Marketing – Agriculture Education/Outreach

Ag Innovations Network ***$271,325***

Title: California Food Systems Alliance Network

Abstract: The California Food System Alliance (FSA) is a county-based network of farmers and their community allies that is dedicated to assuring the long-term viability of agriculture in the state. This project's purpose is to: (a) respond to requests to establish new county Alliances to provide venues for collaboration between SC agriculture and local communities, such as FSAs Food Policy Councils, by creating tools that enable collaborative leaders to start and manage these collaborations including development of a set of trainings, tools, and resources to support Alliances' and other food and ag collaboratives' efficacy; (b) increase the collective effectiveness of the FSAs by improving the capacity to act together on issues of statewide importance; (c) disseminate throughout the Alliance network the best practices for influencing local community attitudes, county regulations and relationships needed for effective action on behalf of specialty crop agriculture; (d) assist each FSA in creating a platform for local communications; and (e) develop programs that link specialty crop producers with new or emerging markets. At the conclusion of the project, FSA and multiple food collaborative across the state will be allied with and working effectively for specialty crop agriculture and producers.

American Pistachio Growers ***$130,666***

Title: American Pistachio Growers New Product Research

Abstract: Pistachios are already the number one snacking nut in America but very few forms of pistachios are available other than roasted, salted in-shell. The development and introduction of additional forms of product are needed for demand to keep up with the expected doubling of production over the next several years. This project will identify new pistachio product opportunities through consumer research. The industry has been investing in the development of prototype new products that needs to be grounded in clearly defined consumer needs and wants. At the completion of this project, American Pistachio Growers (APG) will know what new pistachio products consumers will purchase and what message points will be most successful.

California Avocado Society, Inc. ***$65,108***

Title: Avocado grower training for Spanish speakers

Abstract: The California Avocado Society (CAS) seeks to create an agricultural outreach program to provide technical education that gives critical job skills to a group that has little formal education, in an effort to improve the competitiveness and sustainability of California avocado producers. Hundreds of orchard managers, foremen, and workers are not fluent in English; need training in Spanish, as well as bulletins, advisories, and other educational materials that are oriented to their language, culture, and educational level. With this funding, the CAS, and its collaborators, will develop educational materials and hold classroom and in-the-field seminars to deliver training on subjects such as irrigation, pruning, fertilization, chemigation, pesticide safety, and personal hygiene for food safety. Additionally, simultaneous translation into Spanish of the currently running Grower Seminar Series would leverage CAS's existing program.

California Bountiful Foundation formerly: California Farm & Food Foundation ***$398,730***

Title: Consumer Education - California Bountiful Television Program

Abstract: This project will educate consumers about the health and economic benefits of California specialty crop production by producing specialty-crop-themed episodes of the California Bountiful

television program and maintaining its extended reach through purchases of airtime on commercial television stations in San Francisco and Los Angeles.

California FarmLink ***$194,028***

Title: Digging In: Guiding Farm Success through In-Depth Business and Land Tenure Education

Abstract: California (CA) FarmLink will establish an education series in three CA regions that provides small to mid-sized, beginning and low-resource specialty crop growers the tools and resources to overcome challenges including access to land, access to capital, and a lack of business and financial management knowledge. FarmLink will work with collaborators in each region to develop an educational workshop series that addresses business and financial education, land tenure and marketing. Following the workshops, participants will have access to one-on-one technical assistance from FarmLink staff, consultants and peer advisors. The project will create three regional advisory groups made up of experienced local farmers, and financial and business professionals to provide continued assistance to participants during and after the project. FarmLink will develop a targeted landowner outreach plan to find available lease land for participants, and hold facilitated Mixers to introduce landowners to the beginning farmers.

California State University, Fresno Foundation ***$224,185***

Title: Water Use Efficiency Education for San Joaquin Valley Specialty Crops

Abstract: The proposal will improve irrigation practices for California's specialty crop growers and laborers by developing and implementing an outreach program of sustainable irrigation practices. The seminars would enhance competitiveness of California's specialty crops by assuring adequate and more efficient use of California's dwindling water supply. Furthermore, this program would empower the target audience; specialty crop growers, their employees and industry professionals through acquiring new skills and practices. The program will be available in English and Spanish and will concentrate on areas hit hardest by water shortages such as the Central Valley's Westside and Kern County. It will focus on some of the primary crops grown in those regions such as almonds, grapes, citrus, pistachios and canning tomatoes). Growers will have access to the most current irrigation techniques and equipment to encourage them and/or their staff to adopt sustainable irrigation practices.

Community Alliance with Family Farmers ***$275,315***

Title: Linking Nutrition Education with California Grown Specialty Crops Statewide

Abstract: Since 2001 California Alliance with Family Farmers (CAFF) has run Farm to School programs that increase specialty crop consumption, improve student knowledge of nutrition and agriculture, and generate a steady revenue source for California farmers. The Harvest of the Month (HOTM) Tasting Kit program connects the Network for a Healthy California's (Network) HOTM nutrition education curriculum to California grown specialty crops. CAFF delivers packages of nutrition and local food systems curriculum, farmer profiles, and varieties of seasonal produce to classroom teachers each month. Currently the program operates on the Central Coast, serving over 10,000 students in 500 classrooms across 5 counties. Thousands of teachers in other regions use the curriculum but need help in connecting with local sources of the featured produce. CAFF plans to replicate the HOTM Tasting Kit program in Sonoma County and work with the Network's statewide partners to connect their HOTM programs to sources of California grown specialty crops.

Community Alliance with Family Farmers ***$245,952***

Title: Promoting California Grown Specialty Crops in Santa Clara County

Abstract: In Santa Clara County, efforts to address agricultural economic viability in the south part of the county are disconnected from the movement to improve equal access to healthy food in the urban centers. California Alliance with Family Farmers' (CAFF) Farm to School and Local Food Systems programs work together to merge these interests in a way that benefits both consumers and producers. CAFF proposes to launch a county-wide campaign that creates access to California grown specialty crops while educating residents about their importance and benefits. Staff will work with schools, restaurants, hospitals, and retail outlets to connect them with sources of California specialty crops and marketing materials. Simultaneously, CAFF will launch a media/educational campaign that will coordinate marketing efforts around featured "Harvest of the Month" (HOTM) produce across the various consumer venues. Building these components together will foster an informed population of consumers educated about and engaged with their food system.

County of San Joaquin ***$203,055***

Title: San Joaquin County AgVenture

Abstract: AgVenture, an agriculture and nutrition education program, sponsored by San Joaquin County (SJC), provides SJC third and fourth graders and parents the opportunity to learn about SJC specialty crops, nutrition, and the importance of agriculture through field days and farmers' markets. The program hosts three free field days where 1,100 specialty crop farmers, producers, and volunteers donate their expertise to bring presentations to educate over 11,000 third graders from 142 schools. Volunteers introduce students to healthy food choices, create an awareness of the importance of eating locally-grown specialty crops, and address the role student’s play as consumers in helping maintain agriculture as a strong component of the local and State economies. AgVenture will also host free after school farmers' markets for over 1,000 fourth graders and 250 parents at 10 low-income schools to increase and reinforce student knowledge learned from the previous year's field day.

El Dorado County Ag in the Classroom ***$154,924***

Title: Expanding Specialty Crop Education Programs for Students in the Sierra Nevada Region

Abstract: This project expands and enhances specialty crop education programs to reach more K-12 students and teachers in the Sierra Nevada region of California. The Fields of Learning (FOL) school/farm partnership program will broaden its impact by adding six new school partnerships, piloting a program to train high school students as FOL field coordinators, and developing an orientation program for new partnerships. To educate and inform more teachers about the benefits of specialty crops and local agriculture, the multi-day Teachers' Ag Summer Institute (TASI) will offer two learning tracks: one for K-6 teachers and one for 7-12th grade teachers. To increase outreach to socioeconomically disadvantaged students, El Dorado County Ag in the Classroom will pilot Tahoe Farm Day, introducing students to the importance of specialty crops and the concepts of healthy food choices, and provide "Ag Day" field trips for children and mentors in the local Big Sisters and Big Brothers program.

