



Project Abstracts

Project 1 California Farm Bureau Federation \$152,250

Project Title: California Invasive Species Advisory Committee (CISAC)

Abstract: The purpose of this project is to strengthen California’s ability to respond to invasive species that damage specialty crops. CISAC will leverage a broad network of experts and stakeholder communities to draft a comprehensive list and strategic plan for the State. CISAC will also develop an outreach plan to increase public awareness of invasive species impacts to specialty crops. After working with state agencies to formalize the list and plans, CISAC will monitor implementation progress and report to the Invasive Species Council of California and the public.

Project 2 The Regents of the University of California, Berkeley \$235,032

Project Title: Olive Fruit Fly: Managing an Ancient Pest in Modern Times

Abstract: This project will continue efforts to release and evaluate these exotic parasitoids in order to improve sustainable table and oil olive management. Table and oil olives are a unique California specialty crop that is now threatened by olive fruit fly (OLF), which invaded the state around 1998. Current management strategies rely on frequent applications of insecticide bait sprays, which increase control costs and have non-target impacts. Moreover, the effectiveness of insecticide-based programs is limited by abandoned and residential olive trees that act as reservoirs for fly populations. For these reasons, classical bio-control programs were initiated in 2003 to introduce more effective natural enemies. Currently, four parasitoid species, which screened via a quarantine process, have been selected for mass production, statewide field release, and evaluation.

Project 3 The Regents of the University of California, Berkeley \$489,628

Project Title: Area Wide Mating Disruption for Vine Mealybug in Grapes

Abstract: The vine mealybug (VMB) is an invasive vineyard pest, ranked first in pest importance by the American Vineyard Foundation (AVF) in 2006. Grapevine leafroll-associated viruses (GLRaV) are a complex of viruses that are severely damaging wine grape production in coastal regions, ranked first in pest importance in the 2008 AVF survey. Vine mealybug is a vector of GLRaV strains. Although university and industry researchers have developed chemical and biological controls for VMB, none have resulted in the exceptionally low 'vector' densities needed to eliminate GLRaV spread. The project will test the area wide application of mating disruption in Napa County. Mating disruption or the use of the sex pheromone to reduce mating, has been shown to reduce VMB populations, and may be an especially effective tool to maintain this pest at low densities.



Project 4 SureHarvest

\$360,413

Project Title: Multi-Commodity Sustainability Programs: Assessment and Implementation

Abstract: This project builds on the successes of the Multi-Commodity Sustainability Practices Program funded in the previous grant cycle which developed a sustainability strategic plan an education and outreach model, and a sustainability practices framework for 10 California Commodity groups. The project will use the education/outreach model and the practices framework to develop self assessment tools for at least 8 commodity groups, convene at least 10 self assessment workshops for each of the commodity groups, and bench mark an agreed upon set of practices and performance metrics for each group. The tools will be developed by a stakeholder committee consisting of producer leaders from each commodity and University and private sector agronomic experts. It will be facilitated by SureHarvest, an organization with extensive experience in designing and carrying out such programs, including the California Sustainable Winegrowing Alliance program.

Project 5 U.S. Department of Agriculture, Agricultural Research Service

\$438,442

Project Title: Development of High Throughput Assay for Rapid and Accurate Detection of Regulated Citrus Pathogens

Abstract: Pathogen detection by real time polymerase chain reaction (qPCR) assay has become a common practice. This project is to develop standardized template preparation using pathogen-infected citrus and amplification of target nucleic acid sequences in high throughput qPCR assays capable of detecting multiple pathogens in a series of single and multiplex assays. Pathogens include, but are not limited to, huanglongbing (HLB; 'C. Liberibacter' spp.), tristeza (Citrus tristeza virus), stubborn (Spiroplasma citri), citrus variegated chlorosis (Xylella fastidiosa), leprosis (Citrus leprosis virus) and citrus viroids. Detection of Asian Citrus Psyllid (ACP) in California has triggered regulatory agencies and the Citrus Research Board to sample and test citrus throughout the state for HLB. Since several pathogens cause symptoms similar to HLB, multiplex assays would be better to assess pathogen status. This project differs from others because actual pathogens will be used as opposed to annotated sequences.

Project 6 Paso Robles Wine Country Alliance

\$243,900

Project Title: Paso Robles Distinct & Different Direct-To-Consumer Marketing Campaign

Abstract: The Paso Robles Distinct & Different direct-to-consumer marketing campaign will grow the market for vintners and growers in the Paso Robles American Viticulture Area by creating awareness about the area's diversity among consumers, trade and media. The campaign will: 1. Strengthen marketing data and build practical tools to benefit more than 200 wineries and 100 independent grape growers, focusing on small emerging brands with education, marketing tools and cost-sharing incentives. 2. Improve awareness among consumers and Millennial Generation with events and new interactive technologies used by regional hospitality partners, vintners and growers. 3. Build awareness of wine, culinary and tourism diversity by inviting



lifestyle media to visit the area, resulting in increased regional and national publicity. 4. Leverage regional marketing programs and work with tourism partners to grow traffic to local businesses that will increase direct-to-consumer sales for the Paso Robles wineries.

Project 7 The Regents of the University of California, Riverside \$339,650

Project Title: Management of Asian Citrus Psyllid in Organic Citrus

Abstract: Asian Citrus Psyllid (ACP) is a serious new agricultural pest because of its ability to vector a bacterium that causes a lethal disease in citrus, huanglongbing (HLB). The purpose of this project is to evaluate the efficacy of organic pesticides for ACP control so science-based control recommendations can be made to organic citrus growers. This bacterium is not known to be established in California. Pesticides are effective at controlling ACP and subsequently reducing disease vector pressure in conventional citrus orchards. However, organically-approved chemical control options for organic citrus growers have not been well studied. Uncertainty over the efficacy of control options provides a major management challenge for organic growers with ACP infestations. Further, uncontrolled ACP populations in organic farms could be important reservoirs that may adversely affect the success of area-wide management programs for ACP in California.

Project 8 U.S. Department of Agriculture, Agricultural Research Services \$327,826

Project Title: Accelerated Development of Pest Resistant Baby Leaf Lettuce Cultivars

Abstract: Baby leaf lettuce is an important and highly valuable California crop, but the varieties used are susceptible to many pests that reduce profits of lettuce producers and packers. The purpose of this project is to reduce or eliminate grower and packing company losses on baby leaf lettuce production from the pests downy mildew, *Xanthomonas campestris* pv. *vitians* (Xcv), and leafminers. One objective is to develop resistant lettuce breeding lines and populations within three years and release these to private seed companies for distribution to growers. This will increase the number of available pest resistant baby leaf varieties, thereby reducing crop losses. Another objective is to generate critically needed information regarding the Xcv-lettuce pathosystem, this will increase the effectiveness of developing new resistant cultivars and lead to improved cultural control measures due to the identification of important inoculum sources.

