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Effective biological control of Gill's mealybug from drone releases of Green lacewing Andreas NeumantDavid Halveland. 88,00. Improved control of navel orangeworm: focus on increasing insecticide efficacy using adjuvants and improved timing Joel Siegel \$80,000. Producing sterile navel orangeworm on demand for improvement of pest management Houston Wilson/Chuck Burks/Ramna Bansansi \$125,641. Influence of Pistachio Hull Degradation and Shell Split on NOW Egg Deposition and Infest Burks/Ramna Bansansi \$125,642. Influence of Pistachio Hull Degradation and Shell Split on NOW Egg Deposition and Infest Burks/Sclina Wilson/Chuck Burks/Scli	Identification, synthesis, and development of the sex pheromone of the mealybug Ferrisia gilli	Jocelyn G. Millar	\$23,745
Effective biological control of Gill's mealybug from drone releases of Green lacewing Improved control of navel orangeworm: focus on increasing insecticide efficacy using adjuvants and improved liming Joel Siegel \$80,000 Producing sterile navel orangeworm on demand for improvement of pest management Influence of Pistachio Hull Degradation and Shell Spill on NOW Egg Deposition and Infest Food Safety Comparing Efficacy of two registered atoxigenic strains biocontrol products to reduce affeloxin contamination and expanding Area-wide Long-term Mycotoxin Management Programs A survey of fungi producing Ochratoxin A in California pistachios and management of contamination in the field Themis J. Michailides \$77,500 Horticulture Agronomics Investigating the effects of winter cover cropping on radiation balance, soil-water dynamics, and water productivity of mature micro-irrigated pistachio orchards Assessing Nitrogen Uptake to Develop Best Management Practices and Early Leaf Sampling Protocols for Pistachio Cultivars Lost Hills and Golden Hills Determining non-bearing pistachio initrogen and phosphorus needs Evaluating non-bearing pistachio initrogen and phosphorus needs Evaluating non-bearing pistachio initrogen and phosphorus needs Evaluating norm bearing systems for pistachio California Pistachio Weather Models Update Collaborative Pistachio Rootsiock Breeding Pat J. Brown Thomis J. Michailides Dissection of Pistachio Rootsiock Breeding Pistachio Scion and Rootslock Evaluation Christine Dispensional Dissection of Pistachio Evaluation Craig Kallsen 5126,079 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore 5126,799		•	\$32,169
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Investigating the effects of winter cover cropping on radiation balance, soil-water dynamics, and water productivity of mature micro-irrigated pistachio orchards Assessing Nitrogen Uptake to Develop Best Management Practices and Early Leaf Sampling Protocols for Pistachio Cultivars *Lost Hills** and *Golden Hills** Determining non-bearing pistachio nitrogen and phosphorus needs Evaluating commercially available passive plant water status measurement devices Phoebe Gordon \$33,966 Evaluation of Salinity, Boron, and Soil Hypoxia on Pistachio Tree Growth Year 3 Phoebe Gordon \$37,020 Evaluating new training systems for pistachio Culumber Culumber Culumber California Pistachio Weather Models Update Julia Stover \$20,000 Saline Irrigation on Young Kerman Trees Pistachio on UCB-1 and PGI Rootstock grown in Field Lysimeters Kaomin Vang/Gary Banuelos \$56,000 Saline Irrigation Strategies for Pistachios Louise Ferguson \$285,792 Horticulture Genetics Collaborative Pistachio Rootstock Breeding Pistachio Improvement Program Pat J. Brown Singent Trouillas \$152,026 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,844 Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,700 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore		Themis J. Michailides	\$77,500
