how they have responded to challenges in the past, in order to understand how they might adapt to climate change impacts in the future. Shapero was again active in assisting rancher and private landowners re-establish the Santa Barbara Range Improvement Association. April saw the first general meeting in over ten years and in May, the Association held a follow-up Board of Directors meeting. Advisor Shapero participated in a Santa Barbara County Weed Management Area meeting, organized by the SB County Agricultural Commissioner's Department. He also attended Santa Barbara County Agricultural Preserve Advisory Committee, Cattlemen's, and Cattlemen's Land-Use Subcommittee meetings. Finally, Advisor Shapero continues to respond to clientele inquiries and to meet with county residents to determine best directions for his extension programming.



**Advisor Shapero conducting rangeland monitoring at the Chamberlain Ranch, Los Olivos; there, we are tracking the benefits of compost application to grasslands on the ranch. April 2019**

### Public Value

The University of California Livestock & Range program in Santa Barbara County will provide science-based information to help ranchers, managers, and owners of rangeland manage their land in a sustainable and productive manner. Future research and education will benefit livestock operators and rangeland managers through:

- Addressing animal health issues that will increase the welfare and productivity of livestock.
- Promoting rangeland management practices that benefit both the land and the ranching operation.
- Facilitating conversation between community stakeholders in order to achieve lasting, responsible management.
- Improving animal genetics and performance, ranch profitability, and ecological sustainability.

## 4-H Youth Development—Advisor Liliana Vega with Janelle Hansen

### The Challenge

Communities of scientifically literate, well-informed, and actively engaged citizens are essential to create positive changes needed to solve important issues facing our nation and help us to prosper in a global economy.

The University of California 4-H Youth Development Program provides training and resources to local volunteers who partner with youth to bring about positive change in our communities. The 4-H program equips youth with hands-on science activities, healthy living knowledge, leadership experiences, and service-learning opportunities. Participation in 4-H prepares youth to understand and acquire the skills that will allow them to become problem-solvers and astute leaders.

### Addressing the Challenge

4-H staff supported 199 adult volunteers in delivering positive youth development (PYD) programming to 792 youth members and their families in 23 clubs throughout the county.

Participants engaged in hands-on experiential learning projects in the focus areas of Science, Leadership, Healthy Living, and Civic Engagement. Countywide 4-H activities, training meetings, and educational outreach events were delivered to 4-H youth, families, as well as the community at large, including:

- Hands-on science learning activities presented by 4-H staff, volunteers and youth members to over 400 visitors at the THRIVE Santa Maria's Healthy School Pantry (HSP) program.
- A collaboration between 4-H and the Santa Barbara County Health Department had 26 youth participating in hands-on 4-H STEM activities while their parents attended Community Workshops. A further outcome from this collaboration was a six week 4-H VEX Robotics Project with 20 families and 33 youth.
- Over 100 youth members came together for the annual Countywide 4-H Exhibit Day. This annual 4-H educational event allows youth members to showcase what they worked on during the program year, including showing large animals, small animals, and still exhibits.
- Eighty-Three students from Rice, Bruce, Adam and Liberty School's 4-H Student Nutrition Advisory Council (SNAC) Clubs, in the Santa Maria Bonita School District, trained to be peer educators. This collaboration between UC CalFresh and 4-H provided healthy living education to over 3,711 youth.
- Thirty-Four students from (SNAC) 4-H Clubs attend the Annual 4-H SNAC Culinary Academy



**Robo Knights 4-H Vex Robotics Project Robo Soccer Match**

### Public Value

In Santa Barbara County, the University of California 4-H Youth Development Program is focused on providing youth with opportunities to develop strong, positive youth-adult partnerships while engaging in meaningful activities, which lead to:

- Reduced participation in risky behaviors (e.g. underage drinking, sexual activity, gang activity), which can decrease related public costs.
- Increased academic success and/or science literacy, which contributes to a highly qualified and productive workforce.
- Increased civic engagement, which can strengthen communities through youth training in leadership skills, innovation, critical thinking, and healthy living.
- Increased youth literacy in science, engineering, and technology through special programming, projects, and access to University curricula.
- Increased environmental stewardship and agricultural knowledge, which ensures a safe, sustainable, and secure food supply.

## Master Food Preserver Program—Advisor Dr. Katherine E. Soule with Dayna Ravalin

### The Challenge

A resurging interest in food preservation in Santa Barbara County in recent years highlighted the lack of local information and resources on up-to-date and safe food preservation practices, critical in reducing serious illness. Responding to the community's interest and concerns regarding home food preservation, the UCCE in San Barbara County launched the Master Food Preserver program.

