



**Agricultural
Marketing
Service**

**Transportation and Marketing
Specialty Crop Multi-State Program**

***Fiscal Year 2019
Description of Funded Projects***

Number of Grants Awarded: 11

Amount of Funds Awarded: \$9,496,052.00

For more information, please visit the grant program's website: <https://www.ams.usda.gov/scmp>

NOTE: The below project descriptions were provided by the grant recipients.

Arizona

Recipient: Arizona Department of Agriculture, Phoenix, AZ

Award Amount: \$487,685.00

Project Type: Research

Expanding Novel Sources and Post-Production Uses for Commercial Mushroom Substrates in the Western United States

The Arizona Department of Agriculture, in collaboration with University of Arizona and University of California Cooperative Extension, plans to advance commercial mushroom production, and includes collaborators and partners in academia and industry in Arizona and California. Project outcomes are to improve production and profitability of commercial mushrooms through increased utilization of local agricultural/industrial wastes as production substrates and increased nutritional value of resulting mushrooms grown on modified substrates and environmental conditions. Moreover, this effort will further increase economic efficiency by repurposing spent substrate as novel resources in other agricultural systems. The project will deliver industry-relevant findings and training on substrate utilization/repurposing through state-based extension programs. The project will also collaborate with communities to deliver research findings to consumer groups on the nutritional content of mushrooms and the dietary and health benefits of increased mushroom consumption. This multi-state collaboration represents a planned expansion of the very successful research and extension programs supported for several years by the Arizona Specialty Crop Block Grant Program. California is well prepared to implement these programs due to the expanding efforts of state collaborators to support local mushroom production.

California

Recipient: California Department of Food and Agriculture, Sacramento, CA

Award Amount: \$999,992.00

Project Type: Research

Climate Ready Landscape Plants

The western United States nursery stock, bedding, annual, and perennial plant sales generated more than \$2.9 billion in 2017, with nursery stock sales from this region alone accounting for 37.6 percent of total United States sales (Agricultural Statistics, 2017). However, climate change and increased urban water demand threaten future green industry sales. The western United States is expected to endure extreme droughts escalating in severity due to climate change, less predictable precipitation patterns, and decreased soil moisture (Cayan et al., 2010). Urban water supplies will be further stressed by population growth. The populations of Arizona, Idaho, Nevada, and Utah increased by 1.7 percent or more from 2017 to 2018 (United States Census Bureau, 2018). Low water-use plants must be supplied by growers and utilized by the landscape industry to facilitate water conservation by reducing landscape irrigation requirements. To assist the green industry in responding to this need, the California Department of Food and Agriculture, in collaboration with the University of California, Oregon State University, University of Washington, University of Arizona, and Utah State University, will create a non-biased plant trials network that assesses plant performance under different irrigation regimes. Trial methods developed in California will now be expanded to four additional western states: Arizona, Oregon, Utah, and Washington. Plants irrigated at three different levels will be measured for growth, and rated for aesthetic quality. Plant material that performs well under low- water conditions will be recommended for production and utilization. Information developed will be provided to the green industry to aid in sustainable decision making, marketing, and business support.

Recipient: California Department of Food and Agriculture, Sacramento, CA

Award Amount: \$885,801.00

Project Type: Research

Developing Strategies for Increasing Marketable Yield in California and Florida Pomegranate Orchards

Commercial production of pomegranate has been an important specialty crop industry in California and has emerged as an alternative specialty crop in Florida in recent years. California farmers have been switching to drought tolerant crops like pomegranate because of water restrictions and costs. Florida growers' interest in pomegranates increased as citrus growers face unprecedented challenges from citrus greening and berry growers face fierce competition from other countries. Florida growers have urged testing of pomegranate varieties to evaluate their plant growth and fruiting characteristics in Florida. The California Department of Food and Agriculture, in collaboration with the University of California, University of Florida's Gulf Coast Research and Education Center, Texas A&M University, California State University, and the USDA – Agricultural Research Service's National Clonal Germplasm Repository - Tree Fruit & Nut Crops & Grapes, plans to develop strategies to increase marketable yield of pomegranate in California and Florida. The first objective is to evaluate germplasm and breeding lines for plant growth, flowering, crop yield and fruit quality. This objective will be met by field trials of pomegranate varieties and breeding lines in California and Florida, by sensory evaluation and quality assessment, and by sequencing the genome of 'Wonderful' pomegranate and developing DNA markers and genetic linkage maps for expedited development of competitive pomegranate varieties. The second objective is to develop effective management strategies to address fungal diseases of pomegranate, the commodity's most urgent production issue. This objective will be met by trialing promising fungicides and screening existing germplasm and new breeding populations under natural disease pressures in pomegranate orchards in California and Florida and under artificial inoculation. These objectives will identify and develop cultivars that have the potential for commercialization and will distribute promising varieties to growers for profitable and sustainable pomegranate production.

