

California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts

CALIFORNIA GROWN PROMOTION

CA GROWN, Farm2Fan

\$1,549,039

Buy California Marketing Agreement (BCMA)

In 2016 and 2017, the Buy California Marketing Agreement refreshed its integrated paid media program, designed to highlight the diversity and uniqueness of "California Grown" specialty crop products. This project will continue the execution of the content campaign, "California's Agricultural Rock Stars," launched during the 2015-16 marketing year with a new focused theme entitled "Farm2Fan." The campaign will continue to pursue the objective to elevate the importance of California's specialty crops and their farmers to rock star status and feature key influential fans of those farmers and their crops. The campaign will highlight the diversity of California's specialty crops and will incorporate a strong call to action to California and national consumers to purchase California specialty crops.

When You Think Figs, Think California Grown: A Campaign to Drive Awareness and Demand for California Grown Figs at Retail

\$449,406

California Fig Advisory Board

The California Fig industry produces 100 percent of United States figs sold commercially. However, imports represent 60 percent of figs sold in the United States. The California fig industry has seen a staggering 189 percent increase in fig imports since 2011, threatening the economic viability of the entire California fig industry. The California fig industry must act quickly to raise awareness, stimulate consumption, and drive sales of California grown figs to ensure a sustainable economic future for all involved in the domestic fig value chain. Leveraging the equity in the California Grown platform is critical to encourage consumers to seek out figs.

Launching "California Grown, San Luis Obispo Coast Grown" to Increase Economic Opportunities for San Luis Obispo Wineries

\$196,455

San Luis Obispo Wine Country Association

San Luis Obispo (SLO) Coast wines are indistinguishable in the marketplace due to limited market access and awareness. San Luis Obispo Wine Country Association (SLOWCA) will launch the "California Grown, SLO Coast Grown" marketing campaign to educate wine consumers in Los Angeles and San Diego, CA and the direct flight market in Phoenix and Scottsdale, AZ about the unique terroir of the SLO Coast region. With increased awareness of SLO Coast wine region, wine sales from SLO Coast producers will increase by 5 percent in target markets and increase awareness of SLO Coast Wines to 10 percent of all California/Arizona wine consumers by grant end. The project will focus on digital marketing efforts coupled with educational videos of winegrape growers featuring "California Grown, SLO Coast Grown" stories behind the vine coupled with participation in consumer wine events in target markets. SLOWCA will work with winegrape growers, California Polytechnic State

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

University, San Luis Obispo, and tourism partners to implement benchmarks to measure marketing efforts.

California Grown Retail Promotions in Japan Featuring California Fresh Cherries and Blueberries \$167,196

California Cherry Board

The California Cherry Board (CCB) and the California Blueberry Commission (CBC) propose conducting a series of California Grown retail promotions in Japan featuring fresh cherries and blueberries. To meet price requirements, Japanese importers have shifted to purchasing lower quality fruits. This has damaged the reputation of California fresh fruit in the market, leading to decreased demand and lower export volumes. By organizing large-scale collaborative promotions directly with Japanese retail outlets, CBC and CCB will increase consumer demand, demonstrating to importers the profitability of high-quality California fresh fruit. Leveraging the California Grown identity, CCB and CBC will highlight the availability of California cherries and blueberries as the first fresh imported fruit of the summer. Sales data will be collected and discussed with the importers, who will be surveyed on their perception of California fruit and interest in increasing purchase volumes next season.

Growing Demand for California Processing Tomatoes: Sharing California's Tomato Farmers' Stories and Tomato Health Benefits \$450,000

Tomato Product Wellness Council

California growers produce more than 98 percent of the United States' processing tomatoes – a tomato variety used in sauce, ketchup, paste, and other products. Approximately 75 percent of all tomatoes consumed in the United States are processing tomatoes. Still, the United States demand for tomatoes is flat and vegetable consumption has declined seven percent since 2009 (Produce for Better Health Foundation). Coupled with declining prices, California's tomato growers need to build back consumer interest and boost profitability to their farms. The Tomato Product Wellness Council which represents California tomato growers/processors seeks to accomplish this with a goal of launching a consumer marketing campaign aimed at millennials and Hispanics, the two demographic groups with strongest purchase potential. Project activities include message development; marketing and public relations campaign; and grower/industry outreach. The project outcome is a conservative sales price increase of two percent by 2020 measured by crop price reports. The support of California Tomato Growers Association and processors help with the success of the project.

Bringing Home Consumer Engagement, Showcasing Specialty Crop Vegetables. Driving Consumer Consumption and Awareness \$448,752

M. Entertainment

The campaign connects consumers to specialty crop producers through the nationally broadcast series, Bringing It Home. These programs will air on PBS and will be integrated into a social media video campaign teaching consumers where specialty vegetable crops are grown, who grows them, where and how to purchase them, and how to use them routinely.

California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts

The five show and video series will create an educational but entertaining experience to ensure consumers adopt new behaviors of demanding and consuming more specialty vegetable crops. The campaign will include farmers' stories and sustainability practices, health benefits, as well as new uses and innovative ways to incorporate these specialty crops into daily life demonstrated by local and national chefs. TRAC media services data will allow the project team to determine program reach and number of viewers. Bringing It Home's historical distribution and market penetration suggest the program can reach upwards of 750,000 viewers.

California Specialty Crop Sales and Media Promotions in Mexico and China

\$449,356

Center for International Trade Development

This project will expand opportunities for specialty crop stakeholders through retail promotions, media events, and trade/consumer educational opportunities in Mexico and China. California specialty crops are premium world products, and exports are on the rise to both Mexico and China. Working in cooperation with California Grown, the Center for International Trade Development will implement project activities to showcase California specialty crops through an intensive in-store promotion campaign and develop new export sales in business-to-business meetings in both Mexico and China, capitalizing on the uniqueness of each market. Promotions will include product sampling and chef demonstrations to focus campaign awareness on specialty crops. Project success will be evaluated by a sales increased from \$4 million to \$6 million and by 50 percent as a result of marketing and/or promotion activities serving 60 California specialty crop suppliers.

Paso Robles Wine in the Sunshine State

\$313,057

Paso Robles Wine Country Alliance

The U.S. is the largest wine consuming nation with favorable import conditions. California must aggressively defend and grow its wine market share. Florida, a good market for California wine, will experience growth by introducing consumers to the fruit-forward and unconventional blended wines of the Paso Robles region. Florida consumption of California grown wine is below the United States average and per capita consumption could grow. The array of Paso Robles' crowd-pleasing wines will convert import wine drinkers to California wine. Paso brands in Florida report good success, but to truly make an impact a much larger presence is needed. Per Gallo research, some consumers think Paso Robles is in Mexico. Therefore education is needed. This program will reach consumers at every touch point: media, retail, restaurants and bars, events, and directly through advertising.

