HEALTHY FOOD SYSTEMS • HEALTHY ENVIRONMENTS • HEALTHY COMMUNITIES • HEALTHY CALIFORNIANS

University of California
Agriculture and Natural Resources
Making a Difference for California

University of California Cooperative Extension Monterey County Biennial Report 2011-2013

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MONTEREY COUNTY CALIFORNIA • 1850 •

University of California
Agriculture and Natural Resources

Cooperative Extension Monterey County

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January 14, 2014

Dear Honorable Supervisors of Monterey County, Department Heads,
and members of the community;

The mission of the University of California Cooperative Extension in Monterey County is to serve the people of Monterey County by providing science-based research, education and public service to help them solve problems in agriculture, natural resources, livestock, food safety, and human community development. UC Cooperative Extension is one of your primary departments whose mission is economic development and community education. UCCE has been here since 1918, one of the oldest Departments in County Administration, helping promote the growth of the agricultural industry, the natural resources, and the community. We work in close relationship with the Agricultural Commissioner's Office, to ensure compliance with regulatory and safety issues.

The areas of staff expertise are commodity as well as discipline driven. They include: viticulture, vegetable production, weed science, nutrient management, plant pathology, entomology, irrigation, water resources, and waste management. We also receive expertise from cross county advisors in natural resources, livestock, rangeland, strawberry, caneberries, Ag economics, farm management, environmental horticulture, gardening, and in the human resources, 4-H youth and community development.

Agriculture is Monterey County's number one industry and economic driver, and we support it in two major ways: 1) helping the agricultural industry survive and thrive County's food scares or sudden threats, and 2) providing methods and procedures that guarantee the future sustainability of Monterey County's agriculture and natural resources, and their unique environments.

More than $2.5 million dollars in grants obtained by UCCE supported farm advisors fuel the local economy through the creation of new job opportunities and the purchase of equipment and supplies for the grant-funded research projects. The volunteer contributions from the 4-H and Master Gardener programs accounted for more than $1.5 million dollars per year back into serving our communities. With this, UC Cooperative Extension brings back as reinvestments in Monterey County, $16.84 for every dollar we received in our budget from general funds, so the county's investment in UCCE is well-spent insurance to prevent loss and to promote growth.

Please feel free to contact me for more information or a more in depth explanation of our projects.

Sincerely,

Maria de la Fuente, PhD
Department Head / County Director

Sixteen Ways UC Cooperative Extension is Working for You

Teaching Sustainability. We develop and share various approaches to achieve a healthier environment, a thriving agricultural business cluster, and a community driven by engaged youth and adults

Spurring Economic Development. UC research helps Monterey County's #1 economic driver—agriculture—be competitive and productive.

Creating Jobs. Strong agricultural companies create new jobs and business opportunities. Also, the research grants that UCCE brings into the county create jobs and an entry for young scholars into the business world.

Promoting Food Safety. In-Field experiments show the best ways to prevent harmful microbes from contaminating field produce, protecting consumers and the viability of local agriculture. Local advisors team with campus-based food safety researchers to bring expertise to the county.

Supporting Agriculture. This $4+ billion industry relies on UC research and extension to remain strong and globally competitive. Cooperative Extension has been behind the growth of the local agribusiness industry since 1918.

Brokering Solutions. Cooperative Extension is the neutral party bringing together entities who need to work together to find workable solutions to vexing issues.

Saving Soil. Techniques developed by the farm advisors keep tons of soil in place, preventing erosion, saving valuable topsoil, and pollution of water bodies.

Saving Water. Farm advisors teach farm owners and their irrigators ways to improve irrigation efficiency and to use less water.

Creating Tomorrow's leaders. We certify over 300 adults to work with youth, using the latest research on youth development practices to instill qualities our young people need to succeed

Supporting Military Kids. The 4-H Program reaches out to military youth, offering them fun experiences while cultivating their developmental and coping skills.

Patrolling for Pests. The UCCE diagnostic labs are often the first point of detection for new plant diseases and insects that could harm Monterey County crops.

Channeling UC Expertise. Cooperative Extension collaborates with many UC researchers to help solve the current environmental, agricultural or quality of life issues affecting Monterey County residents.

Reducing Pesticide Use. UCCE farm advisors inform farmers about the most effective ways to treat pests including biological control and computer guided technologies. Using scientifically tested treatments can save thousands of dollars.

Providing Community Service. Youth in 4-H, along with their parents, donate hundreds of hours to creative local community service, and educating community members at county fairs or other events.

Beautifying Public Places. UC Master Gardeners, now numbering in the hundreds in Monterey County, devote time and energy to restoring historical gardens and preserving sensitive plant habitat and beneficial organisms.

Beginner & Minority Famers. Enhancing the competitiveness and sustainability of beginning minority, farmers and ranchers in California.

Melinda Stirling

Administrative Services Assistant

35 years with UCCE

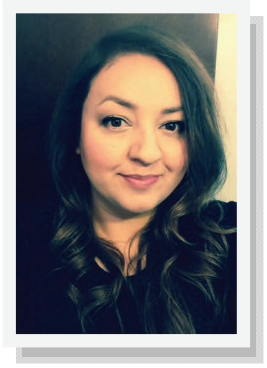
Administrative Services Assistant

This position is our Office Manager for University of California Cooperative Extension and County of Monterey business operations. Responsibilities for both agencies include Finance Management (budget development and monitoring, grant fund management, Purchasing, Accounts Payable) Human Resources, Supervisor for Administrative Staff including the Accounting Technician, Secretary, and part-time assistants. This position is knowledgeable of policies and procedures for both agencies and the many web-based programs associated with them. The ASA is the assistant to the Department Head.

Accounting Technician

This position keeps track of University of California grant funds (currently 83 accounts). This involves maintaining spreadsheets, preparing purchase orders and being the receiver for purchasing card purchases. The position is knowledgeable of U.C. policies and procedures and the web-based programs. Works closely with the ASA and U.C. advisors regarding the management and consolidation of grants.

