University of California
Agriculture and Natural Resources

Santa Barbara County Cooperative Extension

Quarterly Report October-December 2014

Strawberry and Vegetable Crops and Affiliated IPM Advisor, Surendra Dara investigated the potential of micro-sprinklers in water conservation in a field study (shown on left). Initial calculations show that in just three weeks, there was a 38,000 gallon saving per acre compared to water delivered through traditional overhead sprinklers. This represents 32% reduction in water during that period. Surendra also researched lygus bug management in strawberries using the entomopathogenic fungus Beauveria bassiana (shown on right).

Submitted by Mary Bianchi
County Director, Horticulture Advisor
Santa Barbara County
January 29, 2015

University of California Programs, Advisors and Specialists in Santa Barbara County

PLANT SCIENCES/HORTICULTURE, led by Mark Battany, Mary Bianchi, Dr. Surendra Dara, Dr. Ben Faber, and Dr. Mark Gaskell, 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.

UC CALFRESH NUTRITION EDUCATION PROGRAM, led by Dr. Katherine Soule, is funded by the USDA and delivered by the UCCE to Santa Barbara County. In collaboration with local partners, UC CalFresh provides evidenced-based nutrition education to low-income individuals and families. The program provides high-quality nutrition education curriculum and training to educators at qualifying schools.

UCCE MASTER GARDENERS, led by Mary Bianchi, provide the primary outreach and extension method for improving horticulture and science literacy for homeowners and back yard gardeners. They provide research based information for home horticulture, pest identification, landscape management, and other environmental and natural resource information. Master Gardeners interact directly with homeowners and back yard gardeners to provide information on sustainable and edible landscapes, water conservation, and environmentally sound solutions for pest problems.

4H YOUTH DEVELOPMENT PROGRAM, led by Dr. Katherine Soule

4-H is a positive youth development organization that empowers young people to reach their full potential. A vast community of more than 6 million youth and adults working together for positive change, 4-H enables America's youth to emerge as leaders through hands-on learning, research-based 4-H youth programs and adult mentorship, in order to give back to their local communities. 4-H is the youth development program of our nation's Cooperative Extension System. The 4-H Youth Development Program is brought to the counties by the University of California, Agriculture & Natural Resources.

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.

Mark Battany
805-781-5948
mcbattany@ucanr.edu

Mark Gaskell
805-788-2374
mlgaskell@ucanr.edu

Mary Bianchi
805-781-5949
mlbianchi@ucanr.edu

Max Moritz
805-893-2125
mmoritz@ucanr.edu

Surendra Dara
805-788-2321
skdara@ucanr.edu

Katherine Soule
805-781- 4093
kesoule@ucanr.edu

Ben Faber
805-645-1462
bafaber@ucanr.edu

Administrative Accomplishments-County Director, Mary Bianchi

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.

UC ANR Vice Provost, Dr. Chris Greer and County Director Mary Bianchi visit Dr. Surendra Dara's miticide demonstration trial at KG Berry Farms in Santa Maria.

Addressing the Challenge

County Director Mary Bianchi facilitated contact between the Agricultural Commissioner and County Administrative Office and UC ANR Business Contracts and Grants staff throughout the quarter, adapting our 2014/2015 contract to comply with both Santa Barbara County's new 2014 contract template and UC policy, with final agreement reached in October. Director Bianchi searched for and successfully secured a new location for the Cooperative Extension office in Goleta, and a storage unit for program materials and supplies. A five-year lease was completed in December. The University of California is continuing its commitment to programs in Santa Barbara County by agreement to this long term lease, despite the current year-to-year contract with the county.
In October, UCCE Advisors Bianchi, Dara and Soule hosted UC Vice Provost for Cooperative Extension Chris Greer to share accomplishments and partnerships in Santa Barbara County.