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

MARKET EXPANSION AND ACCESS

Statewide School Educational Effort on the Benefits of Buying California

Grown Canned Fruit

\$220,081

California Cling Peach Board

The proposed project would create a multi-media educational outreach campaign targeted at California School Foodservice Directors to raise awareness of how to comply with the Buy American provision of the National School Lunch Act and encourage increased usage of California Grown canned peaches, pears, and olives by California schools.

*Beyond Lunch: Expanding California Food for California Kids into After-School
Supper and Summer Meals*

\$287,361

Center for Ecoliteracy

The Center for Ecoliteracy, in collaboration with the California Thursdays® Network of 71 school districts committed to serving freshly-prepared meals made with California grown fruits and vegetables, will advance an innovative serving model to increase the procurement, consumption, and awareness of California specialty crops. This project includes three integrated efforts: 1) developing a toolkit of resources for "Shaker Salads" (salads served in clear, recyclable cups) including recipes, training resources, and promotional materials, 2) conducting professional development workshops for nutrition services staff, and 3) creating enrichment activities focused on fruits and vegetables to use in after-school and summer programs. Convenient and engaging, shaker salads are an effective service model that help make enjoying healthy California fruits and vegetables an easy choice for students.

*Growing Demand for Sustainable Sonoma Wine Among Millennial
Consumers*

\$448,708

Sonoma County Local District 3 Winegrape Commission

Sonoma winegrapes will be 100 percent certified sustainable by California Sustainable Winegrowing Alliance by 2019. Millennials, the largest adult demographic and who most value sustainability, are top wine consumers but buy more imports, driving approximately 20 percent import growth in the last four years (U.S. Department of Commerce). To grow demand for sustainable locally produced winegrapes the demand for sustainable Sonoma wine must rise. Representing all 1,800 Sonoma winegrape growers, Sonoma County Winegrape Commission will execute a marketing campaign targeting millennials to boost value of Sonoma wine. Tasks include creating marketing materials, ads, events and media tours reaching trade/influencers/media/consumers, and training growers to market their grapes and wine. The goal is to grow consumer demand for high-value sustainable Sonoma American Viticultural Area wine increasing vintner demand for sustainable local Sonoma grapes, shifting grapes from low-value/price uses, and growing sales dollars by approximately 6 percent by 2019. Outcomes will be measured by crop reports.

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

SIP'ing Sustainably: Increasing Awareness and Sales Through Targeted Marketing of SIP Certified Wines

\$193,617

Vineyard Team

Research shows that sustainability is an important factor in wine buying, but consumers are confused about what sustainable means. Sustainability in Practice (SIP) Certified is a rigorous sustainable vineyard and winery program designed to meet the sustainability demand of consumers. This project bridges the gap between SIP's program and the need to raise awareness and sales of SIP wines. SIP brings value to consumers desiring sustainability. Stage one of the project is a research experiment to determine the best marketing and retail displays to reach consumers. Using the results, Stage two implements a revised marketing strategy for SIP. Baseline numbers from current promotional efforts will be compared to numbers using revised marketing strategies to measure project impact. SIP expects to increase sales by 10 percent and raise awareness among the targeted segment by 50 percent. Utilizing the research to focusing marketing strategies SIP will be more efficient, reach more consumers, grow demand, and improve return on marketing costs.

Ventura County Processing and Aggregation Food Hub for Small-Scale Growers

\$254,602

The Abundant Table

This project brings together multiple stakeholders to formalize and expand an existing food hub pilot project. The demand for locally grown specialty crops has outpaced supply, especially among school districts in Ventura County. The food hub helps bridge the need between specialty crop growers and institutional buyers. The hub is located at McGrath Family Farm, where on-farm processing has occurred for the last nine years in their county approved facility. The food hub will help an additional 14 small-mid scale growers meet this increased demand by aggregating and lightly processing multiple specialty crops. Further, by lightly processing specific specialty crops (i.e., carrots, lettuce, and celery) the hub meets the needs of school districts that want to purchase more specialty crops but do not have the capacity to process them on-site themselves.

Increasing Sales and Awareness of Wine Grape Products in Nevada County

\$246,064

Sierra Vintners

Wine grape sales in Nevada County are the lowest they have been in the last ten years. Sierra Vintners Association (SVA) members representing most of Nevada County's vintners and winegrape growers have also seen declines in sales during recent years. This project intends to increase winegrape sales in Nevada County through a comprehensive marketing and public relations campaign for SVA products targeting Reno, Tahoe, Nevada County, and Placer County; and increase the organizational capacities of SVA and its members through recruitment and training. The intended outcomes by 2020 are: 1) a 10 percent increase in annual sales for SVA products, and 2) increase in consumer awareness and intent to access SVA's products. These outcomes will be measured by: 1) a baseline, midpoint and follow-up

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

comparison of SVA's member's annual sales data, and 2) a baseline and follow-up awareness and intent to access consumer and buyer survey.

*Improving Functional and Biological Properties of Almond Proteins with
Protease- and Glycosidase-Processing* \$416,272

The Regents of the University of California, Davis

This project aims to develop a green extraction technology that produces pre-digested proteins with improved functionality (more soluble, more digestible) and reduced allergenicity. This goal will be achieved through the use of specific enzymes that act on protein and carbohydrates (N-glycans) that might affect the complete digestion of the protein and cause allergenic reactions. Processing conditions will be optimized to extract and fractionate oil, proteins, and carbohydrates from almond extracts for further characterization. This project will also investigate the effects of processing conditions on the biological and functional properties of the extracted compounds. Almond processors will be provided with new methods that have the potential to improve protein functionality and positively impact the overall consumption of almond products.

*Enhance Specialty Crop Markets in Urban Centers Through Direct Sales and
Processing* \$319,649

Mandela MarketPlace

Mandela MarketPlace operates Mandela Foods Distribution (MFD) that sources California specialty crops from farmers within 200 miles of Oakland for distribution into urban communities through a network of small retail and grocery, café, produce stand, and local food enterprises. Mandela seeks support to vertically integrate MFD's wholesale operation to include processing and flash freezing of locally sourced specialty crops for distribution to its local and regional network retailers throughout Alameda County and the Northern California region. Integrating processing for MFD and its regional food hub partners will decrease waste, increase sales, and expand access to California Specialty Crops in urban markets. Adding processed products, such as pre-washed/bagged fruits and vegetables, fruit cups, sliced vegetables, frozen fruits and vegetables will more than double access to specialty crops and income for California specialty crop farmers.