Lennis Arriaga

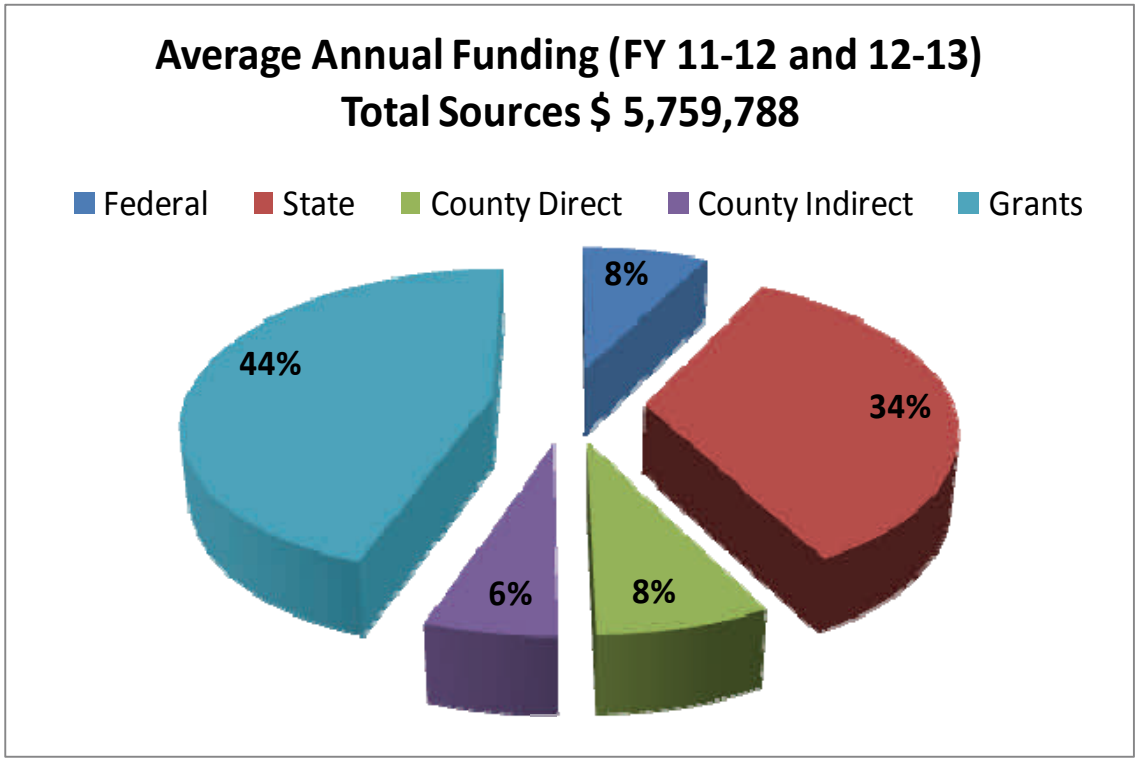


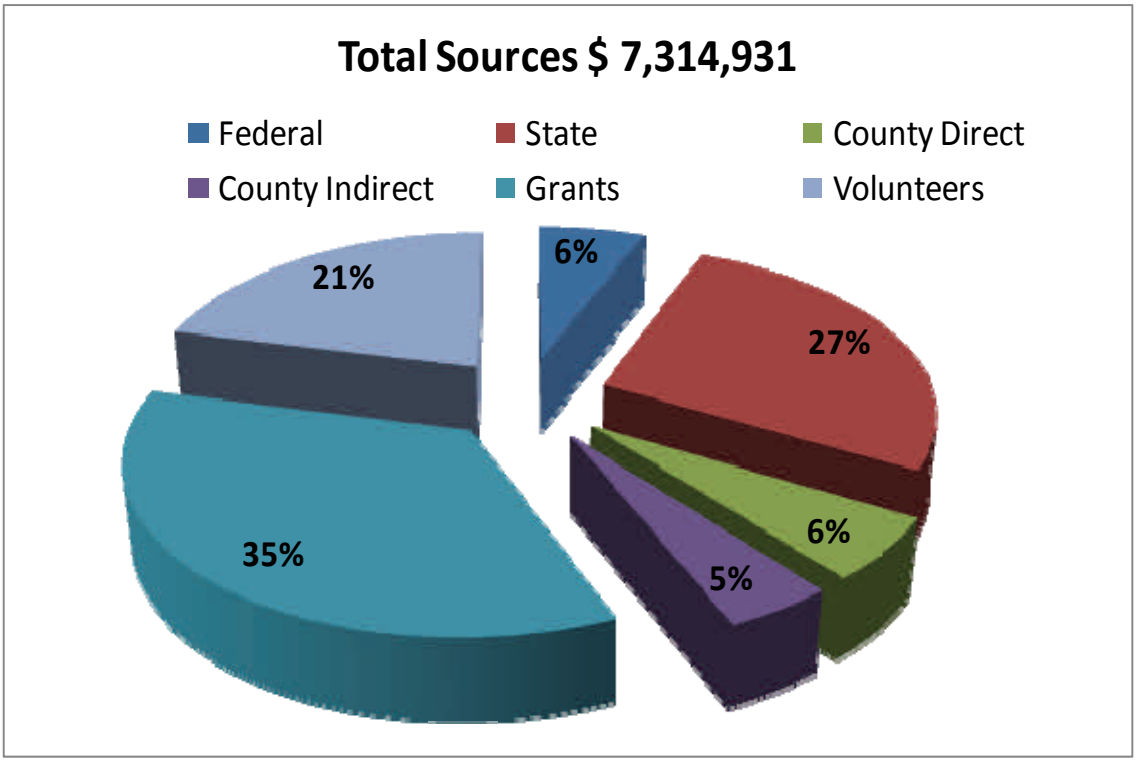
Secretary

6 years with UCCE

Secretary

This position provides secretarial support for the 4-H Youth Program which involves serving the clientele, enrollment, training, assisting the Youth Advisor and Program Representative with projects and events. The position is knowledgeable of the web-based 4-H Enrollment Program. Provides support for U.C. advisors and other staff members. The position serves as our web master and handles our desktop publishing.