Project Apis m. ***$56,325***

Title: Honey Bee Best Management Practices Outreach Program

Abstract: This project will raise awareness of honey bee Best Management Practices (BMPs) through an easily-accessible social media campaign. The outreach program would ensure wide-spread dissemination of information resulting in a healthier bee supply. Sixty percent of bees pollinating California (CA) specialty crops originate out-of-state. Instant access to web-based information on honey bee pest and disease control, nutrition, and mitigating transportation and pesticide stress is vital to beekeepers and growers. Traditional and electronic BMP formats are necessary for adoption of management practices that result in improved pollination of CA's specialty crops. Print media, presentations and trade show presence

will occur; however emphasis will be on social networks, blogs, and content communities. Internet-based development will include Facebook presence, Twitter dialogue, video blogging and YouTube content. Growers would have access to BMPs to encourage their beekeepers to adopt colony management practices.

Regents of University of California, Davis ***$387,796***

Title: Consumer Outreach to Enhance Awareness and Marketing of Specialty Crops in the Sierra Foothills

Abstract: Placer and Nevada counties of California have a vibrant local food movement but less than two percent of the population buys local produce regularly. University of California Cooperative Extension (UCCE) will connect consumers to local specialty crop farmers and raise awareness of these crops and their health benefits. An outreach campaign will reach 50,000 consumers via an "Eat Local" website, other social media, and sampling and tastings at farmers' markets and events such as the Farm & Barn Tour. Outreach will educate consumers about nutritional value, preparation, and where to purchase seasonal local produce. This project will reduce barriers for lower income residents to purchase with vouchers and transport to farmers' markets. This project will develop point of sale materials and train 1,200 specialty crop producers to share nutrition and preparation information with customers in order to increase sales. Increasing consumption will lead to a healthier population and greater sales will improve the economic viability of specialty crop farmers.

The Learning Centers at Fairplex ***$389,260***

Title: Fresh Farming for the Future at Fairplex: A Specialty Crops Education Project

Abstract: Utilizing the myriad resources of the Los Angeles County Fairgrounds, this multi-faceted agricultural education and outreach project will expand the current space fully dedicated to agriculture (1/3 acre) to a three-acre organic farm, thus enabling the organization to better enhance the visibility and customer awareness of 100+ "California Grown" specialty crops on grounds. The project will not only promote this rich variety of crops to the 1.5 million guests that visit the annual Fair, but will educate and connect these guests to the crops on a personal level. The farm will also serve as an accessible public venue for an additional 50,000 community members through several year-round components: the horticulture/agriculture program of the Career & Technical Education Center; the onsite Sheraton Fairplex Hotel; the onsite Child Development Center; new public events/learning opportunities (e.g. farm to table dinners, school field trips, farm store, farmers' market).

U.S. Dept. of Agriculture, Agricultural Research Service ***$253,019***

Title: Determination of post fumigation recovery of soil microbial communities over time

Abstract: Cut flowers and ornamental crops rely heavily on soil fumigation. Fumigants with broad biocidal activity can affect both target and non-target soil organisms, but the recovery of microbial communities are largely unknown until recently. Since soil microorganisms are crucial in sustaining health of agricultural soil by contributing to nutrient cycling, plant nutrient uptake; it is very important to know the recovery of soil microbial community structure after fumigation. The goal is to determine the initial impacts of fumigants on both target (Pythium spp. and Fusarium oxysporum) and non-target (gram positive bacteria, gram negative bacteria, fungi, Arbuscular Mycorrhizal Fungi (AMF), actinomycetes and protozoa) organisms and soil microbial community structure recovery after fumigation with different time frames. Results could be used to determine if reinoculation of fumigated soils with specific microbes (AMF, rhizosphere bacteria, etc.) that facilitate plant growth is required.

Research – Environmental Concerns and Conservation

Almond Board ***$337,746***

Title: Dust Control in Almond Production

Abstract: This project will investigate the potential of using reduced rates of a liquid magnesium chloride (MgCl2) product to control dust on almond orchard roads and floors. This product is an inorganic, safe, proven dust suppressant and regionally available from various sources. More information is needed on the behavior of MgCl2 in orchards with various soil types, climate, and management/disturbance regimes, especially because of new and more restrictive air quality regulations. The project focuses on MgCl2 fate in natural media, pertinent research and regulations, and proven methods of measuring emissivity. Field trials will be used to study 1) MgCl2 migration, 2) rates, 3) positive and negative effects on plant and soil health and water quality, and 4) long-term impacts. Results will be used to determine orchard floor rates of MgCl2 in different managed soil and climate regimes that achieve an acceptable level of performance, coupled with agronomic and environmental protection.

Calaveras Winegrape Alliance ***$104,563***

Title: Improving Water Use Efficiency in High Elevation Vineyards, Phase II & III

Abstract: High temperature episodes in high elevation (HE) vineyards are very problematic for HE growers, making it difficult for growers to simultaneously balance irrigation efficiency, plant performance, plant health and crop yield. During Phase I of this project, funded through the 2011 Specialty Crop Block Grant program, it was anticipated that high elevation (HE) vines using irrigation schedules based on 10 day predictive high temperature forecasts would benefit differently than HE vines using traditional low elevation irrigation guidelines. Therefore, this project will follow through with Phase II and III. In Phase II, the Irrigation models that were developed in Phase I will be tested with alternate sites being used; adding any necessary variables to improve performance. Results will be recorded and evaluated. If any Phase II models are deemed promising, they will be tested in Phase III. Upon completion, if a model proves successful, a Best Management Practices manual with recommended irrigation guidelines will be devised.

Coalition for Urban Rural Environmental Stewardship ***$348,377***

Title: Establishing cost efficient methods to measure nitrate movement beyond the root zone when using nutrient BMPs in California Specialty Crops

Abstract: This project will identify and pilot test methods for measuring movement of nitrates beyond the root zone of irrigated crops with implementation of a nutrient management plan (NMP). Researchers use several methods for this purpose: lysimeters, ion exchange cartridges, soil core analyses, nitrate-specific probes. A literature search and interviews with researchers/private entities that use these methods will identify a scientifically acceptable and cost effective method to measure leaching of nitrate past the root zone. This project's field studies will test the selected method in tomatoes and walnuts. Samples will be collected where growers use NMPs to reduce nitrogen loading to groundwater. Study results will verify the effectiveness of NMPs or inform their modification if they are deficient. The method will serve as the standard protocol for evaluating nitrogen use efficiency in other crops under various soil/field conditions as growers work to comply with groundwater regulations.

Northwest California Resource Conservation & Development Council ***$133,220***

Title: Sustainable Easter Lily Production

Abstract: Northwest California Resource Conservation and Development Council's (RC&D) long-term goal is to collaborate with those involved in the Easter lily industry to generate new plant material that will meet regulatory and economic challenges. RC&D proposes to eliminate the most costly and pesticide intensive 3rd year of lily growth, producing superior commercial sized bulbs in the 2nd year. In the current bulb growing system, 15% of the growers' annual acreage is dedicated to the 1st year scale up crop, 35% is dedicated to the 2nd year yearling crop, and 50% to the 3rd year commercial crop. Only the 3rd year bulbs are currently being marketed. The need addressed by this proposal would be to lower the cost of production and to lower the acreage and pesticide requirements of raising this crop. A 2 year old lily is naturally smaller. The shorter plant will benefit the greenhouse production phase by eliminating the need for growth regulating chemicals and providing the ability to produce more plants per square foot.