The 2014 Drought Report: Impacts on San Luis Obispo County Agriculture was provided to the Office of Emergency Services Drought Task Force and the Agricultural Commissioner. County Director Bianchi served on the Agricultural Advisory Committee's sub-committee providing comment to Santa Barbara County's Planning and Development's Energy and Climate Action Plan.

Rangeland and Watershed Advisor Dr. Royce Larsen served at the October and December meetings of the Agricultural Preserve Committee during the quarter, supporting informed land use planning decisions by the committee. The Agricultural Advisory Committee meetings in October, November, and December were attended by Mark Battany, Mary Bianchi and Mark Gaskell, sharing information on UCCE current local research and upcoming education programs.

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

For more information contact Mary Bianchi Email: mlbianchi@ucanr.edu Phone: 805-781-5940

4-H Youth Development– Advisor, Dr. Katherine Soule

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.

Local 4-H Youth Leaders from the Science, Engineering and Technology Committee at the National Youth Science Day: Rockets to the Rescue.

Addressing the Challenge

Youth members engaged in hands-on experiential learning projects in the areas of Science, Leadership, Healthy Living, and Citizenship. Several county-wide 4-H activities were delivered to 4-H club families, as well as the community at large, including:

- Celebrating 4-H was held at the Santa Maria Town Center Mall. 4-H adult leaders and youth members provided outreach booths and shared various project activities with more than 150 members of the community.
- Santa Barbara County's 4-H All Stars and members accepted the National 4-H Week Proclamation at the October 7th Santa Barbara County Board of Supervisors meeting.
- Santa Barbara County 4-H, Science, Engineering and Technology committee held the third annual 4-H National Youth Science Day. More than 50 youth participated in this year's national experiment, ***Rockets to the Rescue.*** Youth engaged in engineering, math, and nutrition education to help solve a relevant global issue.
- 4-H Adult Volunteer and Santa Barbara teacher, Molly Rothman, won the national "Teachers Bringing Science to Life" contest, sponsored by National 4-H Council and Lockheed Martin.
- 4-H staff and key volunteer leaders held an Adult 4-H Club Leaders Training informing 30 volunteers on topics such as, SBC 4-H structure, online enrollment, 4-H policy updates, outreach, and upcoming events.
- 4-H staff organized groups of volunteer 4-H leaders and youth that provided hands-on educational/recreational activities to 600 –800 visitors at the Santa Maria Healthy School Pantry's monthly event.

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, pregnancy, 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

Email: kesoule@ucanr.edu Phone: 805-781-4093

UC CalFresh Nutrition Education– Advisor, Dr. Katherine Soule

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 over-weight 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.

Parents from Rice Elementary School participate in a nutrition education lesson in December. Participants are preparing a quinoa salad recipe following a lesson on whole grains.

Addressing the Challenge

The UC CalFresh Nutrition Education Program partnered with four schools and over 80 teachers in the Santa Maria-Bonita School District to bring classroom and garden based nutrition education to approximately 2,700 K-6 students during the months of October through December. Participating classes received four food demonstrations led by UC CalFresh Nutrition Education program staff. These food demonstrations encourage students to try new foods con-nected to nutrition concepts taught in class.

In October, UC CalFresh Nutrition Education staff organized teachers, parents and students at Bruce Elementary in order to break ground on their school garden. Community members tilled the soil and built planter boxes.

In addition, UC CalFresh Nutrition Education staff taught their first lessons in the garden at Bruce, Adam and Rice Elementary schools. Second through sixth grade students learned about the parts of a plant and got to prepare and taste a “veggie taco” using edible plant parts.

Staff continued to outreach to parents through a collaboration with THRIVE! Santa Maria and the Santa Maria Food Bank. Community volunteers received training and recipe selection guidance from staff in preparation for providing education and healthy food samples at the monthly Healthy School Pantry.

In addition, 11 parents from Rice Elementary graduated from the UC CalFresh nutrition programming. Adult participants received hands-on lessons in shopping and preparing healthy meals on a budget.