Average Annual Funding (FY 11-12 and 12-13)
Total Sources $ 5,759,788
Federal
State
County Direct
County Indirect
Grants
8%
34%
8%
6%
44%


Total Sources $ 7,314,931
Federal
State
County Direct
County Indirect
Grants
Volunteers
6%
27%
6%
5%
35%
21%

Larry Bettiga

Viticulture Farm Advisor

M.S., CSU Fresno

35 years with UCCE

The viticulture program focuses on extension education, applied research and problem diagnosis for wine grape growers in Monterey County.

Projects benefiting Monterey County Local research has been instrumental in helping the Monterey County wine grape industry achieve and maintain a reputation of being early adaptors of new technologies. This work has been done both independently by wine grape growers and in cooperation with county and campus based staff from the University of California Division of Agriculture and Natural Resources. The following examples will demonstrate how UC Cooperative Extension viticulture research conducted in the county has helped to provide answers to major production issues in vineyards.

Evaluation of vineyard practices to improve the sustainability and viability of wine grape production.

The goals are to evaluate established and alternative vineyard cultural practices; and evaluate grape cultivar clonal selections and rootstocks for the potential to improve plant growth and yield to achieve fruit quality expectations for coastal wine grapes using research based knowledge to promote economic and environmental sustainability. Research is being conducted on one site to compare clonal selections of Riesling, and rootstock evaluations on two sites. The rootstock sites have the recently released UC Davis rootstocks. Nurseries are selling potted dormant benchgrafts with trunks pre-developed as a method to accelerate the vine establishment process. In 2011 I established a trial to evaluate this type of material with the standard type of benchgraft that is trained in either the first or second year. The studies described above are developing new information that is being used by grape growers to improve both economic and environmental sustainability. My extension of vineyard development practices has improved management decisions and has clearly shown growers what management practices will result in delays in achieving full production potential. The selection of clonal material to optimize wine quality is of great interest to the wine industry. The impact of

Comparison of planting stock on the growth of grapevines at the end of the second year. Picture left is a standard dormant benchgraft versus the longer benchgraft with a trunk developed before planting, right. Note the larger diameter of the plant on the right

this work becomes more obvious as the results serve as a basis for more informed planting decisions to improve yields and quality. Both the clonal and rootstock evaluations are providing a local database that is updated as new information is developed. The avoidance of rootstocks that are most susceptible to winter cold injury has helped recent developments to avoid the loss of profitability that can linger in vineyards in the southern part of the Salinas Valley and is one of the most significant impacts of my research on rootstock use on the central coast. The preliminary determination of cold damage susceptibility of the UCD rootstocks can help growers avoid the reoccurring losses in yield in future plantings.

Pest Management in Viticulture

The wine grape annual industry gross value is 214+million in Monterey County

The goal is to identify and document pest issues of wine grape vineyards on the central coast; develop information on the biology of new and established pest issues; devise management strategies to reduce impact from these pests. Field trial evaluating control practices for both powdery mildew and Botrytis bunch rot have been conducted annually. In addition to evaluating low risk and biological fungicides, the demonstration of resistance management strategies is a key component of this fieldwork. The viticulture program has also been cooperating with the D. Gubler lab at UC Davis to further refine the UC Davis Powdery Mildew Risk model by studying fungus biology. In 2011 two new field experiments to evaluate both chemical and non-chemical treatments to manage nematode populations in wine grape vineyards were established. Powdery mildew projects have influenced grower practice in area vineyards with extension efforts making growers more aware of the importance of application timing, material selection, and the use of resistance management strategies to improve disease control. Grower education and assistance in learning how to monitor for invasive species in advance of their occurrence in local vineyards have helped in the early detection and are an important factor in the efforts to prevent establishment. Educational efforts and organizing local growers (in cooperation with the Agricultural Commissioner's Office) to treat the area vineyards in the radius of where a European grapevine moth was found have contributed to this pest being eliminated as a concern during the 2013 season. A major outcome for me in this program area has been the completion of the third revision of the book, Grape Pest Management. As the technical editor and an author for the revision I have provided an active leadership role in getting this publication completed. This book is scheduled to be available at the beginning of 2014.

Grape powdery mildew is the major pest problem of vineyards in Monterey County.

Richard Smith

Vegetable & Weed Sciences Farm Advisor

M.S., U.C. Davis

27 years with UCCE

This program addresses vegetable production issues such as improving nitrogen use efficiency in vegetable production. Nitrogen fertilizer usage has come under strict regulation by the Central Coast Regional Water Quality Control Board (CCRWQCB) and growers need research and education on methods to more efficiently manage nitrogen while maintaining economic viability. These projects also address weed control issues. Controlling weeds in production fields is a constant economic challenge and it is critical to continue to evaluate new techniques for effectively and economically controlling these pests.

Nitrogen Uptake

Worked closely with growers to conduct research the nitrogen uptake of key vegetables that are at risk in the current regulations posed by the CCRWQCB. We have examined nitrogen uptake dynamics of broccoli, cauliflower, cabbage, spinach and baby vegetables. This information provides growers with baseline information on the nitrogen uptake dynamics of their crops as well as providing information for the Crop Manage on-line management tool. This project is assisting growers to comply with current water quality regulations.

Fertilizer Technology

Evaluated fertilizer technology to make more efficient use of applied nitrogen to lettuce and spinach. There are fertilizer technologies that allow applied nitrogen fertilizer to resist leaching. Controlled release fertilizers and nitrification inhibitors allow growers to apply less nitrogen while safeguarding yields. This technology has the ability to help growers comply with water quality regulations, safeguard the environment, yes still be economically viable.

Nitrogen fertilizer trial on lettuce

Weeding Technology

Worked with companies and growers in facilitating the development of automated thinners/ weeders for direct seeded lettuce. In 2012-13 there have been unprecedented labor shortages on the Central Coast. There is a clear need for developing technologies that can make more efficient use of the existing labor pool. Automated thinners use a spray mechanism to remove unwanted lettuce plants.Our research program has facilitated the development of the most efficient spray materials to effectively remove unwanted lettuce and weed plants in the thinning/weeding operation while safeguarding the unthinned plants. In 2013, I spoke at 13 meetings with 760 attendees.