Project 9 California Apple Commission \$80,000

Project Title: California Granny Smith Maturity Standardization

Abstract: California Granny Smith (G. Smith) apple growers and handlers from several counties have been negatively impacted by the fluctuation of release dates given by county officials and the subjectivity of current starch iodine testing methods. The project will use consumer taste testing, historical G. Smith release dates, and scientific evidence, to provide maturity standardization for the apple industry leading to increased production, trade, and value. The



results of this test will be developed by a stakeholder committee of producer members and a private sector researcher.

Project 10 Western Growers \$481,163

Project Title: California Specialty Crop Communications Coalition Promotional Campaign

Abstract: Building on the communications plan funded under the 2009 SCBGP, the California Specialty Crop Communications Coalition (CSCCC) seeks to create and execute a promotional campaign that communicates the value of the specialty crop industry to the consumer. The CSCCC will utilize a 'free groceries for a year' sweepstakes to drive consumers to the CSCCC website where they can register for the contest and learn more about the benefits the specialty crop industry provides the State. While visiting the website, consumers will have the opportunity to interact with farmers representing CSCCC member specialty crop commodities. By using farmers to communicate the positioning strategy and message concepts developed by the CSCCC, the website will create a stronger sense of affinity between consumers and the farmers who produce their food, as well as generate greater trust and confidence in the specialty crop industry.

Project 11 California Department of Food and Agriculture \$161,408

Project Title: Engaging Social Media - The Voice of California's Specialty Crops

Abstract: This project will engage social media to raise consumer awareness on California specialty crops and the farmers who grow our food. Consumers are increasingly interested in the food supply i.e. how their food is grown and where it is coming from. By telling California's agricultural story through the social media, there is increased visibility, improving consumer willingness to try products and enhancing the overall competitiveness of specialty crops. Specifically this project will highlight specialty crops and farmers through a social media campaign. This campaign will include web videos and blogs, as well as active Facebook and Twitter dialogue. Changing traditional media messaging into a conversation through social media will help local food groups; media and mainstream agriculture tell better stories. The result of this project will be a social media based educational resource that documents the diversity of California's specialty crop industry and its farm innovations, environmental contributions and stewardship.

Project 12 The Regents of the University of California, Davis \$289,233

Project Title: Developing Internet Resources for California Specialty Crops

Abstract: This project will significantly expand and improve the online specialty crop production information now available at the University of California's established Fruit & Nut Research and Information Center website and call-in center. UC Cooperative Extension Farm Advisors, specialists and faculty, cooperating with commodity board members and industry stakeholders, will direct the information resource development. The objective is to support



specialty crop production by having the most current, time critical, data based information organized online in accessible, instructive and interactive formats available with call-in backup. SCBGP funding will support writing, video recording, programming, formatting, evaluating and testing website content, and most importantly, the ability of the Center to obtain ongoing support from the fruit and nut industries.

Project 13 Trust for Conservation Innovation \$498,576

Project Title: Promoting Specialty Crops to Federal Nutrition Benefit Clients

Abstract: The California Healthy Food Access Consortium project is currently supporting efforts in six foodsheds of San Diego, Los Angeles, Fresno, Monterey, Oakland and San Francisco to direct market healthy, sustainably grown local fresh fruits and vegetables to nutritionally vulnerable county citizens. This project builds on a previous project funded under the 2009 SCBGP, with plans to expand to 8 counties adding Sacramento and Santa Clara Counties. The Consortium would encourage the purchase of eligible specialty crops by SNAP, seniors and Women, Infants, and Children (WIC) clients at farmers markets in these foodsheds. The project would leverage SCBGP with additional foundation resources to provide the healthy foods grown by California farmers for direct marketing to improve the nutritional needs of vulnerable people in the designated foodsheds.

Project 14 The Regents of the University of California, Davis \$221,330

Project Title: Development of a Steam Injection System for Control of Replant Disease in Fruit and Nut Orchards without Fumigants

Abstract: Preplant fumigation commonly is used to enhance survival and early tree growth in replanted orchards. Newly planted trees can suffer from an array of biotic and abiotic issues including a host-specific microbial complex, parasitic nematodes, as well as soil physical and chemical problems. Although this problem can be minimized with fumigation and soil disturbance during preparation of the field, the phase out of methyl bromide and regulatory restrictions on other fumigants clearly outline the need for a non-fumigant approach for maintaining orchard productivity and competitiveness. The objective is to develop and optimize a tractor-mounted steam injection auger for soil disinfestations at individual tree sites in tree nut and stone fruit orchards.

Project 15 The Regents of the University of California, Davis \$74,861

Project Title: Monitoring and Management of Mealy Plum and Leaf-Curl Plum Aphids in Prunes Using Sex Pheromones **Abstract:** Mealy plum aphid (MPA) (*Hyalopterus pruni*) and leaf-curl plum aphid (LCPA) (*Brachycaudus helichrysi*) are the primary insect pests affecting California's (CA) dried plum (i.e. prune) crop. California produces about 70% of the world's prunes and over 99% of prunes grown in the US. Spring populations of MPA and LCPA inflict significant damage to prunes by their feeding and production of honeydew. Sex pheromones are used for communication between male and oviparous female aphids only during fall. This fall



mating result in the overwintering eggs that give rise to the damaging Spring populations. Conventional sprays are used in most prune orchards for aphid control, often during dormancy. Dormant sprays present the risk of runoff into surface waters. This project's goal is to use sex pheromones to improve monitoring and provide an alternative control (mating disruption) for MPA and LCPA.

Project 16 Western Growers Foundation \$107,842

Project Title: Garden-Enhanced Nutrition Education Grants for Pre-school

Abstract: Western Growers Foundation will work with the California Department of Education 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. SCBGP 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. Dietary habits begin during the early stages of life. Two recent studies of CA 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 USDA's Child Care Food Program.

Project 17 Buy California Marketing Agreement \$441,343

Project Title: California Grown Grower Profile Campaign

Abstract: This project will conduct a 'California Grown' umbrella marketing effort that will feature growers who are the heart and soul of the California specialty crop industry. The outreach will include securing profiles of growers in a variety of industries and translating their stories to consumers through a mix of consumer marketing tactics. By reading, seeing and hearing the story of California agriculture straight from the grower, it will help to instill pride in California grown products, while also inspiring consumers to do their part by looking for and buying locally grown products. Consumer marketing tactics employed in this campaign will build on previously executed tactics and will include video production, public relations outreach, and creation of a dedicated website and point of purchase promotion.