Project Apis m. ***$344,124***

Title: Building California Bees for California Specialty Crops

Abstract: Building honey bee populations is accomplished by building food resources. California (CA) lacks sustainable food resources to build and maintain adequate bee populations within the state. Over 1.5 million honey bee colonies are needed to pollinate CA's specialty crops. CA beekeepers supply only one-third of the need. To enhance the production of CA specialty crops and ensure their long-term viability, a sustainable supply of bees is required. Most bees pollinating CA specialty crops come from out-of-state where nutritional resources are more available. Beekeepers incur costs for transportation and preparing loads for CA border inspections; resulting in higher colony rental fees for growers. Keeping more bees in CA would better service the CA specialty crop industry. This project intends to identify, develop, and test low-water-use wildflower and oilseed mixtures as a means of providing sustainable nutritional sources for the building and retention of honey bees in California.

Regents of University of California, Davis ***$398,963***

Title: Life Cycle Assessment of Air Emissions and Greenhouse Gas Offset Potentials in Perennial Fruit and Nut Crops

Abstract: The Regents of the University of California, Davis (UCD) will assess greenhouse gas (GHG) and pollutant emissions in production of California (CA) tree fruit and nut crops and will quantify the potential for alternative orchard practices to offset emissions. UCD will adapt an existing life cycle assessment (LCA) model for almond production and existing tree growth models for peaches and almonds to study life cycle emissions in peach, almond, prune, and walnut production. Field data on orchard biomass accumulation and N2O emissions with different nutrient and irrigation practices will enhance the models. LCA models will quantify potential GHG offsets and pollution tradeoffs from changing practices and using orchard biomass for power generation. Geospatial analysis will assess potential emissions impacts of sourcing biomass for power generation in different growing regions. Outreach efforts will help growers learn about alternative management practices and income streams, and policymakers to learn about net GHG offsets possible from CA orchard acreage.

Regents of University of California, Davis ***$230,078***

Title: Cultivar trait selection to improve tomato water use efficiency and yield under low water availability

Abstract: Adaptation to climate uncertainty is a challenge, especially for water issues that pose risks for the competitiveness of specialty crops. In a Yolo County survey, farmers preferred adaptation practices

for their current specialty crops rather than change to new crops. High irrigation demand by processing tomatoes (~3 acre feet) makes growers very vulnerable to shortages. Tomatoes have great potential to increase Water Use Efficiency (WUE), but this must be achieved with no decrease in yield. A previous University of California, Davis (UCD) study funded under the Specialty Crop Block Grant Program on alternate furrow irrigation showed that a 25% decrease in irrigation volume did not affect yields. This project will 1) survey tomato growers' irrigation concerns for climate change adaptation; 2) identify cultivar traits desirable for new crop management strategies under low irrigation water availability (drip or furrow); and 3) convey the identification of beneficial trait plus management options to stakeholders for improving WUE with no yield decrease.

Regents of University of California, Davis ***$227,102***

Title: Using Targeted High Frequency Nitrogen (N) Applications to Diminish Reactive N Mobilization in Micro-irrigated Perennial Crops and Modeling Applications

Abstract: The proposed project will develop an application for the hydrological model HYDRUS to estimate N mobilization from fertigation and improve N use efficiency (NUE) for perennial crops. Ground monitoring will quantify reactive N mobilized from alternative fertigation using high frequency low N (HFLN) versus conventional practice where higher amounts of N are applied. N fertilizer cost has increased 100% since 2004, and mobilization of reactive N is of primary concern for environmental quality in California. Reactive N includes NO3- to ground water, the greenhouse gas N2O and smog-producing NOx. Increased global competitions for fossil fuels to generate N fertilizers and regulatory mandates that basically tax use of N indicate no future relaxation of increased cost for N use. Thus, adoption of practices to improve NUE improves competitiveness and green marketing opportunities. The results apply to a broad range of California perennial crops fertilized with N using micro-irrigation systems.

Resource Conservation, District of Santa Cruz County ***$310,740***

Title: Performance-Based Conservation Incentives for Berries

Abstract: The Performance-Based Conservation Incentive Project is a joint project of the Resource Conservation District of Santa Cruz County and Driscolls Strawberry Associates. The purpose of this proposal is to help move the project from pilot phase to full implementation by working with a group of 15-25 growers from the berry industry in the Pajaro Valley to: 1) Improve the berry industry's conservation outcomes for water quality and quantity in the Pajaro Valley; 2) Create tools to provide growers with information regarding strategies to meet conservation targets and create new economic opportunities for farmers by quantifying nutrient reduction.

Robert Mondavi Institute for Wine and Food Science ***$396,737***

Title: Sustainable Technologies for Olive Mill Wastewater Management

Abstract: This project will develop integrated approaches to improve water quality, increase water conservation, and accelerate Best Management Practices for olive processing waste water. In September 2011, UC Davis Olive Center assembled a research team of growers, processors, researchers, and manufacturers to address this issue. The team agreed to (1) develop an environmentally and economically viable integrated strategy for the management of olive processing wastewater, and (2) extract high-value nutraceutical products from olive waste. This project provides an integrated approach to olive processing water management, including membrane filtration, drying processes, and resin separation to carry out the strategy identified by the research team. The project will identify and disseminate Best Management Practices to assist olive processors to maximize water conservation, quality and byproduct value of olive oil byproducts.

U.S. Department of Agriculture, Agricultural Research Services ***$258,429***

Title: Infrared Heating for Improved Drying Efficiency and Quality of Almonds and Pistachios

Abstract: California produces about a million tons of almonds and pistachios each year and is ranked as the number one producer of tree nuts in the United States. However, it is estimated that there is about three percent loss due to adverse weather conditions. For almonds, the Almond Board of California (ABC) has expressed an urgent need to develop a quick drying method to remove the moisture caused by rain during harvest season to reduce quality deterioration and improve product safety. For pistachios, before air drying, they are sorted in water bath which cause significant gain in moisture on pistachio surface. Since air drying is low in energy efficiency and drying rate, the aim of this project is to develop a quick drying method using Infrared (IR) for partial drying of almonds and pistachios with reduced energy and drying time, but improved product quality and safety. The drying method can also be extended to drying of other tree nuts and benefit the entire tree nut industry.

University of California Cooperative Extension, San Luis Obispo ***$152,835***

Title: Improving vineyard irrigation efficiency within the Paso Robles Groundwater Basin

Abstract: The full economic impact of the San Luis Obispo County wine grape industry is estimated to be $1.8 billion. The majority of the county winegrape acreage overlies the Paso Robles Groundwater Basin, and relies solely upon it for irrigation. However, the water level in the basin has been declining significantly, threatening the viability of the winegrape economy which depends upon it. Improved irrigation management information will enable growers to maximize their vineyard water use efficiency and thus increase the sustainable use of the groundwater resource. This project will improve water use efficiency by continuing and expanding the UC Cooperative Extension (UCCE) vineyard irrigation study currently underway at 84 cooperating vineyards; by creating bilingual English/Spanish vineyard irrigation management guides; by demonstrating modern irrigation management tools; by validating the Spatial California Irrigation Management Information System (CIMIS) data to improve local irrigation scheduling; and by improving water management for local salinity-affected soils.