Labor shortages in Monterey County need to be addressed developing technologies

Spray pattern of the automated thinner

Automated Thinner

Steve Koike

Plant Pathology Farm Advisor

M.S., U.C. Davis

23 Years with UCCE

Plant diseases can cause significant damage to crop quality and yields and can be difficult for farmers to manage. The identification of the diseases and development of management strategies are therefore key components of our extension plant pathology program. Our research focuses on diseases of vegetables/strawberry/flower crops, epidemiology of diseases, evaluation of fungicides, identification of new diseases, and exploration of alternative controls (alternative fungicides, biological agents, organic agriculture disease management). We also have been involved in applied research involving foodborne pathogens (*E. coli* and *Salmonella*) as they occur in leafy greens field settings. Four major programs are described below.

Plant Disease Diagnosis

We operate the only off-campus, university plant disease diagnostic lab in the state. We receive and analyze hundreds of plant samples from our Monterey County farmers. Based on laboratory tests and analyses, we advise the growers on the nature of the problem and on management options. This laboratory program also serves as an early warning system that allows us to discover new diseases. This is probably one of the most widely used services that the plant pathology program offers.

Monterey County has the only county-based UC diagnostic lab in the state.

New Diseases of Minor Crops

We provide diagnostic and research support for farmers growing minor crops such as parsley, arugula, corn salad, radicchio, fennel, and many others. Outside of our coastal region, few resources are available to these growers. We help growers diagnose problems and find options for dealing with these minor crop diseases.

Spinach and Lettuce Downy Mildew

These two diseases continue to be the two most important foliar problems on these leafy crops. We have been identifying races of the pathogens so that growers can plant resistant cultivars, if available. In the past year, two new races of the spinach downy mildew pathogen were confirmed in coastal California, so the industry will again need to seek new resistant cultivars. We are also seeking to help develop new fungicides that are of low toxicity and have minimal impact on the environment.

Downy mildew diseases of spinach and other crops remain chronic challenges to county growers.

New Damaging Diseases of Strawberry

The UCCE Plant Pathology program is conducting research on new problems that threaten Monterey County agriculture

New damaging diseases of strawberry. We are actively working on recent disease developments in strawberry. Two new soilborne diseases of strawberry (charcoal rot, Fusarium wilt), previously found only in the south coast region, are now present in Monterey and Santa Cruz counties. We have confirmed these cases and have been advising growers about these new problems. We are now trying to develop management options for controlling these threatening issues.

New soilborne diseases are causing crop loss in strawberry.

Michael Cahn

Irrigation and Water Resource Management Farm Advisor

PhD, Cornell University

18 years with UCCE

The UCCE Irrigation and water resource program conducts research and education programs to promote agricultural stewardship of ground and surface water supplies in Monterey County. Agriculture is the main user of ground water in Monterey County. Identifying practices that can assist growers in using water more efficiently can have a large impact on the sustainability of water resources in the Monterey Bay region. In addition, run-off from farmland during storm and irrigation events can degrade the quality of surface and ground water supplies. Through grant funding support of more than $1,000,000 during the last 2 years we have been able to greatly increase research and outreach activities to improve the efficient use of water by agriculture and to protect water quality. The following highlights a few of these projects.

Online decision support tools can improve water and nitrogen management of coastal crops

Water is often in short supply in Monterey County, but this region has always been a hub of innovation. Following in this tradition, UCCE has developed an online decision support tool to help growers better determine the water needs of their crops using local weather information. The software, known as CropManage, was first piloted and tested for lettuce production. We are now expanding the software to include other widely grow crops in Monterey County, including broccoli, cauliflower, cabbage, and strawberries. Growers can access CropManage (ucanr.edu/cropmanage) from their smart phones or their office computer and determine how much water to apply to their fields in seconds. The easy access to weather-based information has helped some growers reduce water use by as much as 25%.

Irrigation efficiency program provides on-farm evaluations of irrigation system

Farmers can grow crops with minimum water when their irrigation systems work efficiently. UCCE established a field service for evaluating the efficiency of agricultural irrigation systems. We developed procedures for evaluating the application uniformity, operation, and design of the irrigation system. By conducting more than 60 in-field evaluations during the last 2 years, we have been able to help growers find economical solutions to improve the efficiency of their irrigation systems. The implementation of these recommendations will help growers conserve water and reduce pumping costs.

Vegetated water-ways can reduce pesticides in agricultural run-off

Irrigation run-off from agricultural fields can carry sediments, pesticides, and nutrients that degrade the quality of water in creeks, rivers and estuaries. Adding vegetation to farm ditches can be an effective way to minimize erosion during storm run-off events and provide a way to clean water. However, vegetation can also cause problems for vegetable production, by harboring animals that could be a food safety concern, and providing a source for weed seed. To address these concerns, we developed an innovative method to use native grasses and drip irrigation to vegetate on-farm waterways. The introduced native grass species are less likely to attract rodents that would become a food safety concern in leafy green production. Our initial research trials demonstrated that these types of vegetated water ways were effective in reducing the concentration of pesticides in irrigation run-off and by slowing the flow of run-off more water infiltrated into the soil rather than flowed off site.

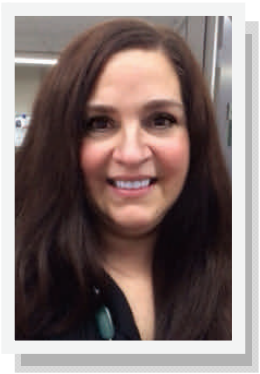
Automated sampling equipment is used for evaluating the effectiveness of vegetated waterways to reduce pesticide concentration in run-off.

Our initial research trials demonstrated that these types of vegetated water ways were effective in reducing the concentration of pesticides in irrigation run-off

Replicate field trials are commercially harvested to evaluate lettuce yield under a reduced water treatment using an online irrigation scheduling app.