*Village Market Place Food Hub: Increasing Access to California Specialty
Crops and Improving Health in South Central Los Angeles* \$449,947

Community Services Unlimited, Inc.

Consumers in South Central Los Angeles (SCLA) experience diet related diseases due to a lack of access to healthy food, including sustainably grown, local specialty crops. This project will connect this underserved and untapped market to California specialty crops through the expansion of Community Services Unlimited's social enterprise, the Village Market Place (VMP). The VMP has sold locally grown produce through produce stands and a Community Supported Agriculture (CSA) program, and offered wholesale in SCLA for nine years. The new VMP-Food Hub will aggregate California grown produce from multiple producers and sell them

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

through a variety of new and existing channels, including: a retail market, increased number of produce stands and CSA sites, and increased wholesale capacity. Specialty Crop Block Grant funding will support the development of the Food Hub and launch of marketing/education campaign to increase awareness of/demand for California grown specialty crops in SCLA. The project will be evaluated by documenting the growth in specialty crop sales and number of consumers served.

California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts

SPECIALTY CROP NUTRITION EDUCATION

*Provide Research-Based Food Preservation Classes for Specialty Crops
in California*

\$145,691

The Regents of the University of California, Davis

This project targets the Central Sierra Nevada areas not served by existing University of California (UC) Master Food Preserver Programs. It will provide research-based classes to teach consumers how to safely preserve specialty crop produce to use in meals throughout the year. Often home canners rely on internet recipes, blogs, old canning books and family history for their preservation recipes, many of which use out-of-date and potentially unsafe methods. Food Preservation classes for adult and youth will be taught in eight Sierra Nevada counties focusing on specialty crop fruits in year one and vegetables in year two. Class materials will be provided to all UC Master Food Preserver Programs and produce associations for continued consumer education. Live demonstrations and tastings will encourage consumers to purchase additional specialty crops. Project success will be measured by the level of community participation and behavior changes reported through follow-up surveys.

*Engaging Youth in Production, Preparation and Consumption of California
Organic Specialty Crops Through Hands-On Learning*

\$253,958

Ceres Community Project

Ceres Community Project's Youth Program provides a unique and transformative educational experience by engaging youth directly in the production, preparation, and consumption of California grown organic specialty crops. Supplemented by a weekly curriculum, the rolling year-round program is offered to youth at three commercial kitchen sites and two gardens in Sonoma and Marin Counties, and teaches comprehensive nutrition and food preparation skills to youth who voluntarily participate. Some youth are formerly homeless or have been in foster care. One-quarter and three-quarter acre gardens at the Sonoma County locations allow youth to participate in growing organic specialty crops themselves. As a result of their participation, youth increase their consumption of specialty crops by an average of one serving per day, and develop life-long skills in how to access, produce, and prepare specialty crops. The project uses 100 percent organic ingredients, with 60 percent sourced from local producers.

*Information, Tools and Strategies to Integrate Specialty Crops into the Diets
of Children with Avoidant/Restrictive Food Intake Disorder*

\$166,231

Kids Growing Strong

The American Academy of Pediatrics states that selective, avoidant and restrictive eating is a burdensome problem in young children that carries into adulthood. A 2015 study showed abnormal picky eating is common. Twenty percent of 3,433 children screened had Avoidant/Restrictive Food Intake Disorder (ARFID). Recent studies show this number is increasing to as high as 35 percent. Among autistic, attention deficit hyperactivity disorder, and other children with special needs the rate rises to 70 percent. ARFID can lead to malnutrition,

California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts

frequent/chronic illness, negatively impact sleep and behavior and present mealtime challenges for all family members. Strategies not specifically tailored to selective eaters are not effective. Good nutrition that includes abundant amounts of specialty crops is needed to keep children healthy. Parents are searching for guidance. This project will gather a team of clinicians and experts to develop a program of information and practical strategies to increase consumption of specialty crops among the large cohort of young children who are selective eaters.

Cultivating Health Justice Through Specialty Crop Urban Agriculture and Nutrition Education \$394,881

Planting Justice

Planting Justice (PJ) will empower low-income Oakland residents to improve the health of their families, schools, and communities by increasing access to and consumption of healthy, affordable, and culturally relevant specialty crops at school and in the home. With guidance from PJ's diverse team of educators, participants will transform high-impact community spaces into organic, bio-diverse urban gardens growing solely nutrient-dense specialty crops. Nutrition and culinary arts lessons will teach youth and adults to prepare delicious, affordable meals using solely specialty crops. The educators come directly from the communities served, having transcended their own struggles with hunger and poverty to become leaders in the good food movement. Thus, this shared life experience will deepen the opportunity for culturally relevant health mentorships and cultural change that will result in documented behavioral changes related to increases in specialty crops consumption, with third party evaluation.

From Start to Finish: Producing, Preparing, and Preserving California Specialty Crops in the Classroom \$83,259

California Foundation for Agriculture in the Classroom

Specialty crops provide an abundance of nutritious food choices and yet many people are unaware of what they are. Youth nutrition remains a prominent issue in California schools. In addition, teachers face barriers to teaching nutrition and lack resources for nutrition education. California Foundation for Agriculture in the Classroom at LearnAboutAg.org has been providing free agricultural education materials to support educators for 30 years. By developing new curricular resources, students will be introduced to what specialty crops are; their nutritional value; and how to grow, prepare, and preserve them. Through lesson plans, fact sheets, workbooks, and farmer and classroom videos students will gain knowledge of specialty crops and eat them more often. Success of the new resource will be evaluated through pre- and post-surveys, as well as a follow up survey that will demonstrate that students increased their knowledge of and consumption of specialty crops.

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

*Improving Student Nutrition through Increased Education and Consumption
of California Specialty Crops*

\$429,716

Oxnard Union High School District

Farm to School (F2S) has proven to increase student consumption of fruits and vegetables, and generate a 5 percent increase in revenue for local farmers. The National F2S Network states that student consumption of produce increased by one serving daily, while cafeterias can expect a 9 percent increase in student participation overall. The project's main goal is to teach students that eating more specialty crops will lead to better nutrition, which contributes to good health and, therefore, academic success. In addition, this project aims to teach students about careers in agriculture while improving leadership and professional skills.