Research – Food Safety

Regents of University of California, Davis Center for Produce Safety ***$231,485***

Title: Novel coating systems with sustained release of food antimicrobials to improve safety of cantaloupe

Abstract: The Center for Produce Safety (CPS) will partner with the University of Tennessee to explore novel antimicrobial coating systems. The netted surface of cantaloupes provide harborage sites for pathogens that are protected from washing and sanitizing and can continue to proliferate during storage. Antimicrobial coatings can potentially improve microbial safety and quality of cantaloupes but have not been studied extensively. Application of antimicrobials is complicated because they can be absorbed by components of cantaloupes which could reduce their activity. Sustained release of antimicrobial compounds from coatings is needed to maintain sufficient quantities to inhibit microorganisms on rinds. Researchers propose to study novel antimicrobial coating systems to improve the safety and quality of cantaloupes. The team will use plant-based food antimicrobials, essential oils, to develop systems that can overcome barriers to diffuse into cavities on cantaloupe surfaces and continuously release antimicrobials. The technology will maintain the visual appearance of cantaloupes and reduce moisture loss during storage. Specific research objectives are proposed to develop such technology and characterize physical and antimicrobial properties of coatings, as well as impacts on the quality of cantaloupes. This novel technology can be applied to other melons and fresh produce products for enhanced microbial safety and quality.

Regents of University of California, Davis Center for Produce Safety ***$99,323***

Title: Science-based evaluation of risks associated with wildlife exposure for contamination of irrigation water by *Salmonella*

Abstract: The Center for Produce Safety (CPS) will partner with the University of Florida to explore risks to human health from *Salmonella enterica* from various wildlife reservoirs. Different *Salmonella* strains appear to be associated with different animal host species and represent a range of disease potential in humans. This project will define genetic diversity among strains recovered from wildlife sources and determine their relationship to strains recovered from water and sediment sources in irrigation ponds in a produce production region of the southeastern United States. The disease potential of these strains will be evaluated by integrating various strain collections using polymerase chain reaction-based (PCR) rapid diagnostics, Centers for Disease Control PulseNet fingerprinting analysis, and deoxyribonucleic acid (DNA) sequencing of selected virulence-associated genes. This project will link eventually with a Food and Drug Administration effort to establish genetic markers that define the regional distribution of *Salmonella* for the purpose of source tracking. The results will shed light on wildlife-associated risks, providing science-based data for implementation of agricultural management practices designed to reduce exposure of irrigation water to wildlife. Outcomes may provide more rapid and accurate assessment of food products implicated in outbreaks and prevent broad-based recalls that impact the specialty crop industry.

Regents of University of California, Davis Center for Produce Safety ***217,273***

Title: Avirulent *Salmonella* strains and their use to model behavior of the pathogen in water

Abstract: The Center for Produce Safety (CPS) will partner with the University of Florida to generate suitable surrogates that could be used to safely model persistence of *Salmonella* in the pre- and post-harvest environment. Such surrogates can then be used for field experiments on the effectiveness of different production practices and post-harvest treatments in reducing *Salmonella*. Coliforms and other indicator organisms are poor predictors of behavior of human pathogens (like *Salmonella*, pathogenic

Escherichia coli (*E. coli)* and *Listeria*) in the crop production environment. The research team will develop safe strains of *Salmonella* (derived from isolates recovered from produce-linked outbreaks) suitable for environmental release. These strains will lack virulence genes and plasmids, they will not be able to acquire virulence plasmids, nor carry antibiotic resistance genes. The safety of these strains will be validated in mouse and chick models. To establish whether these safe surrogate strains behave similarly to their virulent parents in the environment, their fitness will be tested under conditions that mimic pre- and post-harvest treatment of produce. Once the biological safety and environmental fitness of these strains is established, detection protocols will be designed to ensure that the surrogate strains do not trigger false-positive responses, yet are easy to identify.

Regents of University of California, Davis Center for Produce Safety ***$280,071***

Title: Genomic elucidation of the physiological state of enteric pathogens on pre-harvest lettuce

Abstract: The Center for Produce Safety will partner with Cornell University to explore how agents of foodborne disease present in the pre-harvest environment can contaminate produce and enter into the food supply. The methods used by these pathogens to survive on pre-harvest produce have the potential to impact survival of the pathogen during post-harvest processing. The purpose of this work is to determine how the enteric pathogens enterohemorrhagic *Escherichia coli* (EHEC) and *Salmonella* respond to the pre-harvest environment by monitoring changes in gene expression under growth conditions representing those occurring during different harvest seasons. Changes in gene expression will be used as an indicator of the physiological state of the pathogen under different conditions. The physiological state of the pathogen plays a significant role in its ability to survive subsequent stresses, such as decontamination treatments and stresses encountered during distribution. Understanding how these pathogens survive on plants is the first step in mitigating the presence of these pathogens in the food supply. Data resulting from this research determining how pre-harvest conditions impact the ability of EHEC and *Salmonella* to survive in the food chain will provide insights for developing effective post-harvest treatments to reduce consumer exposure to these pathogens via produce.

Regents of University of California, Davis Center for Produce Safety ***$194,770***

Title: Practical validation of surface pasteurization of netted melons

Abstract: Since 1990 cantaloupes have been associated with thirty-six outbreaks and pathogenbased recalls recorded in the public health database. Preventive controls are viewed as the best strategy to combat this burden on consumers and public health, the general economy, and the sustainability of this important fruit category. This project will seek to translate wellestablished laboratory findings that support the effectiveness of hot water pasteurization of cantaloupe and other nettedrind melons into a validated and verified process. This research will be conducted in controlled experimental farm and model process studies and at newly constructed, essentially identical, rind pasteurization and disinfection lines in major commercial facilities in California and Arizona across two growing seasons. The outcome of these studies, using a combination of applied environmentally fit and adapted bacterial strains and native indicator bacteria common to all melon production fields, will assist in the design and implementation of preventive controls and postharvest interventions for netted melons. This research data is viewed by a diverse group of stakeholders as vital to establish meaningful and verifiable food safety control measures to regain and enhance consumer confidence so badly shaken by the listeriosis outbreak of 2011.

Regents of University of California, Davis Center for Produce Safety ***$85,758***

Title: Rapid assessment of oxidative stress induced in microbes to evaluate efficacy of sanitizers in wash water

Abstract: The overall goal of this research proposal is to develop a rapid assessment approach to measure antimicrobial efficacy of sanitizers in wash water. The proposed rapid assessment approach is based on a direct measurement of oxidative stress induced in microbes upon exposure to sanitizers and its correlation with reduction in microbial count. The central hypothesis of the proposed research is that the microbes labeled with cell permeable spin probes will provide a rapid assessment of oxidative stress induced by diverse sanitizing agents and the oxidative stress in the microbes is a sensitive indicator of microbial death induced by sanitizers. The results of this research will lead to (1) a novel approach to rapidly assess the antimicrobial efficacy of diverse sanitizers in the presence of organic load based on direct measurement of oxidative stress in microbes; (2) an evaluation of the differences in oxidative stress response of pathogenic and non-pathogenic organisms induced by sanitizers and their correlations with reduction in microbial count; (3) demonstrate that the proposed assessment approach to evaluate antimicrobial activity of wash water does not require measurement of organic load levels in wash water, thus can lead to a direct measurement of antimicrobial efficacy of sanitizers.