Evaluating the uniformity of drip systems in strawberries

Maria de la Fuente



County Director & Farm Advisor

PhD, Plant Pathology, Iowa State University

17 years with UCCE

My program includes Mushrooms and Waste Management research that aims to introduce new sources of income for mushroom growers and promote the use of local waste products (compost) in agricultural production. I research problems of immediate concern, such as diseases, pests, sustainable agricultural methods, and recycling. This program assists in evaluating new varieties or production methods, and provide research-based information for growers of mushrooms, and growers of container production of ornamental plants. I also devoted a great deal in training beginning and minority farmers.

Greenwaste as Substrate for Oyster Mushroom Production

I researched the use of composted municipal yard trimmings – called "greenwaste" – studying three substrate formulas for specialty mushroom production (*Pleurotus ostreatus*), demonstrating inexpensive mushroom production as a way for farmers to diversify their operations and boost the bottom line while reducing municipal waste.

Oyster Mushrooms growing out of a bag with composted yard or greenwaste

Vermicompost as substitute for peat moss in White Button Mushroom Production

Vermicompost, or worm casings, is a great product for soil amendment

I also used a non-conventional, pasteurized material to evaluate the influence of vermicompost replacement of peat moss in the casing layer of white button mushroom (*Agaricus bisporus)* production. This casing layer was prepared with pasteurized vermicompost produced *in situ* with mushroom stumps, shredded newspaper and coffee grounds as feedstock for vermicomposting windrows. Vermicompost was added on the mushroom substrate 0 to 100% in the casing. It was possible to eliminate peat moss in casing soil, although intermediate levels (peat + vermicompost) gave better yields. One trial produced a biological efficiency of 96% (three flushes). It was noted that vermicompost as casing material held more water than peat moss, the standard casing material. In the vermicompost treated beds the development of mycelia was almost the same than that of standard beds. During the first flush, mushrooms grew vigorously and in higher density than control. They were of comparable quality and weight to

those in standard beds. During the first flush, mushrooms growing in vermicompost treated beds were of bigger size than those growing in standard casing treated beds. Overall, the yields of the beds treated with the experimental vermicompost casing were comparable to the standard casing. More research is needed to come with the best formulation.

Picking white button mushrooms that are produced under Integrated pest Management (IPM) .

IPM for Mushroom Industry

Several workshops and presentations intending information of control measures for green mold (*Trichoderma aggressivum* sp. nov.) and fly pests *Lycoriella auripila* (Diptera: Sciaridae) and *Megaselia halterata* (Diptera: Phoridae) in Mushroom Production. A grant proposal is being prepared to be submitted for funding and expand the knowledge on this matter.

Beginner Farmers and Ranchers

Training Hispanic growers in their own language, brings extra value to UCCE

One long-term goal is to improve viability of small farms by enhancing the competitiveness and sustainability of beginning minority, immigrant, and tribal farmers and ranchers in California. I aim to build on the success of a comprehensive farm management outreach project to enhance the economic viability of minority growers. By partnering with the UC Berkeley specialists, the National Center for Appropriate Technology and 15 community-based collaborators, we included Latino, Southeast Asian and Native farmers and mentors. A USDA-NIFA funded projects offer in-depth, culturally relevant training to beginning minority farmers in combination with capacity-building to partner organizations to

1) Improve access to sustainable farming information and technical support,

2) increase adoption of organic and sustainable farming/ranching practices,

3) enhance the economic viability of minority farms through increased sales and improved financial literacy,

4) strengthen farmer-to-farmer training networks,

5) provide referrals to agencies that provide access to land, financial, and other services, and

6) improve food safety and enhance food security for beginning minority farmers and their communities.

Shimat Villanassery Joseph

Entomology IPM Farm Advisor

PhD, Entomology, University of Georgia

1 year with UCCE

Dr. Joseph's research addresses existing and emerging pest management issues for economically important crops in the Salinas Valley along the principles of applied insect ecology. Research projects are aimed at enhancing our understanding of biology of pest and beneficial species to develop and refine monitoring and management strategies. Major thrust is given to develop management tactics that would reduce the impact on environment and non-targets. Dr. Joseph's extension program promotes the adoption of integrated pest management driven by lab and field data that base on the occurrence and relative abundance of major pest species of vegetables and berries, and efficacy, timing and application method of insecticides on these pests. Also, the program provides diagnosis of pest problems and timely updates on the invasive pests threatening the Salinas Valley agriculture through blog, newsletter, bulletin and other media.

Biology, Ecology, and Management of Maggot Pests (*Delia* spp.) in Vegetable Crops

Over the last few decades, maggots (*Delia* spp.) have become one of the major persistent pests of brassicas and lettuce crops in the Salinas Valley, causing as widespread economic damage. Production of these crops in Monterey Co. alone represents ~70% of the vegetable acreage (Crop report, 2011) and the majority of acreage is affected by root maggots. Management of maggots in Cole crops and others commodities is difficult and involves mainly the use of organophosphate insecticide applications such as chlorpyrifos and diazinon (UC IPM 2012), which never provides 100% control. The goal of series of projects is to learn the biology, ecology and subsequently develop a reduced-risk management strategy for root maggots using multiple preventive tactics, including relay cropping, less susceptible cultivars, insecticides, and phytosanitation practices.

Vegetable crops, alone, represent a 2.5+ billion dollar gross value in Monterey County

Biology, Ecology, and Management of Thrips in Vegetable Crops

Thrips are known to feed by using their piercing and sucking mouth parts and consuming plant sap. Such type of feeding often results in silvering and curling of leaves, followed by necrosis of plant tissue. In addition to causing direct injury, thrips transmit tospoviruses including *Tomato Spotted Wilt Virus* (TSWV). This viral disease Tomato Spotted Wilt (TSW) is known to induce a suite of symptoms on its host plants including leaf speckling, mottling, chlorotic and necrotic lesions of various shapes, sunken spots, etches, ring spots, stunting, yellowing, and wilting. These symptoms are known to typically vary with the lettuce cultivars, age, virus isolate and/or strain, and environmental conditions. The combination of direct injury and/or TSW makes the lettuce unmarketable. Dr. Joseph's research takes an integrated approach in reducing the impact of thrips and the disease.

Endemic arthropods are turning into new crop pests.

