

## **Cooperative Specialist in Sustainable Arthropod Management for Tree, Vine and Small Fruit Crops**

**Developed by:** Entomology, Arthropod and Vertebrate Pests Program Team and UC Davis Department of Entomology and Nematology, Cindy Kron (UCANR), Joanna Chiu (UCD), Frank Zalom (UCD), Ian Grettenberger (UCD), and Kent Daane (UCB and KARE). Houston Wilson (UCR) contributed to an earlier draft. External stakeholders who were consulted and engaged with in preparation of this proposal include Joe Grant (California Walnut Board & Commission), Sebastian Saa (Almond Board of California), Gary Obenauf (California Specialty Crops Council), Lynn LeBeck (Association of Natural Biological Control Producers), Zach Bagley (California Prune Board), Stephen Vasquez (Pistachio Research Board), Bill Turechek (California Strawberry Commission), Leslie Alfonso (California Cherry Board), Mary McDonnell (California Olive Committee), Bob McClain (California Pear Advisory Board), Chris Zanobini (California Cling Peach Advisory Board), and Ruthann Anderson (CA Agricultural Production Consultants Assoc.), Stephanie Bolton (Lodi Winegrape Commission), Davis Pagos (CA Invasive Species Council).

**Position Title:** UCCE Specialist in Sustainable Arthropod Management for Tree, Vine and Small Fruit Crops

**Headquarters and Coverage Area:** The CE Specialist will be based in the Department of Entomology and Nematology at UCD, with a laboratory in Briggs Hall. They will benefit from close proximity to the strong UCD Plant Sciences, Viticulture & Enology, and Plant Pathology departments, which together provide exceptional opportunities for interdisciplinary collaboration. UCD's faculty expertise and research infrastructure support collaborative work across departments. UCD's location is ideally situated to facilitate impact on tree, vine and small fruit crops in the northern San Joaquin Valley, Sacramento Valley, central and north coast, and Sierra foothills, and to facilitate interaction with relevant state agencies including CDFA and CDPR.

**Position Overview:** This position will focus on advancing integrated pest management for endemic, emerging, and invasive arthropod pests of tree, vine, and small fruit crops to support the economic viability and resilience of these California crops. This will include tactics like biological controls, cultural controls, semiochemicals, exploitation of insect-plant interactions, and reduced-risk conventional and bio-pesticides and will leverage technological innovations. Candidates must have a Ph.D. in entomology, insect science, or a closely related discipline and experience with agricultural entomology, biological control, chemical control, plant-insect interactions, and ecologically based pest management. The CE Specialist will be an integral part of the Department of Entomology and Nematology at UC Davis. This scientist and educator will collaborate with other UCANR pest management and horticultural production CE Specialists, faculty representing multiple disciplines and departments at UC Davis and other UC campuses, UCANR Farm Advisors across the state with pest management responsibilities and interests, and the UCIPM program which is based in Davis. This position will also play a key role in training, both directly and through extension, the next generation of pest management professionals and leaders who will guide California agriculture through a rapidly changing environmental and regulatory landscape.

**Justification: Needs:** California's tree, vine, and small fruit crops are valued at over \$25B annually. However, they are facing intensifying pressures from invasive pests, endemic pests becoming more damaging under shifting climate and environmental stressors, and a regulatory landscape that is shifting towards reduced-risk and systems-based pest management under CA

DPR's Sustainable Pest Management Roadmap. Pest-related losses can exceed 10% of production value (>\$2.3B annually), with management costs surpassing \$1B/year. This position would address these challenges by developing management programs emphasizing sustainable but economical practices through a dedicated research and extension program. This position is urgently needed to address the following significant issues facing stakeholders for these crops: *Issue 1: Economic impacts and responding to a dynamic management environment with substantial yield losses and management costs. Issue 2: Water quality, environmental risk, and worker safety. Reducing contamination through water run-off is mandated in California's Irrigated Land Regulatory Program, while reductions in pesticide use and reductions in pesticides of regulatory concern is key to many other issues, including food safety and improving worker safety. Issue 3: Climate change: A changing climate is predicted to increase pest pressure in many cases, increasing management challenges.* At the same time, recent and pending retirements have created a critical gap in UCANR's applied entomology capacity for these crops. This position was identified as a high priority by the Entomology Program Team and is strongly supported by commodity boards, state agencies, and PCAs, who have highlighted the need for biologically based control strategies, new management options, resistance management, invasive species preparedness, and decision-support tools tailored to these production systems. The CE Specialist would provide necessary expertise in the northern San Joaquin Valley, the Sacramento Valley, and central and north coast counties. Outcomes/Impacts: This position will deliver stakeholder-driven research and extension that advances systems-based Integrated Pest Management (IPM), contributing to various UCANR condition changes. These will include increased ecological sustainability of agricultural landscapes, improved water quality and biodiversity, enhanced climate resilience, and increased profitability and stability of agricultural systems. They will also include increased stability, efficiency, and profitability of agriculture and working landscapes and enhanced food systems and markets (e.g., crops/products, supply chains, diversified/niche markets). This position will work closely with other faculty and UCANR advisors to build capacity and support their efforts to support clientele and effect condition changes. This position aligns closely with UCANR's Strategic Vision 2040 by addressing one of the three challenges relating to UCANR's research and programming core, notably *Agriculture and Food Systems*. It also addresses two of the four challenges that are overarching and impact all areas of UCANR research and programmatic activities: *Climate Change and Regulations, Policy, and Compliance*.