Regents of University of California, Davis Center for Produce Safety ***$252,777***

Title: Reducing the risk for transfer of zoonotic foodborne pathogens from domestic and wild animals to vegetable crops in the Southwest desert

Abstract: This study will help the leafy greens produce industry identify domestic and wildlife animal reservoirs of shiga toxin-producing *Escherichia coli* (STEC) and *Salmonella* in the desert southwest growing region (DSGR) of the United States and northern Mexico, a region second only to the central California coast in lettuce production. Additionally, the study will identify management and risk mitigation practices that reduce contamination of leafy greens by these species. Scientific collections and epidemiologic methods will be used to complete three main objectives: 1) Determine if terrestrial and avian wildlife species reported by the local growing community to most frequently intrude upon produce fields in the DSGR, are reservoirs of STEC and *Salmonella*; 2) Determine the extent to which wildlife and livestock share genetically related strains of STEC and *Salmonella* and measure the movement of strains from livestock operations to produce fields by wildlife populations; 3) Extend knowledge to growers of produce contamination prevention gained from the first two objectives. Data from this collaborative study between industry, game management, and academic organizations will fill gaps in knowledge pertaining to animal intrusions and establishing buffer zones between adjacent livestock and produce operations in the desert environment.

Nutrition – Food Security and Healthy Eating

California Foundation for Agriculture in the Classroom ***$203,782***

Title: Tasting California Specialty Crops in the Classroom

Abstract: California Foundation for Agriculture in the Classroom (CFAITC) will provide 500 third through eighth grade classroom teachers with mini-grants of $300 each to purchase California specialty crop fruits and vegetables for monthly taste testing's and nutrition lessons over a six month period. Mini-grant recipients will receive training at CFAITC's annual teacher conference and resources to teach their students about the nutritional benefits of specialty crops. Students will taste the fruits and vegetables and participate in engaging lessons highlighting California specialty crops, easy-to-prepare recipes, and nutritional information. Recipes will be sent home with the students for parents and guardians to use. The specialty crop lessons and resources will be made available through a new website page devoted solely to California specialty crops on CFAITC's website. Pre-service educators will receive information about the lessons through CFAITC's University Student Teacher Program.

City Slicker Farms ***$137,310***

Title: Backyard Garden Program

Abstract: With 11 years of experience, City Slicker Farms has expertly crafted the Backyard Garden Program to build food self-sufficiency by empowering low-income households to grow fresh produce in their own yards for their own table. This program increases awareness of, access to, and consumption of California specialty crops for West Oakland residents and their families. In addition, since 2008, City Slicker Farms has partnered with First 5 Alameda County to expand the reach to childcare centers - working with teachers and students (0-5 years old). Each participant is partnered with a mentor to support the family or childcare center for two years. Mentors provide technical assistance with growing specialty crops and bring needed supplies (e.g. compost and plants). Backyard Gardeners are responsible for maintaining their gardens. Each year, City Slicker Farms works with over 125 families and childcare centers (representing over 1,400 individuals of all ages), and prioritize working with low-income people.

Ecology Center ***$200,000***

Title: Ecology Center Nutrition Food and Farming Policy Program

Abstract: The Ecology Center's (EC) Nutrition, Food, and Farming Policy (NFFP) programs are a comprehensive farm-to-fork continuum that improves nutrition by increasing access to and consumption of California Specialty Crops (CSCs). Specialty Crop farmers struggle with high production costs and losses due to perish ability that increase the farther the CSCs are shipped. Industrial scale cooling, packing, and distribution houses take the lion's share of profits out of farming communities, making direct sales to local shoppers a critical avenue for many small farmers. The Ecology Center sees this as a win-win opportunity to drive revenue to CSC growers by directly connecting farmers with new shoppers for the benefit of all. However, making that connection work is complex. Challenges of convenience, familiarity, affordability, infrastructure, policy, and preference must all be addressed.

Fresh Approach ***$392,810***

Title: Veggie Rx

Abstract: VeggieRx gives low-income families in weight management and diabetes clinics prescription vouchers to purchase fruits and vegetables at local farmers' markets. During at least 8 visits over 4 months, clinic staffs assist nutrition education and monitor health indicators such as blood pressure and Body Mass Index (BMI). Fresh Approach then collects health data from the clinics and voucher

redemption data from the farmers' markets to measure the correlation between produce consumption and health improvements. In 2011, Fresh Approach piloted VeggieRx at a clinic and results were promising. VeggieRx decreases barriers to accessing and using fresh fruits and vegetables and encourages the development of healthy shopping and eating patterns which will encourage the long-term purchase and consumption of specialty crops.

Friends of Independent Living Services of Northern California ***$400,000***

Title: Cultivating Community Advocates

Abstract: Cultivating Community Advocates (CCA) complements 2011 Specialty Crop Block Grant Program (SCBGP) Project 48. Cultivating a Community Nutritional Health Network (CCNHN) teaches and promotes low-cost consumption, cultivation, preparation, preservation and marketing of Specialty Crops (SCs) and incentivizes Electronic Benefit Transfer (EBT) use at Farmers Markets (FMs). CCA increases food security and the SC economy by improving the capacity and sustainability of CCNHN and other projects promoting nutritional/agricultural literacy by reaching into underserved communities for whom access to such resources is a significant barrier. CCA will increase access-challenged residents' participation in—and skill-implementation beyond—CCNHN workshops and other farm-to-fork educational activities. CCA trains advocates to serve as bridges into communities (disabled, homeless, once-incarcerated, and English-limited), whose cultural, lingual, systemic, cognitive or physical access to such programs requires unique facilitation.

Healthy Eating Lifestyle Principles ***$281,532***

Title: Best Buds

Abstract: Best Buds (BB) will be a year round multi-faceted nutrition education program promoting healthy eating, while combating the obesity epidemic by empowering participants with knowledge necessary to make healthy food choices and increase their consumption of California fresh fruits and vegetables. Through after school and community activities on nutrition, healthy eating, farming and positive lifestyle values, participants from elementary aged children to adults will learn the value of good nutrition and come away with life-long skills that will benefit their health and well-being both now and in the future. BB will expand existing afterschool and parent nutrition education classes and projects thereby reaching more people throughout the county and in particular the Salinas Valley. BB brings valuable nutrition education that is lacking in elementary schools and provides a venue for adults to receive practical and life-changing information they would otherwise not receive.

Napa County Agriculture in the Classroom ***$252,148***

Title: Agriculture in the Classroom Harvest of the Month Program

Abstract: This project will implement the Network for a Healthy California Farm to School "Harvest of the Month" (HOTM) program in Napa County. Working with the Napa Valley Unified School District (NVUSD) Food Service and Sodexo food services, locally grown fruits and vegetables will be provided to school cafeterias. "Harvest of the Month" also will utilize template resources to provide families and teachers with newsletters that provide nutritional information and healthy recipes about local produce. Students will learn about agriculture and benefit from improved nutrition from meals provided by the school district's food service program.

People United for a Better Life in Oakland (PUEBLO) ***$114,675***

Title: Building vertically-integrated, community-owned fresh foods enterprise networks

Abstract: In building the socially equitable, ecologically restorative food systems which the future societal health depends on, the path to ensuring long-term sustainability involves relationships between land, producer, and consumer. To achieve results in the low-income urban areas most impacted by gaps in the current food systems, the growth of new networks will have to be driven by entrepreneurs who are deeply rooted in these communities. In addition, the ownership entities will have to achieve economic viability while upholding missions of social and ecological benefit. Through existing partnerships with public landholding agencies, career training/education programs, and resident-owned businesses, People United for a Better Life in Oakland (PUEBLO) and allies will build an integrated network of specialty crops production, distribution/retail, enterprise development/training, and education/marketing programs, creating a foundation for long-term food security in Oakland's most vulnerable neighborhoods.

Sierra Nevada Memorial Hospital Foundation ***$303,043***

Title: Real kids, Real food Farm to School Program

Abstract: The mission of Live Healthy Nevada County Food and Nutrition Action Committee (LHNC FNAC) is to educate, inspire and connect Western Nevada County families to fresh, local, seasonal food. The project would support a replication of a pilot farm to school program throughout the county and would build capacity in the following pilot programs: field trips to local farms; using seasonal, local crops for Harvest of the Month Education; cooking classes with seasonal harvest; hands on experiential learning using school or community gardens; Farm Docent/Garden Docent training; garden stands to improve fresh food access at school; nutrition based enrichment programs; and student engagement in established community gleaning program. A farm to school coordinator serving K-8 students in Nevada County would implement existing farm to school pilot programs and measure results of increased awareness and consumption of fresh, local, seasonal food.