Recipient: California Department of Food and Agriculture, Sacramento, CA

Award Amount: \$999,985.00

Project Type: Research

Evaluating the Food Safety Impacts of Cover-Crop Grazing in Fresh Produce Systems to Improve Cover Crop Adoption, Crop-Livestock Integration, and Soil Health

Winter cover crops have demonstrated benefits for growers and the environment: enhanced soil fertility, structure, water infiltration and storage, and reduced nitrate leaching. Nonetheless, challenges in expanding cover crop use remain due to concerns over cover crop water use and nutrient immobilization, which could increase deficiencies and increase input costs of the following crop. Many growers consider livestock grazing of cover-cropped fields in fresh produce operations as a way to enhance soil health and environmental benefits by increasing carbon inputs and nutrient cycling. However, recent concerns about microbial food safety are limiting expansion of this practice because livestock grazing may introduce fecal-borne foodborne pathogens into soil with a potential for transfer to harvested produce that will be consumed raw or minimally processed by consumers. The California Department of Food and Agriculture, in collaboration with the University of California University of Maryland Eastern Shore, USDA – Agricultural Research Service, University of Minnesota, and The Organic Center, plans to evaluate the food safety impacts of sheep grazing cover crops, compared to tilled termination of cover crops (no livestock integration) and winter fallow, before spinach and cucumber. Specifically, project staff will 1) determine food pathogen persistence/survival in soil and transfer to vegetable crops, and 2) determine the relationship between soil health properties, environmental factors and pathogen survival in grazed cover crop-vegetable production in three states. Changes in soil health indicators will be measured over two years of grazed cover crop-vegetable production, and assess benefits and potential tradeoffs of vegetable cash crop productivity. Benefits of grazing and food safety impacts will be communicated via in-field demonstration and online tools, outreach events, conference presentations, and publications; targeted to growers, policymakers, and consumers.

Recipient: California Department of Food and Agriculture, Sacramento, CA

Award Amount: \$962,804.00

Project Type: Research

Adapting Avocados for Commercial Success in Extreme Environments to Enhance U.S. Based Avocado Production

United States avocado consumption has more than quadrupled in the last 10 years with growth largely sustained by imported 'Hass,' currently accounting for over 95 percent of sales. Expansion of domestic production has been slow because 'Hass' is extremely sensitive to environmental stresses. However, recent advances, namely, development of new varieties more resilient to non-optimal conditions and advances in production technologies, have made it possible expansion of domestic production into diverse locations such as the San Joaquin Valley (SJV) in Central California and the Lower Rio Grande Valley (RGV) in Texas, historically considered marginally suitable due to lack of adapted varieties and high summer/low winter temperatures. New varieties are now available for evaluation against the industry standard, 'Hass.' Moreover, new technology to modify the growth environment provides for stress mitigation exists. The California Department of Food and Agriculture, in collaboration with the University of California and Texas A&M University, will conduct large-scale trials of improved (high-yielding, high-quality, more resilient) varieties under conventional versus modified environmental conditions in the SJV and the RGV. This research will streamline evaluations that were planned separately for California and Texas. The overarching goal is demonstration of the feasibility of expanding United States avocado production into areas currently considered marginal. Both areas grow substantial citrus crops, currently threatened by Huanglongbing, a fatal disease. Increasing domestic avocado production will give domestic growers access to newly expanded market demand, increase industry resiliency, and broaden the availability of specialty crops with nutritional and health benefits for consumers.