San Francisco Schools, Make Half Your Plate California Grown!

\$253,306

San Francisco Unified School District

San Francisco Unified School District's project, "Make Half Your Plate California Grown," will increase knowledge, consumption, and preference for California specialty crops through nutrition education, professional development, and a city bus poster campaign. The initiative will target students at eight low-income elementary and secondary schools and promote six California specialty crops: cucumbers, persimmons, greens, mandarins, avocados, and strawberries. Project staff will develop, pilot, and publish six lessons to promote California grown fruits and vegetables highlighting their health benefits, seasonality, and taste. Training will be provided to classroom teachers to empower them to teach lessons and to tour neighborhood gardens and farmers markets. Simple and low-cost recipes will be distributed to families and teachers. The "Make Half Your Plate California Grown" initiative will culminate in a poster campaign in the schools and on city buses.

California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts

EQUIPPING CURRENT AND NEXT GENERATION SPECIALTY CROP FARMERS

*Helping San Joaquin Valley Specialty Crop Growers Adopt Responsible
Farming Methods Through Training and Education*

\$431,726

Stanislaus Farm Supply

San Joaquin Valley (SJV) specialty crop growers have endured a five year drought and recent flooding, both posing long-term impacts on soil health and water quality. Crop loss from drought alone are approximately \$650 million in the SJV. Growers also need to reduce the impact farms have on regional nitrate pollution. Now more than ever, SJV growers need education and training to make informed agricultural decisions on their farms. Stanislaus Farm Supply, a co-op serving approximately 9,000 specialty crop growers, seeks to expand a prior successful grower education program through this new venture with expanded workshops, trainings at industry events, and new educational materials. Activities will encourage adoption of environmentally and economically responsible farming methods. The goal is to convert 900 specialty crop growers (almond, walnut, winegrape, tomato (row crop), melon (row crop), sweet potato (row crop), and other fruit and vegetable crops) into adopting better input methods for greater financial savings. Results and success will be measured by grower surveys. This project has strong regional support.

*Online Training Program for Organic Specialty Crop Production in
California*

\$297,576

Organic Farming Research Foundation

Organic Farming Research Foundation (OFRF) with support from University of California Sustainable Agriculture Research and Education Program and Cal Poly San Luis Obispo Center for Sustainability will offer free online training modules in organic specialty crop production. Trainings will target beginning farmers, existing organic farmers, and farmers in transition to organic production. In 2015, OFRF surveyed California organic farmers and found a need for training on: 1) irrigation and drought management, 2) soil health, biology, and nutrient cycling, 3) weed management, 4) disease management, 5) insect management, and 6) economics and marketing. OFRF will create six learning modules on the above priority areas focused on organic orchard and vegetable production. These modules will include descriptive essays, video presentations, interviews with researchers, and virtual field trips to production and research sites. Success of the project will be based on the number of participants, the number who adopt new sustainable practices, and participant evaluation.

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

Food Defense and FSMA: How to Model Risks, Vulnerabilities and Implement Mitigation Plans \$374,989

The Regents of the University of California, Davis

Under the Food Safety Modernization Act Mitigation Strategies to Protect Food Against Intentional Adulteration (Food Defense Rule), Food and Drug Administration registered food facilities are required to develop a food defense plan to protect against intentional adulteration. This project will assist California specialty crop facilities meet this new requirement through an online program on creating a food defense plan with model plans representing various specialty crop industries. Representative specialty crop companies of various size and complexity will be recruited to develop model plans. The food defense plans will contain a vulnerability assessment, mitigation strategies and management, and training and recordkeeping. The result will be a formal food defense plan for each volunteer company and template plans for use by all impacted California specialty crop facilities. The project will include a social media outreach plan and a limited number of workshops to socialize the project.

Organic Seedling Production, Demonstration, and Training for Annual Vegetable, Flower, and Herb Growers \$265,636

The Regents of the University of California, Santa Cruz

Producing quality organic seedlings for vegetable, flower, and herb production is challenging for seasoned growers, and more so for beginning farmers and nursery operators. This project will increase the viability of vegetable, herb, and flower growers and nursery operators by improving the success and sustainability of their seedling production. This project builds on over forty years of organic specialty crop production and training at the 30-acre farm and 3-acre garden of the Center for Agroecology and Sustainable Food Systems (CASFS) at the University of California, Santa Cruz. Through trials and improved practices, the project will demonstrate and teach increased efficiency, quality, and sustainability in seedling production. The project will train over 250 growers through field days, conference presentations, a webinar, and CASFS apprenticeship classes and trainings. The project will also develop, write, and publish the Organic and Sustainable Seedling Grower Guide based on these trainings to be distributed free of charge online.

SeedTRAY-2: Training Youth and Beginning Farmers in Sustainable Specialty Crop Production and Water Management Strategies \$214,358

Noyo Food Forest

Fort Bragg is well suited to specialty crop production, but offers few opportunities for youth to learn agricultural skills, and local farmers struggle to adapt to the changing climate and production environment to meet the demand for specialty crops. Noyo Food Forest will expand and enhance its agricultural training program by focusing on water management, soil building, and other sustainable production strategies; adding a new tier of training for beginning farmers; and giving interns opportunities to learn from active farmers. Objectives are to: 1) provide hands-on specialty crop training to 52 high school-age youth through internships of 7-12

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

weeks, and 2) increase specialty crop production skills of 150 beginning farmers by offering six specialized specialty crop production workshops per year. Success will be measured by the number of youth that continue with agricultural studies or careers and pre- and post-testing of the extent to which participants acquire and use agricultural knowledge and skills.

Increasing the Viability of California Winegrowers through Targeted Sustainability Education

\$218,967

California Sustainable Winegrowing Alliance

California Sustainable Winegrowing Alliance seeks to increase the adoption of sustainable winegrowing practices that ensure the biggest return on investment in regards to the triple bottom line (environmentally responsible, socially and economically beneficial). By providing education and training aimed at the 5,900 California winegrape growers and 4,600 bonded wineries the project will address current and future challenges for participants (e.g., water scarcity, high energy costs, climate change, etc.) and help ensure the long-term viability of the industry in an increasingly competitive global marketplace. Educational workshops/webinars and hands-on technical training will educate 360 plus winegrowers on the top 62 sustainable practices that positively impact the triple bottom line and new educational resources, case studies, videos will reach 8,200 plus winegrowers. Project outcomes will be tracked via grower participation and assessment data to measure the increase in sustainable practice adoption.