Stanislaus Multi-Cultural Community Health Coalition West Modesto Kennedy Neighborhood Collaborative ***$376,232***

Title: Vine and Branches Community Supported Agriculture

Abstract: The project, Community Supported Agriculture (CSA), is designed to provide access to affordable fresh fruits and vegetables to low-income individuals residing, working or attending church in West Modesto. A 2007 interview conducted in West Modesto identified a lack of neighborhood stores with fresh affordable produce in close proximity as a barrier to healthy eating. The CSA will operate as one "prong" of a larger, multifaceted effort comprised of (1) partnering with local farmers; (2) expansion of farming currently provided; (3) establishment of a community garden and; (4) expansion of the local Farmers' Market which is held one day a week, between June-October. This project will meet the food and nutritious needs of low-income individuals and families; provide access to quality affordable foods; and promote partnerships and provide community education on healthy eating practices. The CSA, initially supported by grants, will become sustainable through revenue generation.

Trust for Conservation Innovation ***$394,124***

Title: California Farmers Market Consortium (CFMC)

Abstract: The California Farmers Market Consortium (CFMC) will continue to promote the sales of California grown Specialty Crops (SC) at 115 farmers markets in 20 counties by increasing EBT access at direct marketing venues and diversifying marketing outlets for these farmers. Specialty crop farmers will be introduced to other direct marketing opportunities to connect to buyers from neighborhood grocery

stores, local restaurants, and aging and daycare centers. The project will connect partners to statewide food advisory committees to increase sales of SC by low-income populations and those in less food secure communities.

Western Growers Foundation ***$105,000***

Title: Child care/Pre-school Fruit and Vegetable Gardens

Abstract: Western Growers Foundation (WGF) will work with the California Department of Education (CDE) to provide $1,000 to 100 child care/pre-school sites. These competitive grants will be applied for through their Child Care Centers and awarded to pre-school sites for garden equipment, supplies, and professional development. This funding supports Garden-enhanced Nutrition Education (GENE). Through these gardens, California's youngest students are provided opportunities for experiential nutrition education through planting, harvesting, and eating fruits and vegetables. Two recent studies of California child care agencies reveal servings of fruit and vegetables are well below recommended levels. GENE for Pre-school Children Grants impacts: nutrition education related to fruit and vegetables as food choices for pre-school children; the foods served at their homes; and California's specialty crops served to pre-school children in the U.S. Department of Agriculture’s (USDA) Child Care Food Program.

Yolo County ***$399,930***

Title: Yolo County Farm-to-School Planning and Implementation

Abstract: Yolo County is a pilot to provide California county agricultural commissioner’s and school food service directors with a set of 'tools' to deliver a "California Grown" School Lunch reflecting the specialty crops of the region. The project connects school districts countywide with the food and farming community through (1) a countywide website describing and highlighting available crops, (2) sample seasonal menus and recipes naming California Specialty Crops, (3) professional cooking classes with school food services about how to incorporate these crops into lunch menus (e.g. salad bars and scratch cooking), and (4) farmer training about school food service needs and how to meet them. The template, provided to all California counties, will include 40 seasonal recipes integrating California Specialty Crops, sample seasonal lunch menus, a California seasonality chart, and suggested education techniques for professional development of school food service personnel.

Marketing – International Trade, and Market Enhancement and Promotion

California Apple Commission ***$53,680***

Title: Economic impact analysis of the removal of the starch-iodine requirement for Granny Smith apples

Abstract: In June 2011, at the request of the California Apple Commission (CAC), the State of CA removed the Granny Smith (GS) Maturity Standard. This standard, in place since 1992, stated that CA GS growers were not allowed to harvest the apple until the apple reached a 2.5 Starch-Iodine maturity reading. By comparing previous GS data to 2011 and 2012 seasons, this grant will quantify the amount of revenue earned due to the removal of the GS standard. The main question is: Did the removal of the standard have a positive or negative impact on the California GS market? In addition, if the removal of the standard was negative should it be reinstated and at what Starch-Iodine level?

California Cantaloupe Advisory Board ***$294,000***

Title: Rebuilding Consumer Confidence in California Cantaloupes

Abstract: A 2011 outbreak of listeria associated with cantaloupes produced on one farm in Colorado that resulted in the death of at least 30 people has, understandably, impacted the confidence consumers have in buying and eating cantaloupes from any growing area. Over the past 20 years, the California Cantaloupe Advisory Board (CCAB) has invested significantly in research to enhance growing and packing practices that will ensure a safe product. These efforts are ongoing and are being expanded. The project seeks to educate and inform consumers of all that is being done by the California cantaloupe industry to protect public health. The outreach will be conducted utilizing Internet and other new media vehicles to encourage sales and consumption of California cantaloupe and alleviate consumer concerns about the safety of cantaloupes from California.

California Cling Peach Board ***$291,983***

Title: Promoting Healthy Fruits to Safeguard California's Peach and Apricot Industries

Abstract: Peach and apricot imports are growing at the expense of California (CA) growers. Research provided by the CA Canning Peach Association shows U.S. canned peach sales has declined 16% in 10 years; processors also report declines for apricots. 18% of canned peaches sold in the US are imported; this percent is growing, as is the case for apricots. As sales of CA canned fruit declines, orchards are pulled; many are replanted in other orchard crops, taking years to produce. If domestic sales do not increase, growers will continue losing contracts and CA may lose much of its fruit canning industry. The peach/apricot industries seek to promote the taste/health benefits of CA canned peaches/apricots and to combat misperceptions about the nutritional benefits of canned fruit. Steps include evaluation of existing research; focus groups; evaluation of communication platforms; online surveys; in-store promotions; and print, TV, and/or social media campaigns depending on the research findings.

California Olive Oil Council ***$386,300***

Title: Building Markets for California's Fastest Growing Specialty Crop Industry

Abstract: A University of California (UC) study reported 28,500 acres of oil olives as of 2010, twice the 2007 acreage, with expected plantings of 5,000 acres/year through 2020. Markets must be developed for this growing production. U.S. consumption has grown from 30 million to 70 million gallons in 20 years but 99% is imported. A second 2010 UC study found 69% of imported "extra virgin" olive oil did not meet the standard, an opportunity to increase market share for quality California oil. While the need to develop markets for this growing California olive production, nearly all California growers/oil producers are small & family-owned and resources are meager compared to the imports. Efforts to develop markets

for California olive oil include events for key influencers (e.g., media, blogs, chefs); trade shows; marketing materials for events/shows; electronic and print advertising; website upgrades; and social media training for California oil producers.

Center for International Trade Development, Fresno ***$398,252***

Title: Export Development of California Specialty Crops

Abstract: The Fresno Center for International Trade Development (CITD), working together with industry stakeholders, will address the following identified needs of California's specialty crop industries through customized training and counseling: 1) export training, counseling and assistance for specialty crop producers; 2) greater export readiness and increased trade awareness; 3) breaking down barriers facing future export markets and the high cost of developing these markets; and 4) the inability to locate buyers, distributors and importers. Utilizing experience in training new exporters, combined with connections throughout California's agricultural industry, CITD will conduct a program that develops new exporters of specialty crops, while increasing the skill level of both current and new to export companies, along with activities designed to introduce these new exporters to foreign markets through outbound and inbound trade missions.