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 sys-tem and our community.
- Promoting healthy living, food safety, food budget maximization, and physi-cal activity to CalFresh recipients and other low-income individuals, fami-lies, and youth.
- Tailoring the latest science, curriculum and information to the needs, culture and language of low- income commu-nities 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.

Email: kesoule@ucanr.edu Phone: 805-781-4093

Viticulture– 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.

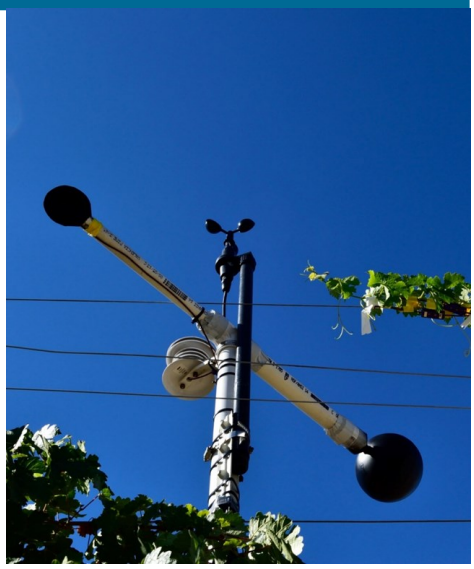
Addressing the Challenge

Frost damage to grapevines and other high-value crops is an annual threat in our coastal production regions. Improved information regarding frost temperature conditions will help farmers understand the conditions during frost nights and select the most appropriate strategies to avoid damage to their crops.

Standard methods of measuring air temperature as currently used do not accurately indicate the temperatures experienced by sensitive plant tissues, as these are subject to radiation heat losses and are often significantly colder than the air. Thus alternative temperature sensors would be useful if they can provide more accurate measurements of plant temperatures.

To determine this, measurements of leaf temperature were compared to standard shielded air temperatures, and to the temperatures of two novel sensors designed to mimic leaf temperatures: 1) a 7 cm diameter thin copper disc positioned horizontally and painted black, and 2) the interior of a 15 cm diameter hollow copper sphere, also painted black. The average leaf temperature was about 2 °F colder than the shielded air temperature during the night, but under very clear sky conditions the leaf temperature was over 4 °F colder than the shielded air temperature. The copper disc and copper sphere were both within 1 °F of the leaf temperature, thus they both provided much better estimates of actual plant temperature conditions.

The result of this trial demonstrates the advantages that non-conventional temperature sensors can have for improving our understanding of plant temperatures under cold weather conditions, and can help farmers respond to frosts more appropriately.



Two novel temperature sensors (flat plate and globe), compared to a standard sensor inside the white vented shield. The flat plate and globe both estimated plant tissue temperatures more closely than the air temperature readings did.

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

Email: mcbattany@ucanr.edu Phone: 805-781-5948

Small Farms and Specialty Crops–Advisor, Dr. Mark Gaskell

The Challenge

Small-scale fruit and vegetable growers rely on relatively higher value, lower volume specialty crops to remain economically competitive. UCCE field trials and educational programs are focused on developing new crop alternatives and alternative cultural practices to make small-scale agriculture more viable and competitive in Santa Barbara County.

Field trials are conducted often and the results of these trials, associated greenhouse or laboratory studies, and the experiences of other specialists are then assembled into educational outreach programs to educate and guide growers and industry representa-

Blackberry planting showing accumulation of salts at edge of irrigation wetting zone.

Addressing the Challenge

Recent low winter rainfall has restricted water availability in many areas and water quality has also been compromised. Electrical conductivity is an indicator of increasing salinity of irrigation water sources and the soil salinity has also increased in many areas and with multiple crops. Soil salinity generally increases with many irrigated crops during the growing season and then with normal winter rains, the salts are leached below the root zone. Many farms in Santa Barbara are now experiencing elevated salinity problems that are adversely affecting many crops including but not limited to blueberries, blackberries, raspberries, short cycle vegetables, ornamentals, etc. Inquiries from growers with salinity problems need to be diagnosed and the growers typically also require assistance with a management program to fix the problem and a continuing management designed to avoid future problems with salt, irrigation and fertilizer management which are all interconnected.