FSMA Produce Safety Rule Alignment for California Specialty Crop Growers

\$385,842

The Regents of the University of California, Davis

This project assists California specialty crop growers with implementation of Food Safety Modernization Act Produce Safety Rule (PSR). It will create and deliver educational materials to ensure understanding of the regulation and facilitate grower compliance in agricultural water sampling, environmental assessments, and record keeping. The materials will incorporate and build on official Produce Safety Alliance training materials and will include a self-assessment tool to gauge alignment of current practices with the PSR. The materials will be available as online courses and in-person workshops. To increase the impact of training and extend grower support throughout California, the project will create training packages tailored for cooperative extension specialists and farm advisors that regularly interact with the specialty crop industry. All materials will be developed in English, Spanish, Hmong, and Mandarin. Student assessments and evaluations will be used to measure project success.

California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts

ENVIRONMENTAL STEWARDSHIP AND CONSERVATION

*Addressing Improvements in Water Use Efficiency of High-Value Salinas
Valley Specialty Crops*

\$337,768

University Corporation at Monterey Bay

This project facilitates continued development of cost-effective technology for specialty crop growers to evaluate and improve/optimize irrigation activity. The CropManage web-application promotes bestpractice regarding specialty crop water and nutrient management, and was recently expanded to operate on celery and cauliflower. Field trials on these crops will be performed at U.S. Department of Agriculture Research Station in Salinas during 2018 – 2019. Crops will be initially established by sprinklers, followed by four replicated surface-drip treatments at 50 percent, 75 percent, 100 percent and 150 percent of crop evapotranspiration guided by CropManage. Support measurements will include applied water, canopy cover, soil water content, reference evapotranspiration, weather data, and crop yield. Outreach by way of grower events, training sessions, scientific conferences, and journal publications. Industry adoption rate of CropManage will be monitored and users will be able to offer feedback on their outcomes/impacts.

*Harvesting Hedgerows: Assessing the Potential of Elderberry as a California
Specialty Crop*

\$271,308

The Regents of the University of California, Davis

Native hedgerows on farm edges benefit wildlife, pest control, carbon storage and runoff, but hedgerow planting by farmers is limited by establishment and maintenance costs. Elderberry trees are often planted in California hedgerows and have potential to provide an income producing crop, offsetting costs. The California market for elderberry products is growing, but very little commercial supply comes from California. Little is known about growing, marketing, or food chemistry of California elderberries. This project will assess and develop the potential for elderberries to become a commercial California specialty crop. Strip plantings of three cultivars plus native elderberries will be installed on six farms in Yolo, Solano, and Monterey counties to assess growth characteristics, management needs, and yield potential. Berries will be analyzed for flavor and nutrition components across cultivars. A production and marketing guide, cost and return study, market analysis, and farmer and buyer outreach activities will be key outputs.

*Investigating the Role of Roots in Breeding for Drought Tolerance and
Nutrient Efficiency in Lettuce*

\$389,707

USDA, Agricultural Research Service

Water is increasingly becoming a limited resource in California, and lettuce production could face costly yield losses if water supplies continue to diminish. We have identified a number of

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

physiological and molecular traits in lettuce that differ among drought treatments, and among drought-sensitive and drought-tolerant cultivars. These traits suggest an active role of the root system in managing water access. Some of the molecular traits studied also suggest a remedial effect of high nutrient load on drought-stressed plants, which suggests that improving lettuce nutrient-use efficiency through its ability to access nutrients from the soil is a promising target for increasing tolerance to drought. This project aims to describe variation in root morphology and gene expression in roots of different lettuce cultivars and different recombinant inbred lines (RILs) to identify genes for better marker-assisted selection and breeding of drought-tolerant and nutrient efficient lettuce.

A System Nitrogen Balance for Container Plant Production \$328,809

The Regents of the University of California, Davis

To produce quality plants, container plant nurseries use large amounts of inputs, including nitrogen (N) fertilizers. There is increasing pressure from state regulatory agencies to reduce N leaching to groundwater and Central Valley Regional Water Quality Control Boards require development of nitrogen management plans by growers. Applied N is targeted to the crop, but potential N losses can occur in runoff, leaching, and gaseous emissions. However, it is necessary to identify how and where N losses occur from container plant nurseries to develop mitigation strategies to address them. We will measure all N inputs and outputs into a container nursery system, including N applied, gaseous emissions, in growing media, utilized by plants, and irrigation, rain, and runoff water to develop a system N balance and determine loss mechanisms. After identifying N losses, we will test mitigation strategies to limit N loss from container plant production nurseries.

*Updating Information on Citrus Water Use for Resource-Efficient Citrus
Irrigation Management in the San Joaquin Valley* \$449,473

The Regents of the University of California, Davis

Despite the economic relevance of citrus in California, information on crop coefficients (Kc) to guide citrus growers in determining evapotranspiration (ET) and improving irrigation scheduling is limited and outdated. This project will develop and outreach updated information on ET and Kc of mature orange and mandarin orchards with three different levels of applied water in relation to various canopy sizes, planting densities and row orientations that are typical of the citrus production areas in the San Joaquin Valley (SJV). Project staff will monitor plant water status and evaluate the effect of the three different irrigation treatments on orchards' ET, crop yield, and fruit quality. The project will also develop a grower-friendly online calculator to estimate citrus ET/Kc based on orchard-specific canopy features in the climate of the SJV under micro-irrigation. Project's outcomes will enable the citrus production industry to pursue resource-efficient irrigation management and improve water productivity.

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

Mist-Cooling to Increase Winter Chill for Dormancy and Bud Break \$101,594

California State University, Bakersfield

As the central valley fog disappears, the dormancy of pistachio is severely influenced. Sustained sunlight warms the buds and decreases chill accumulation. If the accumulated chill is not sufficient for dormancy release and bud break the result is abnormal flowers, poor bloom synchrony, high rates of blanks and low yields. The project proposes to develop: 1) an automated solid state canopy delivery (SSCD) system which mists the trees giving very uniform coverage, 2) data (air temperature, air humidity, solar radiation, and wind speed) acquisition system, and 3) a control system to apply mist (controlling the SSCD) only when it's needed (based on weather data). The project proposes to develop an environmentally friendly and high cost-performance method (misting system). This system will cool down the bud temperature on sunny days to avoid chill offset.