**Extension:** Extension activities will include integrating the specialist's own research with that of UC campus faculty, CE Specialists, CE Farm Advisors, and others to mitigate pest damage on tree, vine and small fruit crops. Methodology will include participation in county CE workshops and field days, contributing to extension publications (including *UCIPM Pest Management Guidelines* and *California Agriculture*), newsletters, web pages, blogs, commodity group publications, and participation in UCANR Program Teams and Workgroups. Key clientele groups will include almond, pistachio, walnut, grape, strawberry, cherry, prune, pear, and olive growers, Pest Control Advisers, and other commercial entities related to their pest management and production, state and Federal agencies, NGOs, and media. Expected extension outlets would include ANR publications including *UCIPM Pest Management Guidelines*, UCANR Production Manuals, blogs and newsletters, and appropriate industry magazines such as *CAPCA Adviser*.

**Research:** The CE Specialist will develop a solutions-oriented applied research program on sustainable management of endemic, emerging, and invasive arthropod pests in California tree, vine, and small fruit systems. Research will develop and evaluate tactics to integrate into systems-

based IPM frameworks, which will include biological control (e.g., conservation and augmentation biocontrol), chemical ecology (e.g., semiochemicals for monitoring and mating disruption), cultural practices, reduced-risk and biological pesticides, and novel and registered pesticides. Research will aim to improve pest management under changing climate conditions, mitigate resistance development, reducing environmental impacts (including pesticide runoff and non-target effects), and address invasive species threats. Research will include on-farm and research station trials, and could incorporate tools such as advanced spray technologies, remote sensing, automated monitoring, and predictive modeling. The Specialist will work collaboratively with UC ANR Advisors, UC IPM, campus faculty, commodity groups, and agencies to ensure stakeholder-driven priorities and implementable outcomes. Research outputs will include decision-support tools and best management practices disseminated through peer-reviewed journals (e.g., *Journal of Economic Entomology*, *Pest Management Science*, *Environmental Entomology*) and applied outlets such as *California Agriculture*.

**UC ANR Network:** The CE Entomology Specialist will fill a key need not currently covered by other campus-based CE Specialists. Specifically, the proposed CE Entomology Specialist will provide ANR with the expertise needed to develop novel sustainable pest management programs in tree, vine and small fruit, entomology in collaboration with CE Advisors and stakeholders in the central and north coast, north central San Joaquin Valley, Sierra Foothills and Sacramento Valley. The Specialist will integrate world-class expertise from UCD-based AES and CE scientists in pest management and production, county-based IPM and Farm Advisors, and scientists at other UCs and agencies across a broad range of disciplines, strengthening the Food Systems Resiliency Network and supporting CE Advisors throughout the state whose work requires entomological expertise for tree, vine and small fruit crops. The CE Specialist will collaborate with and support appropriate CE Farm Advisors colleagues across the state including Cindy Kron, Jhalendra Rijal, David Haviland, Dylan Beal, Sudan Gyawaly, Mark Bolda, Franz Niederholzer, Hamutahl Cohen, Becky Wheeler-Dykes, and Mackenzie Faith Patton. The CE Specialist will be a participant and leader in appropriate ANR Program Teams.

**Network External to ANR:** The Specialist will interact with professional colleagues through participation in the Entomological Society of America and other professional organizations focused on entomology and pest management, and relevant USDA Multistate Research Coordinating Committees. Coordination and collaboration will also occur with state and Federal agencies including CDFA, CDPR, USDA-ARS, USDA-APHIS, US-EPA, and NGOs such as CURES (pesticide runoff mitigation) and CAFF (sustainable agriculture).

**Support:** Department of Entomology and Nematology at UC Davis will provide office and laboratory space, shared equipment, and administrative support (account management, purchasing/travel, and IT services) in Briggs Hall on the central UC Davis campus. Start-up funds (supplied in part by CAES and the department) will be provided in accordance with the candidate's needs. Centralized greenhouse facilities are available, as are growth chambers.

**Other support:** Significant funding opportunities exist for research and extension on tree, vine and small fruit crops. There is an established history of funding for applied entomological projects from commodity groups that have expressed support for this position as well as from private industry sources. Previous CE Entomology Specialists have also obtained substantial funding through competitive grants from USDA-NIFA, CDFA, US-EPA, and CDPR.