Management of Garden Symphylans

Garden symphylans is a serious pest to lettuce production in the Salinas Valley. Symphylans spend their entire life in the soil profile, and moves up and down as soil moisture and food resources become available, which makes it very difficult pest to study or manage. Previous reports have suggested that they infest the roots of lettuce seedings eliciting severe crop injury/mortality. Moreover, symphylans injury distribution across the lettuce field has been patchy/lumped. Dr. Joseph's research is to enhance our understanding of their biology, and management.

Royce Larsen

Area Natural Resource Watershed Advisor

PhD. Oregon State University

19 years with UCCE

Ecology and Epidemiology of *E. Coli* O157:H7 Study in MO and SLO Counties

This study was conducted in MO, SB and SLO counties. Since 1995 there have been more than 20 outbreaks of *Escherichia coli O157:H7* associated with leafy greens. In 1996 an outbreak associated with spinach was traced to a field within the Central California Coast. This research project was looking at key biotic and abiotic processes that link the primary environmental reservoirs of *E coli*, that could lead to contamination of raw produce. The main concern for this project was food safety. A paper has been submitted.

Ranching Self-Assessment Project in Monterey and SLO Counties

The goal of this project was to create and implement a voluntary rancher self-assessment (RSA) program in which to evaluate all aspects of ranching operations to ensure the sustainability of production, lands, and families. This project was developed over the last three years by a committee of ranchers from SLO and MO counties, with oversight and input from natural resource professionals. The San Luis Obispo Cattlemen Association has formally adopted this RSA program.

There was one workshop for this project during this review period. The purpose of the workshop was to have several (9) ranchers "Beta Test" the RSA for its clarity and usefulness. This "Beta Test" proved useful, but it was determined that another "Beta Test" was needed. In addition, there were 3 other workshops and a ranch water quality short course in MO County where portions of the RSA were discussed. The workshops where portions of the RSA were included were the Oak Woodland Management Field Day Part 1 and Part 2, and the Central Coast Range Coalition Spring Meeting held on the Work Ranch, MO County.

Cryptosporidium parvum and *E. coli* in California Ground Squirrels in Monterey and SLO Counties.

This study began in 2002, and is now revisited. The illness cryptosporidiosis can be fatal to humans with weakened immune systems. The perception is that cattle are high carriers of *C. parvum* thus being a threat to public health. A study conducted at VMTRC showed that 1 squirrel provided the same environmental loading of *Cryptosproridium parvum* as 16 mature cows. However, further testing showed that California ground squirrels do not

carry *C. parvum,* but rather an unidentified species of *Cryptosproridium*. In order to verify this DNA testing on three different genes needs to be completed. Additional fecal samples from squirrels were collected during this review period so DNA testing could be completed. In addition to *Cryptosproridium* the squirrels were also tested for *E. coli* O157:H7. It is expected that this data will help understand if the *Cryptosproridium* within the California ground squirrel populations are pathogenic to humans. A journal publication is nearing completion.

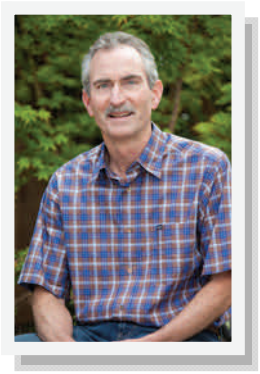
Ranch Water Quality Short Course in Monterey County

Water quality is an issue addressed also in our natural resources

I worked with the Upper Salinas Las Tablas RCD and a private consultant to teach the Water Quality Short Course in Soledad, CA. This short course was asked for by the Monterey County Cattlemen's Association. There is a significant need on the Central Coast to educate landowners about non-point source pollution due to increased pressure on the Regional Water Quality Control Board by the EPA, especially in watersheds that are listed as impaired. Range livestock producers are the majority of private landowners in San Luis Obispo and Monterey counties, making them very vulnerable to increased regulatory pressures. The objective of the short course was to teach landowners how to develop a water quality plan to help them comply with water quality regulations.

There were 22 attendees for this short course. The short course was taught in 2 days, for a total of 9 hours. Seven of the 22 participants turned in a survey. Forty three percent rated the short course as excellent, and 57% rated it as good. I also received the Western Extension Director's Award of Excellence, as part of team, for helping to develop and deliver the Ranch Water Quality Short Course. I have been teaching this short course since 1998.

Steve Tjosvold



Environmental Horticulture Farm Advisor

M.S., UC Davis

32 years with UCCE

Sudden Oak Death: Biology and Management in Nurseries

In 1999, *Phytophthora ramorum* the causal agent of Sudden Oak Death (SOD) was detected in the Santa Cruz Mountains (Santa Cruz County) and Big Sur (Monterey County) for the first time. As the disease spread, thousands of oaks and tanoaks were killed, and the disease continued to spread in other parts of California and southern Oregon. Later, *P. ramorum* was detected in California nursery stock shipments, and the industry was implicated in its unintentional movement to other states and Canada. A Federal Regulatory Order now requires certification that all nursery stock in California be free of the pathogen before any shipments can be made. Nursery growers and regulatory officials need a solid scientific foundation to help manage the disease in nursery operations. Since 2003, I have managed the first officially permitted site in North America to conduct field research on ornamental hosts with *P. ramorum*. Because of biosecurity concerns, I conduct this research at both research sites under permits issued by the California Department of Food and Agriculture (CDFA). My research team and I have been active in 2 major areas of research: (1) *P. ramorum sporulation biology*, to understand the effect of environmental field conditions on sporulation. We found that there were a range of field conditions (consecutive hours of leaf wetness, temperature and lesion age) that would support sporulation. This information now helps nursery managers prevent infection during sporulating conditions with commercially available sensors and data loggers. (2) *The effect of fungicides on P. ramorum sporulation and persistence,* to identify chemicals that would reduce or eliminate its sporulation. We found that some newer fungicides could nearly eliminate sporulation. This information was widely transferred to clientele in multiple presentations and publications.