Cover Cropping Strategies to Enhance Soil Health and Competitiveness of Central Coast Berry and Vegetable Specialty Crops \$312,576

Resource Conservation District of Santa Cruz County

This project will enhance the competitiveness of Central Coast vegetable and berry specialty crops by training growers on soil management practices that can improve farm productivity; compliance with water quality regulations; and resiliency to climate change, water scarcity, and soilborne diseases. One hundred-eighty beginning and experienced growers will be trained in the use, monitoring, and benefits of cover cropping practices to optimize production inputs and reduce costs in specialty crop rotation systems including strawberry, broccoli, and leafy greens. On-farm implementation and monitoring will produce site-specific data on agronomic, economic, and environmental value of selected practices, and provide demonstration sites for broader grower engagement. The project will broadly share information to motivate adoption of soil health management practices to address local threats affecting the long-term viability and competitiveness of specialty crops in our region.

Almond Smart Irrigation Decision Support Program \$428,127

The Regents of the University of California, Imperial County Cooperative Extension

This project will develop a smart irrigation decision support system to help almond growers in California in making irrigation management decisions. The system will consider several variables such as soil type, growth stage, climatic conditions, soil salinity, water quality, irrigation system, and other site-specific factors in deciding when and how much water is needed for each zone. The system will also assist growers in defining zones of similar characteristics then develop variable irrigation scheduling program for each zone. Working with Almond Board of California, four demonstration sites with growers that have orchards representing typical orchards in California will be selected. The project will also validate and test newer commercial irrigation technologies to help almond growers select appropriate technologies for their operations. A mobile application will be developed to assist growers in developing smart irrigation decisions based on the above variables.

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

Recycled Organic Waste Inputs to Lower the Carbon Footprint and Increase Resilience to Reduced Irrigation in Almonds \$290,522

The Regents of the University of California, Davis

This project will evaluate how three distinctly different recycled waste materials used as soil amendments affect crop performance, soil health, and the carbon footprint of almond orchards. Legislative measures to keep food waste from landfills and the disappearance of biomass power plants call for innovative uses of organic materials to improve soil quality and increase almond tree resilience to reduced irrigation. In side-by-side trials, we will assess the impacts of composts, biochar, and food waste hydrolysate on tree growth, stem water potential during deficit irrigation, greenhouse gas balance, and soil biodiversity. The outcomes, including economic analyses, will be communicated to stakeholders through field days, a permanent website, and scientific and trade journal publications. Based on the perceived benefits as measured in this project, growers will be able to make informed decisions on how to use and invest in these organic inputs.

Improving Sustainable Fertilizer Practices for Pomegranate by Leaf Nutrient Concentration Evaluation and Fertilizer Trials \$206,633

Cal Poly Foundation

This project will enhance competitiveness of specialty crops through grower adoption of sustainable fertilizer practices. For most crops, correlations between leaf nutrient concentration and yield and the best time to take leaf samples have been determined. Such information is limited or unavailable for pomegranate. Experiments will be conducted for two growing seasons in mature, commercial orchards. Fertilizer will be applied at one of three rates over three or four application times. Treatment effects on nitrogen leaching will be measured using lysimeters and a nitrate meter. Leaf samples will be collected four times a year to determine leaf nutrient concentrations. Yield data will be collected to determine relationships between leaf nutrient concentrations, fertilizer applications and yield. Commercial tissue testing labs will have pomegranate-specific leaf sampling and sustainable fertilization protocols. The adoption of these best management practices will be assessed by surveying labs and growers.

California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts

PLANT HEALTH AND PEST MANAGEMENT

*Epidemiological-Based Practices for Controlling Cucumber Green Mottle
Mosaic Virus in California*

\$286,335

The Regents of the University of California, Davis

Cucumber green mottle mosaic virus (CGMMV) was first reported in the United States from Yolo County melon seed fields in 2013, and again in 2014 in watermelon fields. For both years eradication measures were followed, including quarantine and abatement efforts. The eradication efforts seem to have been successful, but the biology of the virus is such that future introductions are likely. CGMMV is a seed borne virus, and overseas seed production where the virus is endemic may be the source of future outbreaks. Given current melon industry practices, there are points at which detection and management methods can be improved for CGMMV. This project will, first, conduct surveys to assess for CGMMV incidence in the initial reported and surrounding areas to ensure eradication. Second, it will assess seed and possible pollen transmission properties of CGMMV, and assess cultural practices (greenhouse grown seedling transplants) as contributors to CGMMV spread. Select project participants will present at outreach and extension events to share knowledge.

*Addressing Urgent Research Needs for the South American Palm
Weevil*

\$405,914

The Regents of the University of California, Riverside

South American Palm Weevil (SAPW) is an invasive pest in California that poses an unprecedented threat to California's date industry, estimated in 2015 to be worth \$68 million. Feeding weevil larvae kill palms and this pest vectors red ring nematode (RRN) which also kills palms. SAPW was first recovered in Tijuana in December 2010 from dead Canary Island date palms (CIDPs). SAPW was officially trapped by the U.S. Department of Agriculture in San Diego County in May 2011. The California Department of Food and Agriculture monitoring programs for SAPW trapped 111 weevils over 2011-2013, but no instances of SAPW-induced palm mortality or RRN were recorded. In 2016, surveys resulted in the detection of many CIDPs killed by SAPW in San Diego County, ranging from San Ysidro north to Chula Vista. Large populations of SAPW have established in riparian areas in San Diego that have naturalized CIDPs. This proposal has identified urgent research needs for addressing the SAPW invasion in California.

*Collaboration for Plant Pathogen Strain Identification; Building Grower
Confidence in Vegetable Disease Resistance*

\$339,182

The Regents of the University of California, Davis

Consistent identification of plant pathogen strains is a recognized need for the California vegetable industry, regulatory agencies, and growers. There is no recognized global body that regulates the consistent naming of plant pathogen strains. Inconsistencies exist and can undermine grower confidence in claims of disease resistance. The project's goal is to expand

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

the development and distribution of reference materials to facilitate consistent and accurate strain identification. This will build grower confidence in claims of disease resistance and set realistic field performance expectations in the presence of diseases against which claims of resistance are made. The project will develop differential plant hosts with individual resistance genes, reference pathogen strains, and instructional white papers for use as an industry standard by public, regulatory, and industry scientists. Success will be measured by online tracking of the increasing number of users of these reference materials.