Project 18 Sunsweet Growers, Inc. \$450,000

Project Title: Expanding Usage and Consumption of Prunes Through Introduction of Healthy, High Fiber Prune Breakfast Bread

Abstract: This project would increase prune sales by introducing them as a key ingredient in a new sliced bread, part of a \$10 billion category that would be a new market for the grower-owners' prunes. The bread's key ingredients are diced prunes, prune powder, and prune concentrate, all made from undersized fruit or byproducts of prune processing with little



alternative value. The project would be to test market prune bread in the US Northwest; a successful test would lead to a future national introduction through the national distribution network. Grant funds would be used for website creation; television, print, radio and online ads; public relations; and in-store signage. The product would use California grown prunes only.

Project 19 California State Beekeepers Association, Inc. \$260,675

Project Title: Improving Forage Resources for Pollinators of California's Specialty Crops

Abstract: Honey bees are required to pollinate 1/3 of the food supply, including \$6 billion in California specialty crops. Yet, the important role of the honey bee in pollination of crops is often undervalued. Bees require a diversity of food sources to maintain health. Increased herbicide use in farming, on highways and along waterways has resulted in reduced habitat and biodiversity. California's prolonged drought has resulted in decreased wildflowers and agricultural land laying fallow thereby not producing flowers or a crop. Wildfires have destroyed natural pollinator habitat. Loss of nectar sources, expansion of single crop acreage and urbanization have further combined to seriously affect available food sources for pollinators. This project will encourage land owners and land managers to produce food resources for pollinators, specifically forage crops for honey bees pollinating California specialty crops.

Project 20 California Foundation for Agriculture in the Classroom \$145,237

Project Title: What's Growin' On? 10th Edition - Focus on Specialty Crops

Abstract: The California Foundation for Agriculture in the Classroom (CFAITC) will develop a 16-page standards-aligned, activity-based newspaper supplement to showcase California specialty crops and improve the public's appreciation of agriculture's value to the health and well-being of all Californians. A 4-page Spanish version of the supplement will also be developed. CFAITC will disseminate the supplements through online availability, offering free classroom sets to California teachers, distributing at educator conferences and trainings and inserting into six California newspapers. This comprehensive outreach plan will provide a unified message to Californians on behalf of all specialty crop farmers and ranchers.

Project 21 The Regents of the University of California, Davis \$81,837

Project Title: Light Brown Apple Moth (LBAM) Mating Disruption in Caneberries

Abstract: LBAM is an invasive pest causing direct losses for caneberry growers in Santa Cruz County. It is also the target for preventative pesticide applications by other berry growers in the quarantine area to avoid infested fruit that would embargo their crop. Hand-applying large numbers of dispensers by ground over broad areas is reported to be effective against LBAM in New Zealand on apples. Although aerial application of LBAM pheromone in California is controversial, ground-applied pheromone could be effective as a control for organic and conventional growers. A replicated and controlled study that was conducted on 120 acre of caneberries in 2009 to evaluate 3 dispenser technologies showed that at a pheromone rate of 25



milligrams per acre, LBAM moths caught in traps were statistically reduced relative to untreated, but they were not completely disrupted. The project will study a series of pheromone rates up to the top Environmental Protection Agency (EPA) registered rates to identify the greatest extent of control that is possible.

Project 22 Brentwood Agricultural Land Trust \$150,960

Project Title: Contra Costa Community - Community Supported Agriculture (CSA)

Abstract: This project will 'scale up' the existing Brentwood-Richmond Farm 2 Table Community Supported Agriculture, increasing CSA membership from 100 families to 500 families. The Contra Costa Community CSA will create new markets for specialty crop farmers while increasing the access to fresh fruits and vegetables for low-income areas of Richmond and the East Bay Area. The project builds on a successful collaboration between the Brentwood Agricultural Land Trust (BALT), the Richmond Children's Foundation and Contra Costa County to develop an innovative distribution model that improves food security by directly linking specialty crop farmers with their urban neighbors. Low income families will continue to receive CSA boxes at a reduced cost that is offset by sponsoring families. The partners will develop a business plan for the 'scaled-up' CSA, identify efficient ways to aggregate and transport source-identified specialty crops from local producers and provide nutrition programs to CSA families.

Project 23 California Sustainable Winegrowing Alliance \$374,250

Project Title: Data-Driven Targeted Education to Speed Adoption of Sustainable Winegrowing Practices

Abstract: The project will develop and implement a data-driven targeted education project to speed adoption of sustainable practices that conserve natural resources and enhance the competitiveness of California wine. In early 2010, California Sustainable Winegrowing Alliance (CSWA) released the 2009 Sustainability Report that provides in-depth analysis on the adoption status of practices associated with 227 criteria from the Code of Sustainable Winegrowing Practices. Responding to market demand, the project builds on CSWA's 'Cycle of Continuous Improvement' that enables growers and vintners to evaluate operations, learn new approaches and innovations, develop action plans for improvement, and implement changes to increase adoption of sustainable practices. Using assessment data supporting the 2009 Report, CSWA will identify key areas in need of improvement in California wine regions and develop targeted education events and materials focused on best practices such as water efficiency, integrated pest management, and other natural resource concerns.

Project 24 Wine Institute \$449,553

Project Title: Scalable Solutions to Reduce Water Use & Salinity in California Winery & Food Processing Cleaning Operations



Abstract: The project will compare and analyze current cleaning and sanitation practices of California wineries and food processors. This information will then be used to help facilities select methods that offer improved environmental performance (e.g., reducing water use, minimizing chemical inputs, reducing entrained salts, reducing the volume and strength of process wastewater, and other factors). Project partners will evaluate conventional, widely used products, as well as more innovative "green" products and approaches; original work on green chemistry options will also be trialed. Results will be shared with California wineries and other specialty crop processors, and will address several of the California Department of Food and Agriculture's priority areas, including water and energy efficiency, water quality, regulatory challenges, and acceleration of Best Management Practices implementation.

Project 25 Department of Pesticide Regulation \$134,140

Project Title: Extending Knowledge of Integrated Pest Management (IPM) for Orchard Crops

Abstract: The California Department of Pesticide Regulation (CDPR) has funded many Pest Management Alliance programs based on the idea of effective suppression of damaging pests and diseases using the safest and most environmentally friendly tactics. CDPR proposes to take the successes achieved in on-going programs and extend them to a broader audience through an attractive and informative website using the concept of the 'story booth'. An example of the story booth concept is portrayed in the 'Saving the Sierra' website: <http://www.savingthesierra.org/>. CDPR proposes to create a website that will feature successful integrated pest management in California orchard crops through a combination of words, images, and voices to extend the message to both agricultural and urban communities, including firsthand accounts by the growers and numerous men and women who work the fields, the scientists that develop and test the ideas, and the field consultants who link growers to the science of agriculture.