Florida

Recipient: Florida Department of Agriculture and Consumer Services, Tallahassee, FL

Award Amount: \$850,816.00

Project Type: Research

Improving Lettuce Cultivars against Bacterial Leaf Spot (BLS) through Breeding, Genetics, and Study of the BLS-Lettuce Interaction

Cultivated lettuce (*Lactuca sativa* L.) represents a \$2 billion business largely situated in California, Arizona, and Florida. Lettuce is also an important component of sales for small diversified farms in the Mid-Atlantic and everywhere else in the United States. Bacterial Leaf Spot caused by *Xanthomonas campestris* pv. *vitiensis* (Xcv) is an unpredictable disease causing severe economic losses. Currently there is no meaningful control method available. The Florida Department of Agriculture and Consumer Services, in collaboration with University of Florida, the Pennsylvania State University, and the USDA – Agricultural Research Service in Salinas, California, to use plant breeding and genetic approaches to study disease resistance and diversity of interactions between lettuce and the Xcv. Marker development and other methods will be used to introduce novel resistance genes into romaine, iceberg, leaf, and butterhead types of lettuce. Additionally, analysis of whole genome sequences and other methods will identify pathogen genes involved in disease resistance reactions. These genes and other specific sequences will be developed into race specific detection, identification, and quantification protocols that will be useful for developing seed assays. The identification of weeds as potential reservoirs for Xcv will be determined. This is a 90 percent research and 10 percent extension project that will develop scientific and extension material for the growers' communities of the states of California, Arizona, Florida, and the Mid-Atlantic region centered in Pennsylvania.

Missouri

Recipient: The University of Missouri, Columbia, MO

Award Amount: \$923,155.00

Project Type: Research

Participatory Chestnut Breeding - Establishing a Participant Network to Characterize Genetic Diversity and Ancestry of Superior On-farm Germplasm

United States chestnut cultivation for nut production has increased through grower-led advancement. Grassroots chestnut production over the past decade has led to the successful establishment of multiple farmer cooperatives and many new regional markets in the Midwest. Regional industry leaders indicate that demand perennially exceeds supply and that chestnut cultivation must expand accordingly. In fact, the number of chestnut farms in the United States grew by 57 percent from 2012 to 2017, including over 400 new chestnut farmers in midwestern and neighboring states. Chestnut orchards in the region are primarily comprised of half-sibling seedling families from open-pollinated traditional Chinese chestnut varieties. While suitable for first-generation production, these plant materials serve the dual purpose of pre-breeding - to identify superior individuals that have recombined desirable traits and improved adaptability. There are in excess of 7,000 chestnut seedlings of bearing-age (representing 20 half-sibling families) on farms in the Midwest. The University of Missouri, in collaboration with the University of Notre Dame, will formalize a participatory network of chestnut growers to characterize on-farm germplasm and assemble core sets of superior selections. Accordingly, the proposal has three objectives: (i) develop a database of on-farm germplasm in the Midwest; (ii) expand the genetic base of *Phytophthora* root rot resistance in *Castanea* germplasm; (iii) characterize the phenotypic diversity of top database selections; and (iv) characterize the diversity, parentage, and ancestry of the database selections with expressed sequence tag-Simple Sequence Repeat (EST-SSR) markers. Building genetic improvement efforts from this pre-existing material capitalizes on decades of farmer investments and evaluations, offering an extraordinary opportunity to assemble the improved genetic base necessary to establish a dedicated breeding program.

Rhode Island

Recipient: University of Rhode Island, Kingston, RI

Award Amount: \$444,790.00

Project Type: Crop-Specific Project

Supporting Farmer Adoption of Laser Scarecrow Technology for Bird Control in Sweetcorn

The University of Rhode Island will partner with Cornell University and USDA-APHIS's National Wildlife Research Center to study the ability of laser scarecrows to reduce bird damage to sweet corn and develop the best management practices for using laser scarecrows in sweet corn. The project staff will educate sweet corn growers and agricultural service providers about the benefit of adopting laser scarecrows while providing technical support through the process. The purpose of the project is to support sweet corn growers in adopting laser scarecrows, alone or in combination with bird distress calls, as a tool to protect fresh market sweet corn from pest birds. In addition, the research team will disseminate the project results through Cooperative Extension and USDA-APHIS-Wildlife Services channels and peer-reviewed journals, grower meeting, and conference.