Identifying Genetic Sources of Lygus Resistance in Lima Bean for New Variety Release

\$242,330

The Regents of the University of California, Davis

The project goal is to understand the genetic mechanisms of resistance to Lygus in order to speed the development of improved varieties for California lima bean growers. Researchers will seek to identify markers linked to Lygus resistance and other agronomic traits for marker-assisted selection and determination of inheritance using a previously developed recombinant inbred line. Further study will also investigate the possible mechanisms for Lygus resistance under field conditions and establish potential correlations with Lygus resistance/tolerance. The project will develop and release new Lygus-resistant cultivars via an ongoing crossing program and multi-location, multi-year agronomic evaluation of already developed advanced lines and will develop new integrated pest management recommendations for Lygus-resistant lines. Using results, researchers will host educational field days, present at industry meetings, and perform other outreach activities to provide the lima bean industry with information about newly developed lima bean lines and improved management methods.

Generating a Detection Platform for Clavibacter Michiganensis, the Causal Agent of Bacterial Canker of Tomato

\$396,395

The Regents of the University of California, Davis

Bacterial canker of tomato (BCT) can cause significant losses in tomato production. There are no chemical or genetic control methods. The best way to control this disease is to detect the pathogen on contaminated seed lots and identify infected transplant material to stop disease spread. BCT is caused by the bacterial pathogen, *Clavibacter michiganensis* subsp. *michiganensis* (Cmm). Pathogen detection is primarily performed by immunostrips and PCR, but these methods are prone to false positives. This project will develop a specific detection platform that can distinguish between Cmm and non-pathogenic *Clavibacter*. Previous work has sequenced 39 *Clavibacter* genomes to identify targets that can specifically detect Cmm. The efficacy and sensitivity of the new Cmm diagnostic will be evaluated on plant and seed samples. Information will be provided to growers, extension agents, and seed testing laboratories. Surveys will be distributed to estimate adoption as an indicator of success.

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

Managing Fungicide Resistance in Botrytis Cinerea on Wine and Table Grape, Strawberry, and Blueberry \$295,955

USDA, Agricultural Research Service

Botrytis cinerea (gray mold causal agent) causes pre- and post-harvest losses annually on many specialty crops. Disease management relies heavily on fungicide sprays, but resistance is common and can result in control failure and crop loss. An annual combined pre- and post-harvest loss of 20 percent (grape and strawberry) and 25 percent (blueberry) has been estimated due to gray mold each year. The objectives of the project are to survey Botrytis isolates collected from grape, strawberry, and blueberry crops to determine phenotypic and genetic variability of resistance to major classes of fungicides registered for Botrytis control for developing diagnostic assays. This data will provide growers with information on the efficacy of major fungicide groups and identify markers associated with resistance that can be used as early predictors of future efficacy. Markers will be available for developing diagnostic assays and developing spray programs to effectively manage this pathogen.

A Platform for Breeding Broad Genetic Resistance to Downy Mildew for Organic Spinach Production \$434,227

The Regents of the University of California, Davis

In spinach, new genetic resistance-breaking races of downy mildew (DM) appear every two years, threatening the crop, especially for organic production. This project aims to survey DM race diversity in spinach growing regions over two years and develop race-specific in-field assays to: 1) detect DM races to guide farmers and breeders in germplasm selection, 2) breed broad genetic resistance to DM for organic production to reduce losses, and 3) train students in pathology and plant breeding and extend information to growers and industry personnel. The impact of this project will be measured through the use of survey data by seed industry personnel and growers and specificity and adoption of in-field assays, the development of germplasm with improved genetic resistance across multiple DM races, and experiential learnings acquired by students. Outreach will be accomplished through workshops, field days, professional classes, internships, and media. Results will guide strategies to control DM and varieties will be licensed for sale beyond the life of the grant.

California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts

FIXED AMOUNT AWARDS: TECHNICAL ASSISTANCE FOR WORKFORCE ISSUES

Specialty Crop Job Fair for San Joaquin Valley

\$149,843

Center for International Trade Development

The Center for International Trade Development at State Center Community College District will work with specialty crop companies, industry stakeholders, Partnership for the San Joaquin Valley, and community colleges to host two regional specialty crop job fairs with the goal of assisting 100 specialty crop companies in attracting and securing over 600 skilled and unskilled workers. Specialty crop companies will be assessed, recruited, and trained to maximize the benefit of job fair participation. Job seekers will receive a variety of career enhancement tools to help prepare for job fairs and success when hired. Project evaluation will be based on surveys administered to companies immediately following, at 90, and 180 days; actual results will be compared to projected 250 jobs maintained/created and 100 small businesses maintained/created will measure success. A one page summary report outlining activities and corresponding outcomes and best practices handbook will be disseminated.

California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts

FOOD SAFETY

*Scientifically Valid Corrective Actions for Multiple Harvest Shade-House
Production Systems*

\$249,143

The Center for Produce Safety

The Center for Produce Safety will partner with the University of California, Davis, to validate die-off expectations for bacterial pathogens and corrective action options for shade-house grown specialty crops. From 1996 to 2016, multiple outbreaks associated with consumption of shade-house or greenhouse grown fresh produce were reported, resulting in over 1,200 illnesses, 260 hospitalizations, and at least six deaths. Outbreak environmental investigations boldly underscored the need for science-based practices to prevent or respond to a detected contamination on multiple-harvest crops produced in enclosed cropping systems (protected culture). A common response to pathogen detection may be to destroy the remaining crop as the practical economic loss containment decision; however, a better knowledge foundation for pathogen die-off expectations and development of systematic sampling regimes has broad industry support. Science-based guidance for assessing the risk of contamination of fresh produce grown under protected culture is sparse. Closing this knowledge gap is critical to decision-making and application of validated corrective actions in the case of pathogen detection in product or environmental samples. The specific goal of this project is the validation of die-off expectations for bacterial pathogens and corrective action options for shade-house grown crops (cucumbers, tomatoes, and peppers). The research team also proposes to evaluate corrective actions necessary to minimize the risk of transference and persistence of bacterial pathogens in the shade-house. It is anticipated that project results will have a high degree of transferability to diverse protected specialty crop culture systems. The performance measure for this project will be a detailed publication describing the predisposing and interacting pre-harvest and postharvest root-cause(s) of a serious outbreak attributed to cucumber. The team expects to provide at least four sampling, monitoring, verification, and corrective action options for producers of shade-house grown crops to prevent marketing of contaminated crops and limit economic losses by minimizing crop destruction through validated sampling plans.