Project 26 American Farmland Trust California \$98,199

Project Title: Assessing Grower Needs to Accelerate Adoption of Beneficial Management Practices in Specialty Crops

Abstract: American Farmland Trust will conduct focus groups with growers, commodity groups, private services providers, academics and others with knowledge of specialty crop production to better understand barriers to adoption of Beneficial Management Practices by specialty crop growers and to determine the best strategies for encouraging growers to adopt cost-effective practices that improve the environmental performance of their farming operation. The assessment will focus on irrigation and nutrient management to improve water, air and soil quality in a cost-effective manner. Results of the focus groups will be analyzed and reported with recommendations that identify the methods that will work best for growers. Follow-up group and individual interviews with users of the report will be conducted to measure the effectiveness of the report. Information will be compiled on the types of new programs being implemented, crops and regions targeted, type of delivery mechanisms and effectiveness of the new approaches.



Project 27 Alliance for Food and Farming \$180,000

Project Title: Correcting Misconceptions about Pesticide Residues

Abstract: The project seeks to correct the misconception that some fresh produce items contain excessive amounts of pesticide residues. Claims about unsafe levels of pesticides have been widely reported in the media for the many years, but have largely gone uncontested. Continued media coverage of this misleading information is damaging to producers of California specialty crops and may also have a negative impact on public health. Utilizing sound science backed by a team of nutrition and toxicological experts, the Alliance for Food and Farming will seek to provide the media, the public and various target audiences with information about the safety of fresh fruits and vegetables. The goal is to generate more balanced media reporting and change public perception about the safety of produce when it comes to pesticide residues.

Project 28 SureHarvest \$404,505

Project Title: California Almond Sustainability Program (CASP): Integrating Resource Issues with Beneficial Management Practices (BMP) Implementation

Abstract: The California Almond Sustainability Program (CASP), launched in 2009, educates almond growers & collects information regarding adoption of irrigation & nutrient use Beneficial Management Practices (BMP). Energy & air quality practice information will be included by mid-2010. This project: (1) expands the subjects addressed to include pest management, water quality, soil quality, & ecosystem management; & (2) partners with Community Alliance with Family Farmers extensive Almond Pest Management Alliance network of growers, university researchers, farm advisors, & other industry stakeholders to expand outreach of CASP in the almond growing community. SureHarvest will work collaboratively with key almond grower & industry stakeholders to develop the additional subject modules, coordinate data management for the outreach process, & provide project administration.

Project 29 Valley Fig Growers \$82,000

Project Title: Developing New Fig Products to Increase Grower Returns

Abstract: Well over half the California fig crop goes to low-value bulk paste. This market has been pressured by low-cost Turkish imports, causing California fig-bearing acreage to drop by 52% in ten years. A contract with a food product development firm will be entered into to develop value-added fig paste products that would be difficult for low-cost bulk importers to duplicate. Concept products, or "protocepts," will be created based on research on target consumers and in consideration of current processing capacities. Protocepts will be tested by consumer panels & in-home users for feedback. Protocept finalists will undergo final revisions & ship for final tests & trial sales calls.



Project 30 The Regents of the University of California, Davis \$497,990

Project Title: Building Successful Farm to School Models to Enhance Markets for Specialty Crops

Abstract: Professionals in California's schools and agricultural industry are now generally aware of farm to school practices that can increase availability of fresh fruits and vegetables for school children, but resources, technical assistance, and training are required to develop fully functional programs. The team for this project will work with three committed school districts and their regional partners to (1) expand their procurement of local, seasonal fresh produce; (2) enhance their ability to integrate school food, nutrition education, school gardens and classroom lessons by providing outreach and professional development to food service personnel, teachers, administrators and parent volunteers; and (3) assess changes in food preferences and dietary behaviors of children in participating schools. Children, professionals and regional farmers in focus areas will be directly impacted while developing farm to school models for other districts to emulate.

Project 31 University of California Cooperative Extension \$248,890

Project Title: Best Management Practices for Hybrid Onion Seed Production to Improve Crop Sustainability in California

Abstract: Hybrid onion seed production in California is primarily in Colusa County and the Imperial Valley, on about 2000 acres, and valued at \$12 million annually to growers and \$40 million in retail sales to industry. While clearly a specialty, small acreage crop, onion seed production is important to these local economies with different varieties shipped worldwide. Although acreage harvested has increased by about 50% during the past 5 years, yields (lbs/ac) have declined by about 75% statewide, resulting in millions of dollars in losses (county crop report data). The unpredictable, variable, and declining onion seed yields threaten the viability of this high value specialty crop in our rural areas. University of California Cooperative Extension will develop best management practices for onion seed production in California that will focus on pollination ecology, iris yellow spot virus (newly introduced to California in 2002), and onion thrips control.

Project 32 Center for Land-Based Learning \$500,000

Project Title: Sacramento Valley Beginning Farmer Training and Incubator Program

Abstract: The Sacramento Valley Beginning Farmer Training and Incubator Program will provide the first ever opportunity for a diverse population of beginning farmers in the region to gain valuable training and real experience both "in the classroom" and on the ground. The training program duration, curriculum, cost, and numbers of participants per year will be determined in the first year of the grant, with the assistance of partners Soil Born Farm, Sierra Orchards, Agriculture & Land-Based Training Association, Agricultural Sustainability Institute at the University of California Davis, Western Center for Ag Equipment, Russell Ranch,



California FarmLink, Sacramento Area Council of Governments, and Western Growers, among others. In the 2nd year, creation of an incubator program will provide the opportunity for trainees to gain valuable farming experience utilizing a network of specialty crop incubator sites, technical assistance and support resources (including access to loans and equity-building tools), mentors, and market access, all to successfully prepare them to farm specialty crops in California.

Project 33 Cuties Clementine Cooperative ***\$300,000***

Project Title: Increasing Sales of California Mandarins by Identifying and Preventing Dryness

Abstract: Cuties Clementine Cooperative (CCC) cooperative markets Clementine mandarins grown by 38 California growers, about 75% of California acreage. California acreage has grown 600% in 8 years (20,000 bearing in 2008) with more going in, driven by demand for mandarins as a tasty, healthy snack. However, consumers dislike the high rate of "dryness" in California Clementine mandarins. Research shows that when consumers get dry mandarins they delay future purchases, often until the next crop. CCC will quantify consumer tolerance for dryness via surveys & taste panels. CCC will test ways to identify & prevent dryness during cultivation, packing, & postharvest (e.g., detection using ultrasound, infrared, & MRI testing; prevention tests including review climate data, cooling trials, postharvest analysis). Continued growth/profitability requires the industry to address the dryness in mandarins.

Project 34 California Department of Food and Agriculture ***\$149,944***

Project Title: Bird Depredation to Almonds, Lettuce, Melons and Ginseng

Abstract: In collaboration with scientists from the National Wildlife Research Center, the California Department of Food and Agriculture plans to conduct laboratory efficacy trials of an anthraquinone-based repellent to minimize impacts of wild birds to production of blueberries, lettuce, melons, and ginseng. This research will include lab efficacy trials with American Crows offered treated almonds, horned larks offered treated lettuce seedlings, grackles offered treated melons, and wild turkeys offered treated oats associated with straw coverings used to produce ginseng.