Additional current field trials with organic strawberries, blueberries, blackberries, and coffee assist growers to produce these crops more efficiently. Field trials during the reporting period included:

- Blackberry fruit quality comparisons among new varieties, mowing, and pruning practices for the most profitable production season.
- Blueberry varieties that extend the market season or produce during the most profitable part of the market season.
- Cultural practices for successful coffee production and evaluation of cropping systems to interplant coffee in established avocado orchards.

Public Value

Small-scale agricultural producers need reliable and current information on the most promising crop alternatives and the most efficient cultural practices if they are to remain economically viable. Recent research and educational outreach programs have included:

- Development of alternative small fruit – berry crop varieties and cultural practices
- contributing to establishment of blueberries, blackberries, and raspberries as profitable new crops in Santa Barbara County
- Development of new information and practices to guide organic strawberry and other long season organic fruit growers for efficient management of nitrogen and water
- Providing the research and educational base for establishment of coffee and tea as new crops in Santa Barbara County

Email: mlgaskell@ucanr.edu Phone: 805-788-2374

Master Gardeners-Advisor, Mary Bianchi & Program Director, Fiona Brennan

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 Master Gardener volunteers, trained by the University of California, provide information and problem solving opportunities.

Addressing the Challenge

Master Gardeners held a Trainee orientation on November 1, 2014 to recruit new members for the 2015 training program, which begins in February.

In November, the Master Gardeners presented a Succulent workshop on how to care for succulents and covered different methods of propagation. A portion of the workshop was a hands-on demonstration and participants created their own succulent boxes; a limited venue for 23 participants.

Bilingual Master Gardener volunteers provided instructions on growing food for home gardens for the Santa Barbara Food Bank – "Grow Your Own Way" project at two events reaching 75 largely Spanish-speaking community members.

Information tables at Santa Barbara Farmers' Market reached 79 home gardeners by answering questions on Asian Citrus Psyllid (ACP), soil amendments, converting lawns to drought tolerant gardens, and pests identification and management

Through volunteer work at Alice Keck Park Memorial Gardens and Huerta Garden at the Mission, Master Gardeners reached 68 community members and helped raise awareness of butterfly gardens, and sustainable methods of planting, care, and soil management in collaboration with other community organizations.

The launch of our ACP task force reached 26 members and showed members how to monitor the new growth on citrus trees.

Master Gardeners volunteered 610 hours to community education representing $13,515 in educational activity on ACP, water conservation and integrated pest management.

Master Gardener volunteer at a Food Bank – "Grow Your Own Way" event.

Public Value

The University of California Master Gardener Program is focused on promoting 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

Strawberries and Vegetables, 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.

Annual Strawberry Meeting, November 12, 2014

Addressing the Challenge

Research and outreach efforts address major concerns of the strawberry and vegetable growers and also promote sustainable management practices for a safe environment.

- Organized a strawberry extension meeting where feedback indicated 99% gained useful information, 97% would use it, and 91% believed this information will improve their strawberry production.
- Provided input to CDFA about Bagrada bug damage and organic management options, which was disseminated to Ag Commissioners throughout the state. Met with and provided information to local Ag Commissioner's staff, growers, PCAs, and Grower-Shipper Association about Bagrada bug and its management.
- Reviewed Sustainable/Organic Ag course material for a private organization which will be used by PCAs in multiple counties.
- Worked with Ag Commissioner's entomologist on a pest issue in organic celery.
- Met with nursery growers about non-chemical pest management options for their operations.
- Provided input for six media interviews about Bagrada bug in crucifers, using entomopathogenic fungi for improved plant growth and health, lygus bug management in strawberries, role of UCCE in providing practical solutions to growers.
- Developed nine extension publications, available to growers, about new and existing pests.