Investigating the effects of winter cover cropping on radiation balance, soil-water dynamics, and water productivity of mature micro-irrigated pistachio orchards Assessing Nitrogen Uptake to Develop Best Management Practices and Early Leaf Sampling Protocols for Pistachio Cultivars 'Lost Hills' and 'Golden Hills' Determining non-bearing pistachio nitrogen and phosphorus needs Evaluating commercially available passive plant water status measurement devices Phoebe Gordon \$33,966 Evaluation of Salinity, Boron, and Soil Hypoxia on Pistachio Tree Growth Year 3 Phoebe Gordon \$57,026 Evaluating new training systems for pistachio California Pistachio Weather Models Update Saline Irrigation on Young Kerman Trees Pistachio on UCB-1 and PGI Rootstock grown in Field Lysimeters Kaomin Vang/Gary Banuelos \$56,000 Saline Irrigation Strategies for Pistachios Louise Ferguson \$285,792 Horticulture Genetics Collaborative Pistachio Rootstock Breeding Pistachio Improvement Program Pat J. Brown/Themis J. Michallides/Florent Trouillas Pistachio Improvement Program Pat J. Brown \$178,665 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,844 Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,700 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore	A survey of fungi producing Ochratoxin A in California pistachios and management of contamination in the field	Themis J. Michailides	\$65,499
mature micro-irrigated pistachio orchards Assessing Nitrogen Uptake to Develop Best Management Practices and Early Leaf Sampling Protocols for Pistachio Cultivars 'Lost Hills' and 'Golden Hills' Determining non-bearing pistachio nitrogen and phosphorus needs Evaluating commercially available passive plant water status measurement devices Phoebe Gordon \$33,966 Evaluation of Salinity, Boron, and Soll Hypoxia on Pistachio Tree Growth Year 3 Phoebe Gordon \$57,020 Evaluating new training systems for pistachio Cultimber California Pistachio Weather Models Update Saline Irrigation on Young Kerman Trees Pistachio on UCB-1 and PGI Rootstock grown in Field Lysimeters Kaomin Vang/Gary Banuelos \$56,000 Saline Irrigation Strategies for Pistachios Louise Ferguson \$285,792 Horticulture Genetics Collaborative Pistachio Rootstock Breeding Pistachio Improvement Program Pat J. Brown \$178,663 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,844 Pistachio Scion and Rootstock Evaluation Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,796	Horticulture Agronomics		
Cultivars *Lost Hills* and *Golden Hills* Determining non-bearing pistachio nitrogen and phosphorus needs Evaluating commercially available passive plant water status measurement devices Phoebe Gordon \$33,966 Evaluating commercially available passive plant water status measurement devices Phoebe Gordon \$33,966 Evaluating new training systems for pistachio Tree Growth Year 3 Phoebe Gordon \$57,020 Evaluating new training systems for pistachio Bruce Lampinen/Mae Culumber Sy3,976 Culumber Sulia Stover \$20,000 Saline Irrigation on Young Kerman Trees Pistachio on UCB-1 and PGI Roolstock grown in Field Lysimeters Kaomin Vang/Gary Banuelos \$56,000 Saline Irrigation Strategies for Pistachios Louise Ferguson \$285,792 Horticulture Genetics Collaborative Pistachio Roolstock Breeding Pat J. Brown/Themis J. Michailides/Florent Trouillas Pat J. Brown \$178,663 Dissecting the genetics/genomics of nutritional quality traits in pistachio Christine Diepenbrock \$51,704 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki 99,844 Pistachio Scion and Roolstock Evaluation Craig Kallsen \$97,700	1, 0	Daniele Zaccaria	\$96,825
Evaluating commercially available passive plant water status measurement devices Phoebe Gordon \$33,966 Evaluation of Salinity, Boron, and Soil Hypoxia on Pistachio Tree Growth Year 3 Phoebe Gordon \$57,020 Evaluating new training systems for pistachio California Pistachio Weather Models Update Saline Irrigation on Young Kerman Trees Pistachio on UCB-1 and PGI Rootstock grown in Field Lysimeters Kaomin Vang/Gary Banuelos \$56,000 Saline Irrigation Strategies for Pistachios Louise Ferguson \$285,792 Horticulture Genetics Collaborative Pistachio Rootstock Breeding Pat J. Brown/Themis J. Michailides/Florent Trouillas Pistachio Improvement Program Pat J. Brown Dissecting the genetics/genomics of nutritional quality traits in pistachio Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,848 Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,700 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,790		Douglas Amaral	\$91,352