### Addressing the Challenge

During the second quarter of 2019, the UC Master Food Preserver Program offered 3 public classes with an attendance of 70 individuals. Several of the attendees were residents of Santa Barbara County. Two of the three classes were new topics which included various methods of preserving berries highlighting local strawberries, and how to safely make and can pie filling including a variety of freezing techniques. Our program continues to look for new and exciting topics to share with the community to increase awareness of the importance of using researched based food preservation methods and recipes.

Improving our program's visibility in Santa Barbara County is a high priority for our volunteers. We utilize many Santa Barbara County mass media outlets to advertise throughout the area to announce upcoming programming for the community. We are planning to conduct a volunteer training in early 2020 which may result in increasing our volunteer representation from Santa Barbara County. Through expansion of our group of volunteers in Santa Barbara County, we will potentially be able to increase programming in the region as well.



UCCE Master Food Preserver Pie Class

UCCE Master Food Preservers Jennifer Codron and Dayna Ravalin

Photo credit: Joy Powers

### Public Value

The UC ANR Master Food Preserver program is a public service for residents who want to learn safe methods of preserving produce sources from farmers' markets, local grocery stores, or gardens. These efforts benefit Santa Barbara County through:

- Decreasing health care costs by reducing instances of food borne illness through safe home food preservation practices.
- Increasing community wellness by creating co-capacity building with volunteers who are trained to provide services at lower costs to community residents.
- Increasing environmental sustainability through decreased food waste by teaching residents how to preserve food that might otherwise spoil before consumption.
- Increasing economic stability by growing the purchasing power of residents who can use home food preservation techniques to maximize their food resources.
- Increasing the economic vitality of resident food producers by empowering consumers to choose locally grown commodities.

## Master Gardeners—Linda Baity with Dr. Christopher Greer

### The Challenge

Communities beyond the reach of the land grant campuses of the University of California present special challenges for outreach and extension of research in new horticulture practices to home gardeners. Research based information about home horticulture, pest management; sustainable landscape practices and other environmental and natural resource issues support informed decisions by home gardeners promoting healthy, safe and prosperous communities in Santa Barbara County. Local certified Master Gardener volunteers, trained by the University of California provide information and problem solving opportunities.

### Addressing the Challenge

Two public education events held during April were a workshop on the topic of “Straw Bale Gardening” at Mesa Harmony Garden on April 6th and a presentation at the downtown Central Library entitled “Flowering Plant Identification” on April 27th. This month also saw the relocation of the UCCE Master Gardeners office from Goleta to the Agricultural Commission’s office in Santa Barbara.

Advanced Training sessions providing continuing education opportunities for Master Gardener volunteers included a “Field Day at Sedgwick Reserve” on April 6th that focused on vertebrate pest control and a guided tour of the greenhouse at UCSB on May 2nd.

On May 5th, a public education workshop on “Planning a Pollinator Garden” was held at the downtown library and this topic was also presented on May 19th at Stone Pine Hall in Lompoc.

A graduation ceremony was conducted on May 15th to honor 15 trainees who had completed their 20-week Initial Training classes and passed their final exams. Friends, family and veteran volunteers gathered in the Blaksley Library at Santa Barbara Botanic Garden to welcome the new members into the ranks of certified Master Gardeners.

Victory Vegetable Gardening for True Beginners was presented on four Saturdays in June at Trinity Gardens. Students received a comprehensive handbook, hands-on instruction, and a variety of helpful educational resources on the topics of planning the garden, preparing the site, selecting appropriate varieties, planting, managing and harvesting garden edibles.

On-going Master Gardener projects continued throughout the community, including the Water-Wise Discovery Station at the Santa Barbara Botanic Garden, as well as weekly Help Tables at Mesa Harmony Gardens and the downtown Farmer’s Market.

Contacting 494 county residents during this quarter, Master Gardeners donated more than 1,100 hours of volunteer service to educational outreach, representing a contributed value of \$33,364.30 to the County of Santa Barbara.



**15 trainees from the Class of 2019 graduated on May 15, 2019, and are now certified Master Gardeners.**

### Public Value

The University of California Master Gardener Program is focused on extending research based information on sustainable landscape practices. This effort benefits Santa Barbara County through:

- Safe gardening practices that help to protect water and water quality, support healthy ecosystems and enhance wildlife and biodiversity.
- Sustainable local food systems that enhance food security for families, neighborhoods, and communities.
- Sustainable landscape practices that create efficient communities by conserving water and energy, and reducing and reusing green waste.
- Effective prevention, detection and management of invasive and endemic species through public outreach and education that helps to preserve a prosperous agricultural economy.
- Increasing science literacy of Master Gardeners and their clientele through quality education and outreach.