Studies during this period include nutrition and irrigation management in strawberries and cauliflower, role of micro-sprinklers in water conservation and mite management, and impact of microbial enhancers in improving strawberry health and yield. And, the program reached out to 200 people through direct contact and 283 people through the meetings held during this period.

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 better equips them to take appropriate preventive and/or control measures

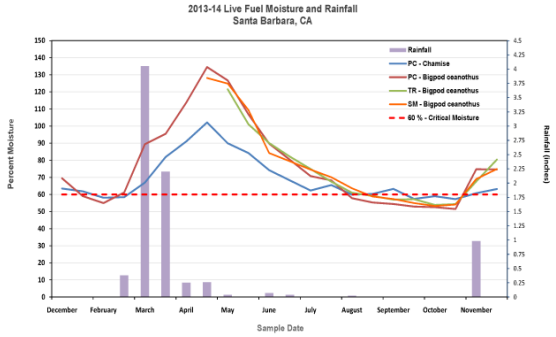
Email: skdara@ucanr.edu Phone: 805-788-2321 Web: ucanr.edu/strawberries-vegetables @calveggies @calstrawberries

Fire Ecology & Management, 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.



The University of California Cooperative Extension has been collaborating with the Santa Barbara Botanic Garden to measure LFM in Vegetation at Painted Cave, at the top of Tunnel Road, and at St Mary's Seminary on Las Canoas Road.

Addressing the Challenge

During this quarter Specialist Max Moritz continued working with new 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. Live Fuel Moisture is one measure of fire risk that agencies use in planning how to allocate their resources.

Live Fuel Moisture is simply the amount of moisture contained in fine fuels (living foliage and twigs less than 1/8 inch diameter) expressed as a percent of the dry weight of that fuel. Fire agencies typically consider 60% to be a critical moisture level where fires can become catastrophic.

Working with members of the Santa Barbara County Fire Safe Council, Moritz also assisted in development and submission of a grant proposal to CAL FIRE to fund a demonstration project for a "native type conversion" for fuel breaks. This project would demonstrate creation of a fuel break that converts flammable brushlands to an oak woodland buffer rather than to a fuel break largely composed of non-native, weedy invasive grasses. Potential impacts would be reduced maintenance, increased carbon sequestration, and greater acceptance by the public.

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 managers, policy makers, and planners about long-term fire-related decision making.

Email: mmoritz@ucanr.edu Phone: 805-893-2125

Soils, Water, Avocados, Tropicals, 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/Subtropicals 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

Ben Faber continues his extension work with Santa Barbara County subtropical fruit growers, providing evidence based information via phone and email regarding production issues, with more than 50 contacts during this quarter.

Ben also coordinated and/or authored 6 articles for the Topics in Subtropics blog (http://ucanr.edu/blogs/Topics/ with current information for growers of subtropical crops. This readily accessed information on crop production had 44,572 direct hits during this report period. Although this information is not specific to Santa Barbara County, it is information that is readily accessible and useful to Santa Barbara producers and is used by local growers. A blog article authored on Bagrada Bug in Avocados had 1165 hits in this quarter alone. Typical viewership is more than 400 hits per day. Traps for a potential new pest, Polyphagous Shot Hole Borer, were established in Carpinteria and Goleta near avocado groves. Applied research that will benefit subtropical producers in Santa Barbara County includes projects examining the following:

- Performance of 'Hass' avocado on 6 different rootstocks
- Water requirements of raspberries grown in tunnels
- Ongoing projects with local grower cooperators, including girdling effect on lemon production, lemon rootstock effect on lemon production, and strawberry establishment with reduced water applications
- Pitahaya variety evaluation and cultural practices

Funnel traps for Polyphagous Shot Hole Borer will help detect this potential new pest of avocados and many other woody plants

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

Email: bafaber@ucanr.edu Phone: 805-645-1462