Texas

Recipient: Texas Department of Agriculture, Austin, TX

Award Amount: \$949,423.00

Project Type: Research

Enhancing Pepper Production, Profitability, and Seed in the Southwest U.S.

Hot pepper production is a key component of the agriculture industries in Texas, New Mexico, and Arizona. Despite increased demand for hot peppers and hot pepper products, the United States is still a net importer of these commodities. Overall domestic production has stagnated in recent decades in part due to increased labor/input costs as well as lack of adapted cultivars and improved production practices to minimize environmental stress impacts. These limitations are negatively impacting the livelihoods of farming communities in the southwestern United States. Improving overall production efficiency by implementing new agronomic technologies and practices can reduce production costs and help reverse the downward trends in United States production. The Texas Department of Agriculture, in collaboration with Texas A&M AgriLife Research and New Mexico State University, plans to optimize production, product quality, marketing efficiency, and profitability of hot pepper production in the U.S. This goal will be accomplished by: 1) identifying high-yielding, stress-tolerant cultivars among recently-developed varieties that are adapted to specific locations; 2) developing and implementing efficient cultivar and site-specific production strategies to minimize environmental stress/disease impacts, enhance product quality, and minimize production costs; 3) implementing practices to detect, monitor and control plant pathogens on peppers; and 4) developing a matrix of cost-of-production budgets to reveal the most profitable cultivar-location-production practice combinations and to assess the socio-economic impacts of improved pepper production. By implementing these strategies, it is anticipated that significant improvements in production efficiency, production cost reductions, and a sustainable supply of safe and high-quality products that will allow growers to remain competitive.

Virginia

Recipient: Health Care Without Harm, Reston, VA

Award Amount: \$997,765.00

Project Type: Marketing and Promotion

Building and Promoting Institutional Markets for High-Protein Specialty Crops

Health Care Without Harm will collaborate with Community Alliance with Family Farmers, Colorado State University Extension, Ecotrust, and another group to be determined to create new markets with institutional food buyers in the health care sector for high-protein specialty crop producers, particularly of legumes such as dry pulses and fresh peas and beans, as well as processors, and value-added product manufacturers that use these crops. The project will implement a national promotional campaign with the health care sector around high-protein specialty crops and conduct in-depth purchasing pilots in four distinct regions: Pacific Northwest (Oregon and Washington), California, Colorado, and the Northeast (Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont). High-protein specialty crops provide an opportunity to meet dietary protein needs while also providing human and environmental health benefits. Additionally, engaging institutional buyers to purchase from their regional producers strengthens regional food systems and stimulates the economies of impacted farm communities

Washington

Recipient: Washington State Department of Agriculture, Olympia, WA

Award Amount: \$993,836.00

Project Type: Food Safety

Advancing Robotic Approaches to Pollination for Improved Yield and Quality in Fruit Crops

There is an estimated 180,000 acres (~2,500 farms) of apples planted in Washington (USDA National Agricultural Statistic Services, 2017) alone, contributing to ~\$2 billion direct and ~\$10 billion downstream economic activities/impact to the state. Another 23,000 acres of apples is planted in Pennsylvania by ~2300 farmers. Other tree fruit crops such as cherries, and pears also make huge economic impact nationally. Profitability of these crops depends heavily on product quantity and quality – two components that are dependent on efficient pollination during flowering stage. For pollination, growers currently rely heavily on renting hives of honeybees, which is declining rapidly. Environmental conditions also interfere with the natural pollination process thus causing huge uncertainty in achieving optimal pollination. The Washington State Department of Agriculture, in collaboration with Washington State University and Pennsylvania State University, plans to develop a robotic pollination system that can lead to efficient and reproducible pollination of tree fruit crops (e.g. apples). Specifically, the project will focus on; i) developing a machine vision system for identifying and locating blossoms in orchards; ii) determining pollination targets and timing through incorporating horticulture knowledge; and iii) developing and evaluating a pollination end-effector and overall robotic system. By the end of the project, it is expected that a prototype and field validation study will provide sufficient information for companies (e.g., collaborator FFRobotics) to develop and commercialize a robotic pollination system. Commercial adoption of this technology will substantially improve farmer's ability to pollinate optimal amount of crop at lower cost to achieve high yield and quality of fruit crops resulting in a substantial benefit to the tree fruit industry.