## UC CalFresh Nutrition Education—Advisor Dr. Katherine E. Soule with Shannon Klisch

### The Challenge

In 2009, the Santa Barbara County Department of Public Health reported that approximately 1/2 of adults and 1/3 of teens in the county are overweight or obese. Obesity is a contributing factor of disease and death. Rates of obesity are generally higher among low-income populations.

To improve the health of the public, the University of California CalFresh Nutrition Education Program (UC CalFresh NEP) provides high-quality, nutrition and physical activity education programs for youth and adults in Santa Barbara County, focusing on low-income populations.

### Addressing the Challenge

#### CalFresh Healthy Living, UC

During this quarter, the UC CalFresh Nutrition Education Program underwent a statewide re-branding and is now CalFresh Healthy Living, UC. The purpose of the re-branding is to align CalFresh United programs and partners around increasing all low-income Californians' nutrition, health, incomes and well-being. CalFresh United includes all SNAP-Ed funded programs (CalFresh Healthy Living), CalFresh Food (nationally known as SNAP), CalFresh Disaster Response, and CalFresh Employment & Training.

The goal of uniting programs under one brand is to reduce barriers to participation in CalFresh services. Currently, California has one of the lowest SNAP participation rates in the nation and it is estimated that 1.7 million Californians are eligible for CalFresh Food but are not receiving benefits. In Santa Barbara County, it is estimated that 62% of eligible individuals currently receive CalFresh Food and the county ranks 39th out of 58 counties for CalFresh Food reach. This amounts to an annual loss of \$28 million in federal funds and a potential \$51 million loss in economic activity. In addition, for families in need, CalFresh Food supports increased food security and health.

In June, CalFresh Healthy Living, UC supported increased food security through training summer food program partners. UC staff trained 17 Santa Maria Recreation and Parks employees to provide fun and inclusive physical activities at summer meal sites. Recreation and Parks staff provide daily programming to families that attend the summer meals program. In addition, UC staff wrapped up the school year, providing evidence-based nutrition education services with 76 teachers and 3700 students in two Santa Barbara County school districts.



4-H SNAC Students teaching a 2nd grade class how to make a healthy oatmeal breakfast.



New CalFresh Healthy Living, UC logo

### Public Value

The UC CalFresh NEP is focused on improving the health of the public, which in turn reduces public costs by providing research-based quality nutrition education. These efforts include:

- Serving as a vital bridge between the learning and knowledge of the UC system and our community.
- Promoting healthy living, food safety, food budget maximization, and physical activity to CalFresh recipients and other low-income individuals, families, and youth.
- Tailoring the latest science, curriculum and information to the needs, culture and language of low-income communities to provide culturally sensitive programming that meets nutrition education and resource needs in Santa Barbara County.
- Enhancing individual efforts to make healthier lifestyle choices by utilizing the Socio-Ecological Model (SEM) to encourage social and environmental (e.g. home, school) changes.

## Water Management and Biometeorology — Advisor Mark Battany

### The Challenge

Growers of wine grape vineyards throughout California face challenges with increased competition for limited water supplies and potential changing climate conditions.

Improved information on climate conditions resulting from local field research can provide growers with the knowledge to make the most informed decisions possible to ensure that their vineyards remain productive and economically viable under these changing conditions.

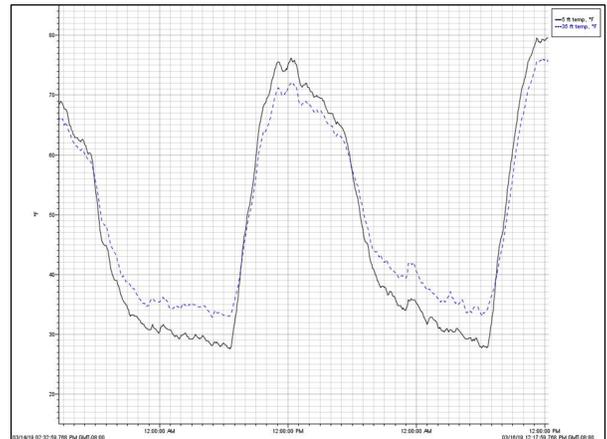
The efficient management of irrigation water will become increasingly more critical in the future. Limitations of water supplies will force all farmers and other water users to generate the maximum possible returns from their available water.