El Dorado Winery Association ***$179,000***

Title: El Dorado Winery Association Education & Public Relations Campaign

Abstract: The El Dorado Winery Association (EDWA) Education & Public Relations Campaign will educate media, trade and consumers about the wines and 90 wineries of the growing El Dorado American Viticultural Area (AVA), a sub-appellation of the Sierra Foothills AVA. The campaign will: 1. Strengthen marketing data and identify market growth potential for EDWA wines. 2. Enhance EDWA website with technology to facilitate key audience access and create core educational tools that communicate the uniqueness of the EDWA terroir characterized by high elevation and complex topography. 3. Create awareness of the area's wine industry with a year-round communications plan, social media platform to engage followers, plus media and wine buyer familiarization trips to EDWA. 4. Take EDWA story to the marketplace with brand-building seminars and tastings for media and trade in key markets. 5. Leverage marketing plans and work with tourism partners to grow local businesses traffic and sales of EDWA wine.

Lake County Winegrape Commission ***$80,405***

Title: Sauvignon Blanc Advocacy Group - Summertime in a Glass (SIAG)

Abstract: This project is to provide funding assistance to an advocacy organization, Summertime in a Glass (SIAG), for the Sauvignon Blanc varietal. The purpose of the organization is to raise awareness and educate both the consumer and wine industry about this key winegrape. Funding will support several critical activities for the group, which has been founded in partnership with the Lake County Winegrape Commission. Similar to other food and agriculture based advocacy groups, the SIAG campaign, educational activities, public relations and informational content are designed to promote the varietal in the marketplace. It also seeks to assist growers, wineries and others in the industry to share knowledge and best practices. Through workshops, web-based and social media, and creative partnership building, SIAG will present a range of topics and provide educational and information resources to key audiences. The branded campaign will aggressively pursue media coverage and other similar public relations efforts.

Sonoma County Winegrape Commission, Local District 3 ***$378,881***

Title: Branding Sonoma County Wines

Abstract: Sonoma County wines draw solid price premiums due to their quality and research shows 68% of wine consumers associate Sonoma with quality wine. All Sonoma American Viticulture Area (AVA) labels were recently required to include "Sonoma County," providing a unique chance to market and promote this highly valued name uniformly, and to build brand value for Sonoma County wines. This will be accomplished by local/regional/national promotional events, online & print ads, create an online wine locator for consumers to locate and purchase wines direct, and conduct on/off sale programs.

Sunsweet Growers, Inc ***$350,000***

Title: Increasing Grower Returns by Marketing Phosphate Substitute for Food Processing

Abstract: Approximately 50% of U.S. poultry is treated with phosphates to preserve moisture; phosphates ultimately end up in wastewater. A prune-based substitute provides the same benefits at similar costs. Prune-treated poultry has no chemical aftertaste and can be labeled "natural". This project includes: Commercial chefs conducting onsite demonstrations, comparing prune-treated poultry to phosphate-treated poultry, working with technical staff at poultry suppliers/users, demonstrations at four key trade shows by chefs and sales consultant, a Public Relations/trade ad campaign and an informational website. Replacing just 10% of phosphates would bring $16+ million in sales, $4.3 million in additional grower returns over 3 years.

Research – Plant Health and Pest Challenges

California Department of Food and Agriculture ***$303,044***

Title: Host Range Testing of the Olive Psylla Parasitoid

Abstract: Olive psylla was first reported in California in 2007. It attacks only olive trees and was found at multiple sites in San Diego and Orange counties. It has since spread to Riverside and Los Angeles Counties, and one private home in Monterey County. Based on its distribution in southern Europe, this pest has the potential to spread throughout most of the state's olive growing regions. The psylla attacks flower buds and has been reported reducing up to 60% of olive yields in the western Mediterranean. CA Department of Food and Agriculture (CDFA) recently collected the most important parasitoid attacking olive psylla in southern Europe. CDFA has now had Psyllaephagous euphyllurae (Encyrtidae) in culture for over 1.5 years. The focus of this project is to conduct host range tests needed to obtain a permit to release this parasitoid into commercial olive trees. Since olive psylla attacks flower buds, permanent populations of this new natural enemy have the potential to permanently reduce numbers of olive psylla and increase yields.

Regents of the University of California, Davis ***$187,055***

Title: Sensing Method for Rapid, Non-destructive, Reliable Detection of Aflatoxin in Almonds

Abstract: The occurrence of aflatoxin (AF; a carcinogenic substance) in almonds, beyond a permissible safe limit (20 ppb in USA, 10 ppb in the EU) is a concern for its trade, particularly to export markets. Detection of AF infested almonds in California is currently performed by chemical analysis on a random sample taken from a lot. However, the existing destructive method is unreliable as AF distribution in the lot is highly heterogeneous as AFs are often concentrated in very small portion of the lot and increased sampling is costly using this method. Studies in other commodities have shown that AF contamination results in chemical and textural changes that can be sensed by changes in their optical properties. These methods can reliably detect AF in corn, Brazil nut, chestnut, and hazelnut. The Regents of the University of California, Davis (UCD) propose to develop a rapid, non-destructive optical sensor for AF contamination in almond as a management tool for reducing fungal contamination, and promoting delivery of high quality almonds.

Regents of University of California, Davis ***$124,874***

Title: Developing Integrated Pest Management Programs in Mint Emphasizing Biopesticides to Improve Crop Profitability and Sustainability

Abstract: In California (CA), 5,000 acres of mint are grown in the northeastern counties of Shasta, Lassen, and Siskiyou valued at $5-7 million annually. This specialty crop is grown for herbal tea and its essential oils, used in personal care products and confectionary flavoring. Two spotted spider mite and mint root borer and cutworm larvae attack mint. Damage results in decreased oil yield and quality and reduced productive expectancy of mint stands. These pests are the target of considerable insecticide use which is potential problematic in these environmentally sensitive areas. Botanical and Bacillus thuringiensis (Bt)-based biopesticides have several favorable characteristics and can effectively control arthropods. However, these are underutilized in current mint integrated pest management (IPM) programs. The objective of project is to develop biopesticide-based IPM programs to control key arthropod pests on mint thus improving the sustainability and profitability of CA mint production.

Regents of University of California, Riverside ***$245,938***

Title: Developing a management plan for the Asian citrus psyllid in retail nurseries

Abstract: The Asian citrus psyllid (Diaphorina citri; ACP), a vector of the pathogen that causes Huanglongbing (HLB) disease, is one of the most significant pests of California citrus. Areas where both the vector and disease have invaded, such as Florida and Brazil, have suffered devastating losses to their citrus industries. The psyllid arrived in California in 2008 and the pathogen is rapidly spreading northward in Mexico, threatening citrus in California. In Florida, retail nurseries were responsible for rapid spread of both ACP and HLB. To avoid this situation in California, a well-defined ACP management plan for nurseries is needed. The proposed project will target ACP in retail nurseries through monitoring, evaluation of chemical control effectiveness, evaluation of nursery practices, and extension education to nursery employees. The results of this work are of value to retail and production nurseries, nearby commercial citrus and residents, and state regulators.

Regents of University of California, Riverside ***$232,788***

Title: Develop management strategies by investigating the mechanisms of pathogenesis and natural defense responses of citrus greening (HLB)

Abstract: Huanglongbing (HLB) is one of the most devastating diseases of citrus. So far, no cure for HLB has been found and the mechanisms of its pathogenesis and host responses are hardly known. Plant immunity is regulated by small RNAs and regulatory genes. Preliminary data revealed induction of miRNA399 in response to HLB, suggesting phosphorus deficiency in HLB plants. University of California, Riverside (UCR) proposes to test various solutions that can alleviate HLB symptoms. Recent screening of citrus species discovered that trifoliate orange (P. trifoliata) and some of its hybrids are among the best for HLB resistance/tolerance. UCR will perform comparative analysis of small RNAs and mRNAs from tolerant US-942 (C. reticulata x P. trifoliata) and susceptible Cleopatra (C. reticulata), and identify components that regulate HLB resistance/tolerance. The outcome of this project will help understand the mechanisms of host natural defense responses against HLB, and develop HLB control strategies and HLB tolerant/resistant varieties.