Evaluation of Salinity, Boron, and Soil Hypoxia on Pistachio Tree Growth Year 3 Phoebe Gordon \$57,020 Evaluating new training systems for pistachio Bruce Lampinen/Mae Culumber \$93,978 California Pistachio Weather Models Update Julia Stover \$20,000 Saline Irrigation on Young Kerman Trees Pistachio on UCB-1 and PGI Rootstock grown in Field Lysimeters Kaomin Vang/Gary Banuelos \$56,000 Saline Irrigation Strategies for Pistachios Louise Ferguson \$285,792 Horticulture Genetics Collaborative Pistachio Rootstock Breeding Pat J. Brown/Themis J. Michailides/Florent Trouillas \$152,024 Pistachio Improvement Program Pat J. Brown Dissecting the genetics/genomics of nutritional quality traits in pistachio Christine Diepenbrock \$51,704 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,844 Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,700 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,790	Determining non-bearing pistachio nitrogen and phosphorus needs	Phoebe Gordon	\$68,485
Evaluating new training systems for pistachio California Pistachio Weather Models Update Saline Irrigation on Young Kerman Trees Pistachio on UCB-1 and PGI Rootstock grown in Field Lysimeters Kaomin Vang/Gary Banuelos \$56,000 Saline Irrigation Strategies for Pistachios Louise Ferguson \$285,792 Horticulture Genetics Collaborative Pistachio Rootstock Breeding Pat J. Brown/Themis J. Michaillides/Florent Trouillas Pistachio Improvement Program Pat J. Brown \$178,663 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,796	Evaluating commercially available passive plant water status measurement devices	Phoebe Gordon	\$33,969
Culumber \$93,976 California Pistachio Weather Models Update \$20,000 Saline Irrigation on Young Kerman Trees Pistachio on UCB-1 and PGI Rootstock grown in Field Lysimeters Kaomin Vang/Gary Banuelos \$56,000 Saline Irrigation Strategies for Pistachios Louise Ferguson \$285,792 Horticulture Genetics Collaborative Pistachio Rootstock Breeding Pat J. Brown/Themis J. Michailides/Florent Trouillas \$152,024 Pistachio Improvement Program Pat J. Brown \$178,663 Dissecting the genetics/genomics of nutritional quality traits in pistachio Christine Diepenbrock \$51,704 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,848 Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,700 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,796	Evaluation of Salinity, Boron, and Soil Hypoxia on Pistachio Tree Growth Year 3	Phoebe Gordon	\$57,020
Saline Irrigation on Young Kerman Trees Pistachio on UCB-1 and PGI Rootstock grown in Field Lysimeters Kaomin Vang/Gary Banuelos \$56,000 Saline Irrigation Strategies for Pistachios Louise Ferguson \$285,792 Horticulture Genetics Collaborative Pistachio Rootstock Breeding Pat J. Brown/Themis J. Michailides/Florent Trouillas \$152,024 Pistachio Improvement Program Pat J. Brown \$178,663 Dissecting the genetics/genomics of nutritional quality traits in pistachio Christine Diepenbrock \$51,704 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,848 Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,700 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,796	Evaluating new training systems for pistachio	• • • • • • • • • • • • • • • • • • •	\$93,978
Saline Irrigation Strategies for Pistachios Louise Ferguson \$285,792 Horticulture Genetics Collaborative Pistachio Rootstock Breeding Pat J. Brown/Themis J. Michailides/Florent Trouillas Pistachio Improvement Program Pat J. Brown \$178,665 Dissecting the genetics/genomics of nutritional quality traits in pistachio Christine Diepenbrock \$51,704 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,848 Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,700 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,796	California Pistachio Weather Models Update	Julia Stover	\$20,000