Project 35 Western Growers ***\$461,112***

Project Title: California Specialty Crop Communication Coalition Social Media Outreach Plan

Abstract: The California Specialty Crop Communications Coalition (CSCCC) will create and execute a social media outreach plan. This project will identify where online conversations about the California specialty crop industry are currently taking place, determine what topics are important to consumers, and engage consumers in real-time dialogue designed to educate them about the benefits the industry provides the state. The CSCCC will conduct research on current trends in social media and develop a platform that will present the value of the industry and connect consumers to the source of their food supply. Utilizing the social media platform



developed in this project, the CSCCC will become a trusted source of information for consumers and will aim to transform the relationships developed in the online community into lasting allegiances to the industry.

Project 36 Cachuma Resource Conservation District \$256,226

Project Title: Spanish Strawberry Production Manual and Outreach

Abstract: The project will improve the long-term competitive position of small/medium-acreage strawberry growers by providing technical outreach in Spanish. Growers are facing unprecedented production pressures yet maintaining a critical volume of growers is essential to the long-term viability of statewide strawberry production. Much information exists in English related to strawberry production but appropriate information available in Spanish is minimal. The project will develop a field-ready Spanish Strawberry Production Manual and distribute it to 300 growers, impact 100 growers through 12 workshops, and conduct field visits to 50 growers. The project will facilitate grower access to up-to-date technical information in Spanish to enable growers to effectively address common challenges in strawberry production. Cachuma Resource Conservation District will provide these growers with agricultural outreach and continuing education opportunities that will help to enable them to become sustainable specialty crop producers.

Project 37 The Regents of the University of California, Davis \$137,765

Project Title: Spinosad Resistance in California Olive Fruit Fly (*Bactrocera oleae*) Populations

Abstract: Olive fruit fly (OLF) is the most serious insect pest of cultivated olives worldwide. First detected in 1998, it is now found throughout California. OMRI-approved spinosad (GF-120) bait is the only insecticide used for OLF control in California. Recently, University of California, Davis (UCD) has documented that this exclusive use of spinosad has led to as much as a 13 fold increase in resistance ratios compared with untreated European populations. UCD will survey resistance ratios in OLF populations from California regions not sampled in UCD previous study, select a resistant OLF strain from California as a lab colony that can be used to isolate resistance-related mutations, identify mutations in the acetylcholine receptor subunits that are linked to spinosad resistance, shed light on the resistance mechanism, determine associated genetic markers that can be easily used as a molecular test for assessing frequency of the resistance alleles, and document need for additional control products.

Project 38 California Agricultural Export Council \$294,600

Project Title: California Specialty Crops to Europe

Abstract: California Agricultural Export Council (CAEC) will partner with interested members as well as groups representing California products such as almonds, pistachios, prunes, raisins, walnuts, and wine. California faces fierce competition in Europe; CAEC seeks to leverage "brand California" to grow sales and price premiums. CAEC's "California On Board" project would target travelers on Germany's busiest railway, the Deutsche Bahn, during 3 major events



in March 2012 that jointly draw over 700,000 in a 175 mile radius (Hannover, Dusseldorf, and Berlin) and drive heavy ridership. It is modeled on a successful event coordinated by the California Department of Food & Agriculture in 2002 and includes: ads on in-train television; a California menu option & brochures in 290 dining cars; event tie-ins (space in Wine Institute and CA Travel and Tourism Commission pavilions), and; media and public relation campaigns.

Project 39 Ecology Center \$150,000

Project Title: Ecology Center Nutrition Food and Farming Policy Programs **Abstract:** The Ecology Center's (EC) Nutrition, Food, and Farming Policy (NFFP) programs work directly with residents, farmers, and lawmakers to improve nutrition by increasing consumption of California specialty crops. EC's NFFP programs are: (i) the Berkeley Farmers' Markets, increasing the consumption of California specialty crops by serving over 200 specialty crop growers and 10,000 shoppers each week for over \$3 million a year in farm-to-consumer sales; (ii) the EBT Program, providing Farmers' Markets across the state with the technology and training needed to accept EBT; (iii) the Berkeley Food Policy Council, a city-wide coalition of nonprofits, health service providers, schools, government agencies, and residents, connecting local agriculture with the community through replicable food policies and programs; and (iv) Farm Fresh Choice, promoting the health benefits of California specialty crops to over 36,000 low-income youth and families with nutrition/disease-prevention education, farm stands, tastings, and culturally relevant cooking classes.

Project 40 Center for International Trade, Fresno \$132,950

Project Title: California's Specialty Commodity Opportunity Outlook: Global Analysis and Prioritization of Leading and Emerging Export Market Opportunities for Specialty Commodities

Abstract: The Center for International Trade (CITD) will work with the leading global research firm to the U.S. Department of Agriculture to research, create and circulate an electronic Specialty Commodity Opportunity Outlook that uniformly quantifies and prioritizes export markets for California's top 20 specialty commodities, which represent more than 6 billion of the state's specialty commodity exports. Such a guide does not exist and there is no off-the-shelf report to meet this need. This project helps special commodity groups quickly and effectively quantify and qualify existing and prospective growth opportunities through 2014. It will further assess the relative importance of countries, key trends driving historical and forecast consumption map opportunities globally. It will also support the private/public sector in developing strategic plans and marketing activities that will effectively increase exports of California's specialty commodities. CITD will work with the California Department of Food & Agriculture to circulate this guide online and its availability and use.

Project 41 Sustainable Agriculture Education \$101,313

Project Title: Launching a Cal Ag Almanac: Putting California Specialty Crops on the Map

Abstract: The Cal Ag Almanac will be a syndicated web feed of California Specialty Crop information - what's in season where - for print and online newspapers to feature on their



weather and food pages. The feed will include a map (interactive for websites) with lively crop icons showing the general locations of specialty crop production throughout California during any given week. The feed will also include geocoded crop information provided as a data layer for weather maps, in order to show connections between weather and production. An accompanying brief, 'what's in season' report, will provide additional updates about selected crops. Data will be collected by means of a password-protected interactive website, which will allow specialty crop growers and associations, starting with Buy California, to report crop news by regional location. Data will be distributed as a feed to registered users, starting with the San Francisco Chronicle (print and online) and then expanding to other media outlets.

Project 42 U.S. Department of Agriculture, Agricultural Research Service \$295,218

Project Title: Heat-tolerant Lettuce and Spinach Varieties for Adaptation to Global Warming and Low Land Cost Areas of California

Abstract: Adapting horticulture to global warming and climate change is essential to meet the need of growing population and increasing demand for fruits, vegetables, and other horticultural products. There is an urgent need to mitigate the abiotic stresses through improvement of leafy vegetable crops. The U.S. Department of Agriculture's Agricultural Research Service will screen, study, and identify heat-tolerant lettuce and spinach varieties that can also be grown in low land cost areas of California. This project will help ensure the long-term future, reduce production costs, and improve the profitability and sustainability of lettuce and spinach crops.