Regents of University of California, Riverside ***$384,706***

Title: Development of a biological control agent for snail and slug pests of nursery plants in California

Abstract: Snails and slugs are among the most important pests attacking California specialty crops such as nursery plants. Current control options are impractical for large areas or cause damaging non-target effects. There is an urgent need for an alternative strategy such as bio control. In this project, pest gastropods collected in California nurseries will be screened for arthropod and nematode natural enemies. Since European species comprise the main element of this pest fauna, parasitoids of key species will be collected in Europe. Host acceptability, specificity and rearing potential of the most appropriate natural enemies will be determined and the bio control potential of the most efficacious agents will be tested in preliminary release trials in quarantine. Field release trials will take place with the most efficacious and safe agent with the aim of providing an agent for use in California nurseries. This agent will increase the competitiveness of the state's nursery industry.

U.S. Dept. of Agriculture, Agricultural Research Service ***$353,560***

Title: Improved diagnostics for Phytophthora plant pathogens important to California Agriculture

Abstract: Plant pathogens in the genus Phytophthora can have a significant impact on a wide range of California specialty crops either by their direct effect on reducing plant yield or indirectly with regulatory

restrictions on the movement/shipment of plant material intended to prevent pathogen introduction or spread. Current detection techniques do not adequately fulfill the need for sensitive, accurate, rapid and cost effective detection of these pathogens. This proposal will address this by expanding a current research project on molecular detection of Phytophthora spp. using real time Polymerase Chain Reaction (PCR) to include next generation techniques that will require less technological sophistication and expense to run. The California Department of Food and Agriculture (CDFA), Plant Pest Diagnostic Center will be a partner in this project to allow validation of the techniques with real-world plant samples and ensure technology transfer. Techniques and supporting data will also be posted on a website to facilitate technology transfer to a wider audience.

U.S. Dept. of Agriculture, Agricultural Research Service ***$129,000***

Title: Identification and development of Olive Knot Resistant olive cultivars for commercial production in California

Abstract: Olive knot disease caused by the bacterium Pseudomonas savastanoi pv. savastanoi causes significant losses to olive production in California where disease severity is greatest in the northern part of the state where higher rainfall promotes disease development. Olive knot disease is increasingly more important due to increased plantings of susceptible cultivars and the introduction of high-density olive plantings combined with mechanized cultural practices. All these activities dramatically enhance disease development. Currently there are limited disease management strategies which leave the State's olive crop vulnerable. One of the most cost effective disease control strategies for any plant disease is the identification and use of disease resistant host genotypes. This project proposes to exploit the olive germ plasm collection to identify olive knot resistant selections which will then be used to develop commercially viable olive knot resistant olive cultivars.

U.S. Dept. of Agriculture, Agricultural Research Service ***$225,019***

Title: Detection and quantification of pathogenic Pythium species in Calla lily soils

Abstract: In Monterey and Santa Cruz counties of California, hybrid calla lilies are planted each year using true seed, which is the start of a 2-year crop. Cut flowers are harvested during the growing season and the rhizomes are harvested following the second season. The wholesale value of this crop has decreased from more than $330 million in 2004 to $286 million in 2010. This is partly due to the susceptibility of the calla lily to soil borne pathogens that limit its production and lower the quality of its rhizome. The primary pathogen is known to be a species of Pythium, however, an effective method for detection and quantification of the pathogen not been developed yet. The goal of this project is to develop effective method(s) for detection and quantification of pathogenic Pythium species. It is anticipated that the method(s) will help growers avoid crop losses due to the pathogens and reduce fumigant applications.

U.S. Dept. of Agriculture, Agricultural Research Service ***$298,648***

Title: Creating New Weed Management Tools for Lettuce and Spinach Production in California

Abstract: California produces about 80% of the lettuce and 70% of the spinach in the U.S., valued at $2.2 billion and $257 million in 2010. Weeds in leafy vegetables increase production costs and reduce yields and quality; sometimes resulting in 100% yield loss. Lettuce and spinach growers in California have one or two key herbicides for each crop, and these old herbicides have low sales volumes but high regulatory costs for registrants to keep selling them. The loss of pronamide registration for leaf lettuce in 2009 has increased production costs by over $200/acre. The U.S. Department of Agriculture, Agricultural Research Service (USDA, ARS) will create sustainable weed management systems by developing herbicide-tolerant lettuce and spinach germ plasm through conventional breeding, which has been done successfully in corn, rice, sunflower, and wheat. This project will provide efficient and much more effective weed

control tools than growers have now, and improve the profitability and sustainability of lettuce and spinach production in California.

U.S. Dept. of Agriculture, Agricultural Research Service, Western Regional Research Center ***$360,459***

Title: Rapid, non-invasive, and early warning detection of mycotoxigenic aspergilli on almonds and pistachios in holding, storage, and transit using hand portable Gas chromatography–mass spectrometry (GC-MS)

Abstract: Aflatoxin contamination of almonds and pistachios results in millions of dollars of lost product annually. Aflatoxins are metabolites produced by Aspergillus flavus and A. parasiticus, ubiquitous fungi of CA tree nut orchards, and represent a grave food safety problem due to their carcinogenic attributes. Current methods of analysis are time consuming, expensive and destructive. An air sampling /probe device will be developed to collect the volatile emissions of nut samples without requiring the destruction of the product and provide results in near real-time. The air sampling method will allow for transfer of the volatile compounds directly to a hand portable GC-MS instrument for onsite analysis. The sophisticated software on the GC-MS instrument will allow for determination of target compounds even in cases where there are other interfering volatiles. The portable GC-MS system will use modified hardware specific for this application and developed under this project proposal.

U.S. Dept. of Agriculture, National Wildlife Research Center ***$125,999***

Title: Assessing increased efficacy of rodenticide baits containing metabolic inhibitors

Abstract: This proposal tests additives to anticoagulant bait formulations for the control of anticoagulant resistant voles. Continued used of anticoagulant rodenticides has resulted in rodent populations that are resistant to anticoagulant compounds. These resistant rodents have increased metabolism of the anticoagulant compounds. The additives are inhibitors of metabolism and therefore make the resistant animals susceptible to anticoagulants again. The palatability of additives will be determined using wild trapped rodents. The efficacy of anticoagulant bait formulations with the additives will be determined. Finally, field studies will be performed to determine field efficacy of new formulations.

U.S. Dept. of Agriculture, National Wildlife Research Center ***$193,166***

Title: Improved diagnostics and quantification assays for Verticillium species important to California Agriculture

Abstract: Members of the fungal genus Verticillium can be particularly devastating for California (CA) specialty crop growers due to their broad host range and ability to survive in the soil for long periods of time. Current techniques for quantifying inoculum in the soil are not optimal for a variety of reasons; including the length of time it takes to get results. The availability of a rapid and accurate molecular technique would improve the ability of growers to evaluate the risk of planting susceptible crops early in the decision making process. To address this need for V. dahliae, an accurate and rapid molecular soil quantification assay was developed and validated with field soil samples. Markers were also developed for detection of several other Verticillium species and data collected to design markers for additional species. This project will complete the work and field validate these markers for soil quantification assays that growers can use to accurately assess the disease risk.