### Addressing the Challenge

A project conducted this spring exemplifies how UCCE Advisors can work with local growers to provide useful information for making critical management decisions. Nearly a decade ago, Advisor Battany developed an inexpensive method to measure the temperature inversion conditions. This data can indicate whether or not wind machines offer useful protection against damaging frosts. Growers who currently use sprinklers are interested to determine if they can replace sprinklers with wind machines, to free up water for other uses.

Working with a local producer, this spring Battany assessed the inversion conditions using 10 towers at a vineyard site in Santa Barbara County. The results were very supportive of wind machines being able to provide useful frost protection at this site. The grower's goal has been to replace their existing frost sprinklers with the wind machines, and thus using the saved water to expand their acreage and generate increased crop value. They have been hesitant to do so without having information that indicates the risk of this choice. The data that Advisor Battany was able to provide with the set of towers helped them understand the risks much better, and to have the confidence to proceed forward.

This situation is a perfect example of how an Advisor can develop a tool, and then help local growers utilize the method to make the most informed management decisions possible. In this example this leads to increased efficiency in our use of limited water resources, and to increased production of some of the most valuable crops in the County.



**Air temperatures at heights of 5' and 35' for two cold nights this spring show strong inversion conditions**

### Public Value

The University of California Viticulture/ Soils program in Santa Barbara County is focused on developing and extending critical research-based information to help wine grape growers maintain sustainable production.

This effort benefits Santa Barbara County through:

- Achieving sustainable wine grape vineyards that enhance productivity, crop quality and economic returns to growers with benefits to the entire local economy.
- Vineyard irrigation and soil management practices that help reduce water use and maintain soil productivity, thus relieving the strain on impacted water resources and ensuring more reliable supplies for all water users.
- Improved understanding of frost conditions and protective measures to help achieve effective practices that minimize impact on water resources.

## Strawberries and Vegetables—Advisor Dr. Surendra Dara

### The Challenge

Public health and environmental resources are protected through efficient use of agricultural inputs and safe agricultural practices. Strawberry and vegetable growers and pest control advisors are continually in need of information on improved production technologies and strategies for managing endemic and invasive pests, diseases, and weeds. Optimizing inputs and maximizing returns with food safety in mind are key strategies for healthy, safe, and prosperous agricultural operations. The Strawberry and Vegetable program identifies growers' needs, develops solutions based on sound scientific research, and extends information in a timely and proactive manner.

### Addressing the Challenge

- Completed two studies evaluating biostimulant and nutrient materials on crop health and yield and a biofungicide study in strawberry.
- Published a trade journal article on Lewis mite and its management in strawberry, an extension journal article on improving tomato yields with nutrient and biostimulant materials, and a UC Delivers story on the impact of the Ag Innovations Conference: Biologicals that was organized in March. Also published an article on the new IPM model in a peer-reviewed journal (<https://academic.oup.com/jipm/article/10/1/12/5480541>) which has been viewed more than 2200 times.
- Appeared in seven news, web, or TV media sources providing input on strawberry, grape, vegetable studies, IPM, and biologicals.
- Organized the Annual Santa Maria Strawberry Field Day, which was attended by 162 people.
- Reached out to 68 people through individual consultations various agronomic and pest management issues, and 300 people through extension meetings.
- UCCE continues to provide timely information on production practices, pest, disease, and weed management to the clients.



**Annual Santa Maria Strawberry Field Day at Manzanita Berry Farms on 14 May, 2019**

### Public Value

The UCCE Strawberry and Vegetable program promotes a prosperous local economy, as well as a safe and healthy food system through:

- Improved production practices by optimizing input costs and increasing yields.
- Innovative research on alternatives to chemical fumigants, insecticides, miticides, fungicides, and improved Integrated Pest Management practices.
- Efficient use of fertilizers and irrigation water which contribute to reduced leaching of nitrates, reduced ground water contamination, and water conservation.
- Education on invasive pests and diseases that impact both the farming community and home gardeners which better equips them to take appropriate preventive and/or control measures.