Project 43 The Regents of the University of California, Davis \$231,007

Project Title: California Strawberries and Insulin Resistance (IR) in Humans: Combating a Major Risk Factor for Diabetes and Cardiovascular Disease Through Diet

Abstract: A project to evaluate and confirm the role of strawberry in reducing insulin resistance (IR) in humans. Anthocyanin-rich fruits like strawberries are suggested to have favorable effects on human health due to their ability to modulate oxidative-, inflammatory- stress in peripheral and central tissues. Insulin resistance correlates strongly with inflammation. Research has shown that consumption of strawberry along with a meal representing the typical American diet significantly decreased measures of oxidation and inflammation. Follow up work in cell culture suggests that strawberry components interact in the insulin signaling cascade to improve insulin action. Collectively, this research supports the project and hypothesis for testing that polyphenolic compounds derived from strawberry will restore impaired oxidative stress- and inflammatory- mediated insulin signaling resulting in decreased IR and provide a net benefit to chronic disease risk reduction.

Project 44 The Regents of the University of California, Santa Cruz \$220,000

Project Title: Fresh Fruit and Vegetables: A Centerpiece for a Healthy School Environment (FFVCHSE)



Abstract: This project supports expansion of the Fresh Fruit and Vegetables: A Centerpiece for a Healthy School Environment (FFVCHSE) trainings. The team of experts in nutrition, agriculture, and garden-based learning representing California state agencies, the University of California, and other partners around the state have provided training and technical assistance to school personnel and their partners since 2006. The team will utilize a proven and successful FFVCHSE training program to train school personnel and their partners in educational and administrative activities that support the incorporation of more fresh fruits and vegetables in school meals and snacks. The FFVCHSE was developed and piloted by the project team in early 2009 through a USDA Team Nutrition Training Grant. The 2010 California Specialty Crop Grant would allow UC Santa Cruz to sustain and expand the 2009, 2010, and 2011 statewide, two-day, spring and fall FFVCHSE trainings through the summer of 2013.

Project 45 California Associations of Nurseries and Garden Centers \$296,603

Project Title: Unified Production Nursery Systems Approach for Integrated Pest Management (IPM) and Best Management Practices (BMP)

Abstract: Various invasive plant pests and diseases severely impact the ability to compete and increase the cost of business for all nursery segments. California's nursery industry already uses best management practices (BMP) in combination with IPM approaches to exclude and prevent spread of several major pests. Unifying these pest specific systems approaches into a proven methodology and keeping BMP current safeguards nurseries from spreading or transporting pests as nurseries conduct business and ship plants. The combined segments compile, review, validate, integrate and disseminate best grower practices throughout the industry, making it more profitable and sustainable while benefiting crop agriculture and the environment.

Project 46 Ecological Farming Association \$128,987

Project Title: On-Farm Practices to Manage Water Supply and Supply Reliability Risks

Abstract: The California Natural Resources Agency predicts a drying trend throughout California and altered precipitation amounts and patterns, posing a significant risk to California agriculture through loss of water supply and supply reliability. This project will increase the implementation of science-based drought-management best practices among specialty crop growers through technical seminars and field days; partnering with technical experts to develop a curriculum (a slideshow, fact sheets and other materials) that we will deliver to existing producer networks and through online venues; and working with technical support entities to increase funding for and delivery of water management support services. Curriculum will focus on the interplay of cultural practices and irrigation management in mitigation of water supply risks with information about financial and technical support, updates on policy/regulations that affect farm water, and grower input on barriers to adoption of water best management practices.



Project 47 Almond Board

\$304,254

Project Title: Carbon Dynamics of Orchard Floor Applied Chipped Almond Prunings as Influenced by Irrigation Methods, Soil Type, Cover Crop Management and Farm Practices

Abstract: Chipping of annual prunings in almonds rather than burning has increased over recent years due mostly to air quality regulations. Increasingly, this product is applied back to the orchard floor. Soil type, irrigation method, farm management and between-row vegetative cover vary significantly among almond orchards throughout the state and can significantly influence the Carbon (C) affects of applied prunings. Past and ongoing work conducted by Holtz, et al. focused on the influence of chipped tree residue on various parameters in the San Joaquin Valley. The Almond Board will build on this work through a state wide survey of almond production practices, development of a comprehensive C literature review, modeling of soil C and N dynamics and development of a comparison between total C impacts of applied prunings compared with burning. It is hypothesized that an accumulation of soil C will occur in otherwise low organic matter soils and will show C sequestration opportunities and overall soil quality benefits.

Project 48 California Cut Flower Commission

\$74,900

Project Title: California Cut Flower Industry Sustainability Study

Abstract: California is America's best source for high quality cut flowers. When you buy California cut flowers you're buying flowers that implicitly meet the strictest of growing standards, were raised in a world-class growing environment and were probably in the field just 24 - 48 hours ago. However, with intense overseas competition, California flower farms must continually find new ways to differentiate their product beyond quality and freshness. Therefore, the California Cut Flower Commission (CCFC) will demonstrate the environmental benefits of buying California Grown flowers over its competitors. The primary focus of the study will examine CA flower farmers' current sustainability practices and establish a carbon footprint analysis method that compares imported flowers to California Grown flowers. Once the analysis is complete, the CCFC will conduct a comprehensive public relations campaign targeting industry, media and consumers with findings from the study.

Project 49 Buy California Marketing Agreement

\$275,000

Project Title: California Grown Marketing and Public Relations Campaign in Canada

Abstract: This project will create a marketing and public relations campaign in Canada to increase exports of California specialty crops to this market. Activities will focus on strengthening relationships with the media, retail sector, and building top-of-mind consumer awareness of California grown products, emphasizing the important role they play when Canadian products are out-of-season.



Project 50 California Sustainable Winegrowing Alliance \$449,921

Project Title: Field Testing a Carbon Offset and Greenhouse Gas Emissions (GHG) Model for California Wine Grape Growers to Drive Climate Protection and Innovation

Abstract: This project seeks to field test, evaluate and implement a climate protection incentive system incorporating the DeNitrification DeComposition (DNDC) model and practices that improve air quality, reduce emissions, improve carbon sequestration potential, and promote other environmental benefits. A DNDC crop model for wine grapes (currently under development) will be field trialed, leading to the development of well-tested management practices that deliver measurable climate benefits. This project will result in knowledge and tools to help California wine grape growers reduce emissions and increase carbon sequestration, participate in emerging GHG emission reduction markets, and assist in developing incentives for natural resource conservation and sustainable winegrowing. New knowledge and tools for wine grapes will expedite the development of opportunities for table grape and raisin growers and other specialty crop producers, thus extending the benefits to a much larger number of growers and acres.