Light Brown Apple Moth in Ornamental Crops

In February 2007, Light Brown Apple Moth (LBAM) was first detected in California. Associated quarantine restrictions severely threatened the viability of California's $ 3.8 billion nursery industry. If the pest is detected in nurseries by regulatory officials, growers must spray insecticides until LBAM life stages are no longer detected. However, moths remain uncontrolled in urban landscapes and natural areas outside of many nurseries, and moths can migrate into and re-infest nurseries. LBAM eradication in these situations is difficult. Therefore I researched a cost effective, sustainable strategy to manage: (1) *Effectiveness of Insecticides:* experiments at the USDA Center for Plant Health Science and Technology (CPHST) Otis Lab have determined the efficacy of several insecticides targeting LBAM egg and larval stages in a laboratory environment. This information has been used by CDFA in developing approved insecticide treatments when regulatory inspectors detect LBAM in nurseries. Growers need to know how long these insecticides remain

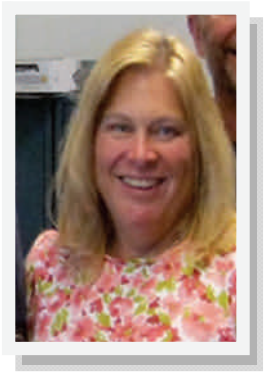
biologically active in the field so they can judge how often to spray. We determined the efficacy and residual action of these and other new insecticides in preventing or retarding oviposition, egg development, egg eclosion, larva and pupa development in field conditions. Residual effectiveness was determined to be less than 1 week to more than 3 weeks when applied before or after eggs were laid. Ultimately these experiments will aid in the development of an insecticide treatment strategy, with rotating chemical classes, to manage LBAM and prevent insecticide resistance in nurseries. This information was transferred to clientele via presentations. The results were published in a trade publication and newsletter. (2) *Integrated Pest Management for LBAM in Nurseries:* We targeted management efforts that can be improved with the development of new information. Areas of emphasis are: improve scouting (field inspection) and efficiency to detect LBAM; evaluate host preferences in ornamentals and native vegetation; and improve control of LBAM with insecticides in the field. I helped prepare with 2 APHIS PPQ CPHST entomologists an internal report on "Use of Horticultural Oils for Control of Light Brown Apple Moth (LBAM) on Nursery Crops". This was used in clarifying and broadening guidelines on the type of horticultural oils that can be used in regulatory actions. CDFA changed their regulatory procedures to meet these new guidelines in early 2012.

Master Gardener Program Management & Training

Master Gardener Volunteers give back to our communities an average of 15,000+ hours per year

In 1994, a Master Gardener Program was established to meet the pressures and demands for home and gardening information and problem solving from a growing local urban population. Since 1995 I have managed and trained a highly successful, award-winning Master Gardener group, Monterey Bay Master Gardeners (MBMG), which is headquartered at UCCE Santa Cruz County. Activities associated with this program include: the administration of background clearances, volunteer training and hours tracking, UC certification, and the training of new classes of Master Gardeners, as well as many other typical tasks required to run a vibrant volunteer program. I wrote diverse articles for the MBMG newsletter "Gardening on the Edge" based on the theme chosen for each issue. In January 2012, I supervised the training (minimum of 50 hours of instruction) and management for the 13th graduating class of the Monterey Bay Master Gardeners. There were over 45 trainees and eventually 42 graduates and most have continued on as active Master Gardeners. I presented information in 3 sessions, including one of the most popular full day classes on Basic Botany/ Horticulture. Trainings are on Saturdays to accommodate the widest range of working and non-working participants. The trainings and programs are widely publicized in print and social media to garner the most diverse volunteers. Master Gardeners performed 15,156 volunteer hours on 15 community projects.

Lynn Schmitt-McQuitty



Youth Development Advisor

M.S., Outdoor Teacher Education, Northern Illinois University

17 years with UCCE

TechXcite Youth Engineering Program

America faces a future of intense global competition with a startling shortage of scientists. In fact, only 18 percent of U.S. high school seniors are proficient in science (NAEP 2005) and a mere 5 percent of current U.S. college graduates earn science, engineering or technology degrees compared to 66 percent in Japan and 59 percent in China. The 4-H Youth Development program in partnerships with the Pratt School of Engineering at Duke University are working with Monterey County youth to develop engineering and technology skills by engaging youth in building bionic arms, solar powered cars, water filtration systems and solar ovens through the TechXcite program and exposing youth to the planning and conceptual design of engineering. During the course of 17 months, over 150 youth have participated in the TechXcite program. Impact data, collected via youth surveys, indicate that 80 percent of the participants “definitely feel science, engineering and technology help make our lives healthier, easier and more comfortable.” Additionally, 60 percent of youth indicate that they “definitely would rather do experiments to learn about how or why something happens than to read about it,” while another 80 percent of youth say they “definitely would like to do more activities like TechXcite."

Pathways to your Future Project

Research shows that high school graduates who select majors that are congruent with their interests, are able to match educational plans with requirements of desired careers, attend an institution that is a good match and develop realistic goals are more likely to be successful in achieving their educational and career aspirations. As such, UC Cooperative Extension educators developed and implemented 4-H Pathways to Your Future: Destination UC, an education and career exploration project designed for youth in grades 7-12. The project included curriculum, guest speakers and experts from the community, as well as UC campus tours. As a result of participating in the project, young people reported significant increases in their ability to connect academic and career aspirations to their interests, skills or talents; understanding of different pathways to higher education; identification of their pathway to higher education; understanding of how to prepare for UC; plans to attend UC; exploration of different careers; and the ability to set and manage goals.

The Impacts of Implementation Frequency on Youth Scientific Literacy in 4-H Club Settings

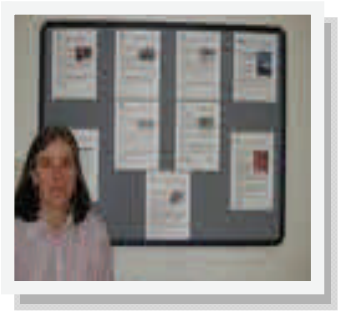
Science Education at a young age is a core statement for effective pedagogy

The frequency of effective pedagogy, including science instruction involving hands-on activities that involve learner interactions and applications to real-world settings is necessary for effective science programming. In an effort to better understand how frequency impacts youth scientific literacy, Monterey County 4-H members in grades fourth through sixth participated in research aimed at identifying optimal implementation frequency of science education programs and their impacts on science content, science process skills and science interest. Quantitative findings relative to science process skills indicate that youth participating in the three-week implementation sequence had significantly greater improvements over time than the one-week implementation sequence. Qualitative data from focus group interviews revealed that frequency of implementation was important to youth and adult participants with respect to learning science. Youth expressed a desire for more frequent implementation and discussed how it benefitted their learning.