## Fire Ecology & Management—Specialist Dr. Max Moritz

### The Challenge

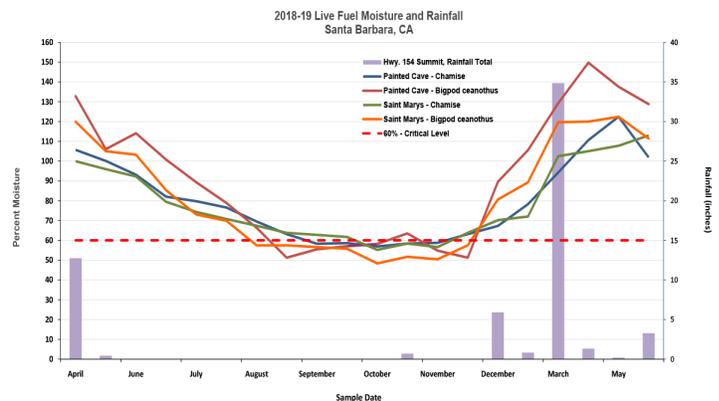
Understanding the nature of fire in California can help to save lives, minimize property damage, and protect the environment. Focusing broadly on fire ecology and management, this program brings UC research expertise to Santa Barbara County on the following topics:

- Quantifying the natural ranges of variation in fire regimes including frequency, size, seasonality and intensity within fire-adapted vegetation.
- Understanding where and when various fuel management techniques are likely to succeed and be sustainable.
- Mapping fire weather patterns, which historically have been associated with the greatest losses.
- Modeling linkages between fire activity and climate change.

### Addressing the Challenge

During this quarter Specialist Max Moritz continued working with local citizen science volunteers to maintain local Live Fuel Moisture (LFM) data sampling and processing, which feed into regular updates and distribution through the Santa Barbara Botanic Garden website (see image).

As a board member of the Santa Barbara County Fire Safe Council, Moritz continued to work with local constituents on fire-related issues. The UCSB project on restoration of big cone Douglas fir in the Zaca Fire area of Santa Barbara County continues, and the sundowner wind mapping project with other UCSB collaborators is also ongoing.



This image is the latest live fuel moisture characterization from our local citizen science team, showing that we are now roughly half-way into the typical dry-down cycle of the fire season. (See <https://www.sbbg.org/about/onsite-weather-station-live-fuel-moisture>.)

### Public Value

Fire is an important and natural process in almost every terrestrial ecosystem of California, yet it is one of the most persistent threats facing communities that live on fire-prone landscapes.

Communicating and implementing the latest scientific information about fire research is crucial for making communities safer, reducing property damage, saving lives, and protecting the environment.

UC Cooperative Extension helps Santa Barbara County create safer, healthier and more prosperous communities through efforts that emphasize the following:

- Education of homeowners about fire danger and preparedness steps.
- Communication with fire manager, policy makers, and planners about long-term fire-related decision making.

## Soils, Water, Subtropicals—Advisor Dr. Ben Faber

### The Challenge

Santa Barbara County's agricultural competitiveness depends on adopting new scientific and technological innovations derived from new knowledge in agriculture. Research and educational efforts must enhance the opportunities for markets and new products. Creating a sustainable local agricultural economy also depends upon improving water quality, quantity, and security; managing pests and diseases; and improving cultural management practices for subtropical producers.

The Soils/Water/Subtropical Program has a 60 year history of local research and extension that optimizes crop production, maximizes net farm income, conserves natural resources and protects the environment.

### Addressing the Challenge

#### Avocado Thrips, Pest Scouting, Avocado Pruning

The last three months have had three grower meetings for avocado and citrus growers. We had April field days with speakers on scouting for a variety of pests and beneficials in avocado, especially looking for avocado thrips and assessing their potential for damage. The day also included the perpetually vexing question of how to prune avocados. These meetings were held at Cal Poly SLO and Cal Poly Pine Tree Ranch in Santa Paula. We also had a June series of presentations on vertebrate management, focusing on ground squirrels and gophers, but also covered rabbits, coyote, mice and birds. When and how is damage significant enough to cause concern and how to avoid damage. The most recent meeting was for citrus growers, an all-day meeting concerning Asian Citrus Psyllid, Citrus Greening (Huanglongbing). This included discussion of management strategies, as well as how to select varieties and rootstocks for future plantings. Attendance at the combined meetings exceeded 300 growers.



Avocado Thrips Damage



Avocado Prunings



Ground Squirrel Tunnel  
in an Avocado Orchard



Scouting and Monitoring of Pests

### Public Value

Healthy people and communities, healthy food systems, and healthy environments are strengthened by a close partnership between the University of California and its research and extension programs and the people of Santa Barbara County.

The Soils/Water/Subtropical Program provides innovation in applied research and education that supports:

- Sustainable, safe, nutritious food production through the delivery of information on soil and water management.
- Economic success in a global economy through production of high quality fruit.
- A sustainable, healthy, productive environment through improved water and nutrient management.
- Science literacy within the agricultural community promoted by rapid access to evidence based information.