Horticulture Genetics Collaborative Pistachio Rootstock Breeding Pat J. Brown/Themis J. Michailides/Florent Trouillas Pistachio Improvement Program Pat J. Brown \$178,663 Dissecting the genetics/genomics of nutritional quality traits in pistachio Christine Diepenbrock \$51,704 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,848 Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,700 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,796	Saline Irrigation on Young Kerman Trees Pistachio on UCB-1 and PGI Rootstock grown in Field Lysimeters	Kaomin Vang/Gary Banuelos	\$56,000
Collaborative Pistachio Rootstock Breeding Pat J. Brown/Themis J. Michailides/Florent Trouillas Pistachio Improvement Program Pat J. Brown \$178,663 Dissecting the genetics/genomics of nutritional quality traits in pistachio Christine Diepenbrock \$51,704 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,848 Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,706 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,796	Saline Irrigation Strategies for Pistachios	Louise Ferguson	\$285,792
Pistachio Improvement Program Pat J. Brown Pat J. Brown Pistachio Christine Diepenbrock \$51,704 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,700 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,796	Horticulture Genetics		
Dissecting the genetics/genomics of nutritional quality traits in pistachio Christine Diepenbrock \$51,704 Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,848 Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,700 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,796	Collaborative Pistachio Rootstock Breeding		\$152,024
Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance Georgia Drakakaki \$96,848 Pistachio Scion and Rootstock Evaluation Craig Kallsen \$9,700 Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,796	Pistachio Improvement Program	Pat J. Brown	\$178,663
Pistachio Scion and Rootstock Evaluation Serior Scion and Rootstock Evaluation Serior	Dissecting the genetics/genomics of nutritional quality traits in pistachio	Christine Diepenbrock	\$51,704
Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio Richard Michelmore \$126,796	Dissection of Pistachio Fruit Development Towards Optimal Shell Split and Insect Resistance	Georgia Drakakaki	\$96,848
	Pistachio Scion and Rootstock Evaluation	Craig Kallsen	\$9,700
Pistachio Pan-genome for Accelerated Breeding J. Grey Monroe \$127,594	Development of Molecular Markers and Biotechnological Approaches to Improve Agricultural Traits in Pistachio	Richard Michelmore	\$126,796
	Pistachio Pan-genome for Accelerated Breeding	J. Grey Monroe	\$127,594

Horticulture Physiology		
Do cover crops help lower canopy temperatures and enhance chill accumulation in Pistachios?	Gurreet Brar	\$47,451
Metabolomics analysis of bud and shoot samples during the dormant period from two pistachios cultivars	Gurreet Brar	\$62,612
Early to bed? Managing Dormancy induction to enhance chill accumulation and endodormancy in Pistachios	Gurreet Brar	\$44,886
Effect of bloom time on pistachio hull integrity and nut quality at harvest	Barbara Blanco-Ulate	\$80,431
Early detection of pistachio hull breakdown by biomarkers in Kerman and Golden Hills	Barbara Blanco-Ulate	\$40,510
Gene expression marker-enabled precise and reliable application of rest-breaking enhancing chemicals	Li Tian	\$64,597
Confronting Central Valley's Variable Climatic Conditions: Developing Novel Tree Carbohydrate Budget-Based Methods for the Sustainable Management of Pistachio Orchards	Maciej Zwieniecki	\$99,280
Determining severity of Internal Kernel Discoloration Incidence in Pistachio Cultivars	Pheobe Gordon	\$22,175
Mechanics		
Development of Precision Yield Monitor For Pistachio	Stavros Vougioukas/Patrick H. Brown	\$60,000
Pathology		
Quantification and management of fungicide resistance in Alternaria populations causing Alternaria late blight in California pistachio orchards	Themis J. Michailides	\$65,038
Is there a risk of plant-parasitic nematodes in pistachio on current and future rootstocks?	Andreas Westphal	\$64,582
Evaluating the Efficacy of Phosphites, Mefenoxam and New Oomycota Fungicides for Managing Phytophthora Crown and Root Rot of Pistachio	Florent Trouillas	\$66,753
		\$2,975,964