Project 51 California Kiwifruit Commission \$125,000

Project Title: Development of Market Based Best Practices for California Kiwifruit

Abstract: This project is designed to research and evaluate the potential to reposition and sell California kiwifruit through retail and other channels and improve the profitability and sales of California kiwifruit thus improving grower return and providing industry stabilization.

Project 52 Tulevome \$75,000

Project Title: Woodland Community Garden Project

Abstract: The Woodland Community Garden will have 30 to 60 garden plots on half an acre of land near the city center, public transportation and low income housing. The garden will improve the health of the community in many ways. Native plants and California specialty crop garden plants will create wildlife habitat and increase biodiversity in the urban area. Benefits will also reach beyond the community; gardeners and gardeners families will use less fossil fuel and be active participants in the sustainable farming movement. These people will no longer be passive food consumers with diets dictated by our food system, a system in which a fast-food hamburger is cheaper than a head of lettuce. Similarly, the garden will provide an opportunity for intergenerational and cross-cultural connections, as well as opportunities for recreation, exercise, therapy, and education.

Project 53 California Department of Food and Agriculture \$96,000

Project Title: Host a Plenary Panel on the Essential Role of Specialty Crops in Meeting the Growing Food and Energy Demands of the World. Also Participate in the Sixteenth United Nations (UN) Conference of the Parties (COP) to the Kyoto Protocol



Abstract: Building on the accomplishments made at the first two Governors’ Global Climate Summits in 2009 and 2008, California will host the Governors’ Global Climate Summit 3 at the University of California, Davis (UC Davis) November 15 - 16, 2010. A key feature at the third annual summit will be a plenary panel hosted by the California Department of Food and Agriculture on what the role of agriculture, especially specialty crops, will play in meeting the world's growing food and energy needs. Information from the plenary panel will be essential to the discussions at the United Nations Conference of Parties 16 in Mexico.

Project 54 California Department of Food and Agriculture \$484,271

Project Title: Statewide Specialty Crop Protection Program – Environmental Compliance

Abstract: The purpose of this project will be to prepare a Master Environmental Impact Report (Master EIR) to support the California Department of Food and Agriculture’s statewide program for the protection of specialty crops through the control and eradication of non-native invasive species (invasive or pest). Producers of specialty crops across the state have been, and continue to be, negatively impacted by the ongoing invasion of invasive pests. The project will use the services of an environmental consulting firm to prepare an environmental impact report based on the collection and assessment of the latest scientific data and independent research. The final Master EIR will include five program elements: Public Outreach; Statewide Survey; Containment; Rapid Response; and Research. The grant funds will be used for the Human Health and Ecological Risk Assessment portion of the project.

Project 55 The Regents of the University of California, Center for Produce Safety \$296,368

Project Title: Developing and Validating Practical Strategies to Improve Microbial Safety in Composting Process Control and Handling Practices

Abstract: Compost as soil amendment and organic fertilizer is a major source of nutrients for plant growth. Although the high temperatures generated by microbial activities during active composting can inactivate pathogens, survival or re-growth of foodborne pathogens during the composting process or in finished compost can be problematic for vegetable production. This study uses a systems approach to address pathogen control during the composting process and subsequent storage and handling of finished products and develops and validates some practical strategies which can be readily adopted by composting operators or growers. The partners in this project will validate the thermal inactivation data of E. coli O157:H7 and Salmonella in compost using naturally occurring isolates; optimize and validate the finished compost as physical covering and straw as the base of passive static compost heaps and windrow compost piles; apply the pathogen growth model to determine the potential of finished composts to support the pathogen growth, and investigate the growth, survival, and control of foodborne pathogens in the finished compost. Results from this study will provide practical methods or practices on compost production and handling to eliminate or reduce pathogen contamination of compost, thereby helping the produce industry to grow safe products for human consumption.



Project 56 The Regents of the University of California, Center for Produce Safety \$142,523

Project Title: Evaluation of Amphibians and Reptiles as Potential Reservoirs of Foodborne Pathogens and Risk Reduction to Protect Fresh Produce and the Environment

Abstract: The project will help the leafy greens produce industry determine if wild amphibians (frogs, toads) and reptiles (lizards, snakes) are potential carriers of *E. coli* O157:H7 and *Salmonella* in the central California coast produce production region. The project will identify management practices and prevention strategies that reduce the risk of contamination of leafy greens and nearby waterways by these species. Statistical procedures and epidemiological methods will be used to complete three objectives: 1) determine if wild amphibians and reptiles are reservoirs of *E. coli* O157:H7 and *Salmonella* in the central California coast; 2) identify farm production practices, environmental factors and control strategies that reduce the risk of contamination from amphibian and reptile species in the leafy greens produce growing environment, and 3) extend knowledge of preventing produce contamination by amphibians and reptiles to the produce community. The science-based data from this study will support co-management to promote both food safety and environmental goals in the central California coast. Specifically, the results will improve pre-season and pre-harvest environmental assessments and interventions as required in the Leafy Green Marketing Agreement (LGMA) metrics, in particular those addressing animal intrusions.

Project 57 The Regents of the University of California, Center for Produce Safety \$296,360

Project Title: *Escherichia coli* O157:H7 in Bioaerosols from Cattle Production Areas: Evaluation of Proximity and Airborne Transport on Leafy Green Crop Contamination

Abstract: A clear role for dust or wind in the transport of *Escherichia coli* O157:H7 from cattle to produce crops has not been determined. The research objectives are to: (1) Determine if *E. coli* O157:H7 is transported by dust or wind from cattle production to leafy green crops, and (2) Determine the impacts of environmental conditions and proximity on any dust/wind transmission of *E. coli* O157:H7. In each of two years, spinach will be planted in plots at distances from 60 to 180 meters from a cattle feedlot. Spinach plants will be collected every two weeks and examined for *E. coli* O157:H7 and nonpathogenic *E. coli*. Weather data, including rainfall volumes and intensity, air temperature, wind direction and speed, and relative humidity will be recorded at 15-min intervals by an on-site weather station. Thus, if *E. coli* O157:H7 is found to be transmitted to spinach by dust or wind, the effects of distance and other environmental factors on the transport process can be determined. This information is critical to the produce industry for understanding the risks associated with growing crops in close proximity to cattle production, and for determining safe distances between cattle feedlots and crop production.