King City Blue Ribbon 4-H Club Honors Local Veterans

To honor our local veteran's, the King City Blue Ribbon 4-H Leadership members met at the King City Cemetery on Veteran's Day 2012. At a previous meeting, each member had brought a Veteran's Day poem. These poems were typed and copied onto patriotic paper, laminated to be protected from weather elements and secured to old campaign signs as a method of recycling. At the cemetery, Mrs. Domingos gave the members a lesson on what Veteran's Day is about. They learned about each war, and each branch of the military. They then each read their poems. After, the members went around the cemetery looking for gravesites that were marked as veterans. They then placed their poem next to the grave by pushing the signs deep into the ground. This was a very special way to honor our local veterans and we will make this an annual event.

Laura Tourte



Farm Management Advisor

M.S. Vegetable Crop Production, UC Davis

13 years with UCCE

Cost and Returns for Central Coast Growers

1. Sample Costs to Produce Second Year Strawberries – Central Coast Region. 2011.
2. Sample Costs to Produce Fresh Market Raspberries – Primocane Bearing – Central Coast Region. 2012.

Studies available at: http://coststudies.ucdavis.edu

The second year strawberry production study is the 'first ever' of its kind; the raspberry study is the 'most comprehensive' evaluation of primocane raspberry production ever performed. These crops were identified for study by growers and colleagues as being most important due to their value, and unique niche in Central Coast agriculture. The information contained in the studies offer growers tools for sound farm management decision-making, and are held up by growers and other UCCE partners as some of the most valuable extension work we perform. Statistics show that Central Coast studies are viewed and downloaded thousands of times each year.

California Small Farm Conference (2011-2013)

Tourte is on Board of Directors for the California Small Farm Conference. In 2011 (San Jose), 2012 (Valencia), and 2013 (Fresno): chair and lead for the Farm Management Workshop Track, which includes developing and planning five workshops, inviting speakers, and moderating panels. Each year the workshops are well attended and received. Examples from 2012 workshops: Managing Risk on the Farm, Access to Land and Financial Management, Farm Apprenticeships, the ABCs of Starting a New Farm, and Organic Certification and Integrity. At least one farmer is included on each workshop panel. Evaluations were positive; 72% to 92% of respondents indicated that the information shared was excellent or good. Quotes: "Excellent, relevant information, stimulates thoughts"; "Exceeded expectations, honest viewpoints"; "Good to have farmers give first-hand experience"; "Great information for basic or beginning farmers". Tourte is also co-chair of the Scholarship Program Committee and helps develop applications for, extend information to, and select eligible candidates. Roughly 100 scholarship recipients, many from the Central Coast, attend the conference each year, and report successful conference experiences. Testimonial from 2012: "Without reservation, the conference was a magnificent learning experience and provided incredibly valuable information that I was struggling to find elsewhere".

The Farm Business and Market Place Website

Developed by Tourte in 2009 to provide small and mid-scale farmers along the Central Coast with easily accessible farm management and marketing information, Tourte currently maintains and updates the website with relevant materials through literature searches, reviews, quality evaluation, and selection of articles. Articles are cataloged and briefly described prior to uploading to the website. Outdated resources or those no longer available are removed. The Website has been a helpful resource to respond to new and beginning farmer questions, and providing diverse educational materials in an 'always available, one-stop' format. One farmer quote: "A big thank you for the fantastic online resources you recommend". Analytics show consistent use of website; goal is to provide more diverse resources (including narrated presentations and Spanish language materials) in the future.

Mark Bolda

Management of the Spotted Wing Drosophila in Caneberries

Strawberries & Caneberries Farm Advisor

M.S. Plant Protection and Pest Management, UC Davis

10 years with UCCE

The spotted wing drosophila as a recently introduced pest has been particularly problematic for Central Coast caneberry growers. Mr. Bolda has been engaged in a three year long effort to study the field biology of this pest, while at the same seeking control methods to reduce the damage of this pest to area caneberries. The impact of this effort has more effective monitoring of spotted wing drosophila, as well as more targeted approach to its control. While initially the impact of this pest on the production of caneberries in the industry was estimated at 20%, that impact because of improved monitoring and control has fallen to less than 5%.

Strawberries & Raspberries in Monterey County generate 826+ million dollars per year

Test of Biological Fungicides in Strawberries

A number of biological fungicides registered for use in strawberries have not been thoroughly tested through empirical studies to give guidance to growers on their efficacy and use. While it is not expected that any biological fungicides will provide a full replacement of for methyl bromide fumigation, that any of these has the potential to enhance yield or plant performance makes them worthy of at least some investigation.

The results of the first year of this trial are encouraging. In the early part of the season up through the middle of May, several treatments had significantly higher amounts of fruits harvested than the grower standard. We plan on doing two similar studies this coming season to more thoroughly understand correct and efficacious use of these materials.

Cost and Returns for Central Coast Growers

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3. Sample Cost to Produce Fresh Market Blackberries – Central Coast Region - 2013

Studies available at: http://coststudies.ucdavis.edu

The second year strawberry study at 15% of the total addresses a significant portion of the strawberry production market. Both the primocane raspberry and blackberry study (released September, 2013 are thorough studies of two very unique cropping systems.

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We wish to thank our 4-H volunteers, Master Gardeners, and student interns for their dedicated service. They help Cooperative Extension enrich the lives of many residents in Monterey County.

We're on the web! Visit us at cemonterey.ucanr.edu & ucanr.org

We wish to thank Ms Liliana Reyes for her help in the production of this report.

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