*Establishment of Vegetative Buffer Zones to Reduce the Risk of STEC and
Salmonella Transmission from Animal Operations to Fresh Produce on
Co-Managed Farms*

\$384,649

The Center for Produce Safety

The Center for Produce Safety will partner with North Carolina State University (NCSU) to evaluate the use of vegetative buffer zones to reduce the risk of transmitting human pathogens from animal operations to produce fields in co-managed farms. Sustainable farming practices have an integration of crops and livestock, recycling of nutrients, and the well-being of humans and the environment. These farming practices increase crop productivity and environmental stewardship, although there are knowledge gaps specific to the presence and/or removal of

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

vegetative buffer zones (VBZs) between animal production areas and produce fields as well as the potential relationship for pathogen transfer. The overall goal of this project is to evaluate the effectiveness of fast-growing and cost-effective multi-row VBZs between animal production areas and adjacent produce fields in reducing or eliminating the potential movement of Shiga toxin-producing *Escherichia coli* (STEC) and *Salmonella* on co-managed farms. This project will determine (i) the risks associated with the presence of VBZs as barriers and/or sources of pathogen transmission between animal production areas and produce (tomato and lettuce) fields; (ii) whether pathogen movement into produce fields increases with removal of the VBZ; and (iii) whether the proposed strategy is a tangible and cost-effective solution for growers applying co-management practices. Presentation of project results at the annual Center for Produce Safety Research Symposium will allow for evaluation by produce industry and regulatory stakeholders of the progress toward the objectives, accomplishment of activities, and performance related to the timeline and anticipated milestones. Indicators will include specific information on program implementation, perspectives from stakeholders and project participants, and analysis of the completion of each activity.

The Effects of Storage Conditions and the Microbiome of Non-traditional Salad Ingredients on the Fate of Listeria Monocytogenes \$358,058

The Center for Produce Safety

The Center for Produce Safety will partner with California Polytechnic State University to evaluate the behavior of *Listeria monocytogenes* on non-traditional salad ingredients as influenced by storage and distribution conditions and the microbiome. Recent outbreaks and recalls of produce due to *Listeria monocytogenes* contamination have increased the need to understand its potential for growth on fresh-cut produce at both ideal and abusive temperatures. Fresh-cut produce has provided an easy and convenient way for consumers to increase consumption of healthy foods. To meet consumer demands for “superfoods,” and to create sustainable products by utilizing more of the whole plant, new salad blends have been developed from non-traditional fresh-cut salad ingredients. Many of these ingredients are not normally consumed raw or may not have even been widely consumed. New salad ingredients include beet greens, kale, Brussel sprouts, and shredded broccoli stalk. While researchers have investigated the growth of *L. monocytogenes* on common fresh-cut salad ingredients, such as spinach and iceberg lettuce, research on the new salad ingredients is limited. This project will determine if and under what conditions *L. monocytogenes* will grow on non-traditional salad ingredients. This will be accomplished by placing a known number of *L. monocytogenes* cells on the selected produce and monitoring the population under ideal, abusive, and “real-world” storage conditions. Also, the influence of the produce microbiome on *L. monocytogenes* behavior will be investigated. Producers of bagged salads and fresh-cuts will be able to use these data to guide risk management strategies for beet greens, kale, Brussels sprouts, and broccoli stalk. The project’s industry cooperators will be engaged throughout the research study to ensure results are communicated effectively and to the appropriate audience.

California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts

Preservation of Stone Fruits by Spray Application of Edible Coatings with Antimicrobial Properties

\$98,480

The Center for Produce Safety

The Center for Produce Safety will partner with Clemson University to develop practical preventive intervention strategies to improve the safety of stone fruits. *Listeria monocytogenes* is an important foodborne pathogen commonly found in the environment. Recent foodborne *Listeria* outbreaks have been linked to fresh produce, including stone fruits. Contamination of stone fruits is problematic since these products are usually consumed without heating. In addition, some surfaces associated with packing operations (brushes, peach rollers) are inherently difficult to sanitize. In the packinghouse, these fruits are covered (brushed) with a wax-based coating containing antifungal agents to prevent moisture loss and fungal infection. This project will develop and compare alternative coatings based on edible components that have antilisterial properties in addition to their physical barrier and antifungal role. The coatings will be formulated to contain safe antimicrobial agents, such as nisin, Listex P100, organic acids, and/or their combinations, and to be applied as a spray, thereby reducing the risk of cross-contamination in the packinghouse. Experiments will be performed in laboratory settings and validated in challenge studies with inoculated stone fruits. The goal is to formulate a coating that would prevent *Listeria* contamination on fruits and bacterial persistence on packing equipment. Results from this study will be used to provide improved pathogen control in addition to basic good agricultural practices, thereby helping the stone fruit industry to produce safer produce for human consumption.

Engineering and Ecological Approaches Reduce Pacific Tree Frog Intrusion into Leafy Green Agriculture

\$124,472

The Center for Produce Safety

The Center for Produce Safety will partner with the University of Illinois at Urbana-Champaign to develop a multi-faceted approach to reduce the intrusion of the Pacific tree frog into leafy green production environments. As the interface between wildlife and agriculture becomes increasingly intertwined, the challenge of providing high quality produce to consumers becomes more difficult, with lapses in quality carrying massive financial repercussions to the producer. This study will use an integrated approach to improve exclusion methods used to keep frogs from entering production environments. Team engineers will improve on the traditional drift fence by testing new materials, designs, and deterrents to determine an optimal design for field sites. The team also will test new thermal imaging technology to detect frogs in leafy green environments. From the biological perspective, the research team will test the efficacy of noninvasive acoustics to attract frogs away from ag-adjacent bodies of water and conduct targeted surveys to better understand local frog populations in leafy green production areas. The study will provide novel data on fence design, frog detection, and animal responses to deterrents and acoustic signals, as well as greatly increase understanding of frogs and the leafy green environments they use. All components of this study integrate to provide a multifaceted approach to improving frog management. At the conclusion of this project the team anticipates the development of one or more methods for reducing and potentially eliminating Pacific tree frog intrusion from leafy green fields. Each method developed in this

**California Department of Food and Agriculture
2017 Specialty Crop Block Grant Program
Project Abstracts**

study will aim to quantify the reduction of Pacific tree frog intrusion by the simple implementation of the method. In the case of multiple methods showing success, this project will further investigate the effect of using multiple methods in combination for even better control.