Project 58 The Regents of the University of California, Center for Produce Safety \$70,104

Project Title: Rapid Testing of Flume Water Organic Load to Better Assess the Efficacy of Free Chlorine Against *Escherichia coli* O157:H7 During Commercial Lettuce Processing



Abstract: In response to continued outbreaks involving *E. coli* O157:H7 and other bacterial pathogens, the safety of fresh produce has now become a top priority. Although bagged salad mixes and other such products available in supermarkets have been commercially washed multiple times in various chemical sanitizers to minimize the risks from hazardous microorganisms, such practices will not totally ensure end-product safety. As product residues accumulate in the water during processing and reduce the effectiveness of commonly used commercial sanitizers, bacterial contaminants in this water are readily transferred to previously uncontaminated product. The study will explore some of the water quality issues related to chlorine effectiveness with the goal being to identify several easily measureable water related factors (example - the amount of lettuce debris in the water) that can be easily monitored by the industry to increase the effectiveness of chlorinated sanitizers.

Project 59 The Regents of the University of California, Center for Produce Safety \$45,008

Project Title: Non Invasive Imaging Approaches to Evaluate Potential Infusion Of Pathogens During Vacuum Cooling Of Lettuce Leaves and Real Time Dynamics of Microbes on Leaf Tissues as a Function of Moisture Content

Abstract: The research is aimed at developing non-invasive imaging methods to characterize interactions of pathogens with leafy green vegetables and evaluate the potential risk of infiltration/infusion upon vacuum cooling of leafy greens. The project study uses lettuce as a model system to demonstrate the potential of non-invasive imaging methods to detect changes in structure of pathogens both on surface and in side of leafy green vegetables as a function of moisture content. With vacuum processing, effect of different varieties of lettuce, role of process conditions (spray water, vacuum pressure and release rate of vacuum) and differences in laboratory and field inoculated lettuce on localization will be compared using non-invasive imaging methods. Results of this study will provide a comprehensive assessment of potential risks of infiltration during a vacuum cooling process and practical approaches to address the risk factors.

Project 60 The Regents of the University of California, Center for Produce Safety \$169,575

Project Title: Developing Buffer Zone Distances Between Sheep Grazing Operations and Vegetable Crops to Maximize Food Safety

Abstract: Recent outbreaks of human infection with *E. coli* O157:H7 and other bacteria linked to consumption of produce have raised concerns that sheep and other ruminants may elevate pathogen levels within the soil, and have the potential of being transmitted to produce fields via aerosols. Buffer zones between crop production fields and livestock operations are important to prevent potential transmission of pathogens from animals to crops. Currently, there is little information related to appropriate combinations of time and distance between livestock operations and crop systems, particularly in terms of pathogen survival in animal feces, soil, aerosols, and pathogen movements through wind, water or flies. The California Leafy Green Products Handler Marketing Agreement (LGMA) suggests that a distance of 400ft exist between a concentrated animal feeding operation and the edge of a crop and 30ft for grazing



lands/domestic animals, but recognize a lack of science on which to base this recommendation. This research aims to investigate factors associated with the survival of bacterial pathogens from initial deposition as feces, to presence in soil before and after irrigation events, to presence of pathogens in dust generated in fields with active livestock grazing, and investigate the distance which pathogens can be transferred by aerosolized particles.

Project 61 The Regents of the University of California, Center for Produce Safety \$58,554

Project Title: Developing a Program to Educate the Walnut Supply Chain as it Pertains to Product Handling and Safety

Abstract: Walnuts have not been implicated in any food borne illness outbreaks to date. However, recent *Salmonella* outbreaks associated with almonds and more recently pistachios have highlighted the vulnerability of nut crops as potential vectors for food borne pathogens. The California walnut industry has a critical interest in preventing outbreaks associated with walnuts and limiting the scope should there be an outbreak. This project describes the development and implementation of education and training programs specific to the walnut industry, to be delivered to 60+ walnut “handlers” operating in California. The program seeks to bring all walnut handlers up to a common level of knowledge about food safety hazards, processes and programs through a series of on-line educational modules. The modules will cover the basics of Good Agricultural Practices (GAP), Good Manufacturing Practices (GMP), Homeland Security (HMLS), Product Protection and Defense and Safety, Hazard Analysis and Critical Control Point (HACCP), and principals of Trace/Recall. The second part of the program will entail a series of group meetings with handlers to prepare a hazard analysis appropriate for the individual operations. Training and implementation materials will be developed to aid in addressing the identified hazards. Finally, a second series of workshops provide training in developing trace-recall and food security programs.

Project 62 The Regents of the University of California, Center for Produce Safety \$330,541

Project Title: The Likelihood of Cross-Contamination of Head Lettuce by *E. coli* O157:H7, *Salmonella* and Norovirus During Hand Harvest and Recommendations for Glove Sanitizing and Use

Abstract: Mandatory glove use when handling raw produce and the practice of sanitizing gloves with bleach is common despite uncertainty that these practices improve the safety of foods. Here, the impacts of glove use (frequency of changing and glove composition) and sanitation (using bleach and a novel sanitizer developed at the University of Georgia (UGA) on cross-contamination of raw head lettuce by bacterial (*E. coli* O157:H7, *Salmonella*) and viral (norovirus) pathogens during harvest will be investigated. Since build-up (soil and lettuce residue) on gloves likely impacts transfer of pathogens to and from gloves, accumulation of these materials on gloves over time (0.5, 1, 2 and 4 hr) will be quantified for volunteer harvesters wearing either rubber or nitrile gloves. In the lab, natural accumulation will be mimicked on gloves and the likelihood of pathogen transfer to gloves and head lettuce will be investigated. Finally, a novel sanitizer will be evaluated for its efficacy in removing organic material



accumulation and inactivating pathogens on gloves as compared to bleach. This study will provide a scientific basis for making recommendations on glove use and sanitation during harvesting head lettuce and will contribute to improving the safety of fresh produce.

Project 63 The Regents of the University of California, Center for Produce Safety \$56,935

Project Title: Influence of the Pre-Harvest Environment on the Physiological State of *Salmonella* and its Impact on Increased Survival Capability

Abstract: *Salmonella* spp. has been implicated in numerous outbreaks of foodborne illness tied to the consumption of fresh fruits, vegetables, and nuts, seeds and spices. Multistate outbreaks of salmonellosis due to consumption of tomatoes, mangos, melons and raw almonds have highlighted the ability of *Salmonella* to persist in a wide range of pre- and postharvest environments. Exposure to large swings in moisture, temperature, and nutrient levels are expected in these environments. The relative tolerance to these conditions is known differ among strains of *Salmonella*. In addition, some of the environmental stressors may trigger a variety of survival response mechanisms in some strains providing further competitive advantage. While strain dependent survival phenomena have been documented, the mechanism of these differences is not clear. The research seeks to increase our understanding of the environmental factors that trigger survival mechanisms in outbreak-related strains of *Salmonella* and to better elucidate those mechanisms related to desiccation tolerance and environmental persistence. The results will help the produce industry to better interpret *Salmonella*-positive test results and should assist in making informed decisions related to pre and postharvest risks of contamination.