

## Matthew Patrick Daugherty

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### EDUCATION

Ph.D. Integrative Biology (2006), University of California, Berkeley

M.S. Biological Sciences (2000), Illinois State University

B.S. Biological Sciences, minor in Geology (1995), University of California, Davis

### PROFESSIONAL APPOINTMENTS

2019-present **Cooperative Extension Specialist**, Department of Entomology, University of California-Riverside

2015-2019 **Associate Cooperative Extension Specialist**, Department of Entomology, University of California-Riverside

2009-2015 **Assistant Cooperative Extension Specialist**, Department of Entomology, University of California-Riverside

2008-2009 **USDA Postdoctoral Fellow**, Department of Environmental Sciences, Policy & Management, University of California-Berkeley

2006-2008 **Postdoctoral Researcher**, Department of Environmental Sciences, Policy & Management, University of California-Berkeley

### PUBLICATIONS & MANUSCRIPTS

Schartel, T.E., Bayles, B.R., Cooper, M.L., Simmons, G.S., Thomas, S.M., Varela, L.G., and M.P. Daugherty. 2019. Reconstructing the European grapevine moth (Lepidoptera: Tortricidae) invasion in California: insights from a successful eradication. *Annals of the Entomological Society of America* 112:107-117

Daugherty, M.P., and R.P.P. Almeida. 2019. Understanding how an invasive vector drives Pierce's disease epidemics: seasonality and vine-to-vine spread. *Phytopathology* 109:277-285

Lillian, S., Redak, R.A., and M.P. Daugherty. 2019. Assessing the role of differential herbivore performance among plant species in associational effects involving the invasive stink bug *Bagrada hilaris* (Hemiptera: Pentatomidae). *Environmental Entomology* 48:114-121

Lillian, S., Redak, R.A., and M.P. Daugherty. 2018. Associational susceptibility of a native shrub induced by context-dependent attraction of an invasive herbivore. *Ecosphere* 9:e02442

Del Cid, C., Krugner, R., Zeilinger, A.R., Daugherty, M.P., and R.P.P. Almeida. 2018. Plant water stress and vector feeding preference mediate transmission efficiency of a plant pathogen. *Environmental Entomology* 47:1471-1478

Sicard, A., Zeilinger, A.R., Vanhove, M., Schartel, T.E., Beal, D.J., Daugherty, M.P., and R.P.P. Almeida. 2018. *Xylella fastidiosa*: insights into an emerging plant pathogen. *Annual Review of Phytopathology* 56:181-202

Daugherty, M.P., Almeida, R.P.P., Smith, R.J., Weber, E.A., and A.H. Purcell. 2018. Severe pruning of infected grapevines has limited efficacy for managing Pierce's disease. *American Journal of Enology and Viticulture* 69:289-294

- Cooper, M. L., Daugherty, M.P., Jeske, D.R., Almeida, R.P.P., and K.M. Daane. 2018. Incidence of grapevine leafroll disease: effects of grape mealybug (*Pseudococcus maritimus*) abundance and pathogen supply. *Journal of Economic Entomology* 111:1542-1550
- Simmons, G.S., Varela, L., Daugherty, M., Cooper, M., Lance, D., Mastro, V., Cardé, R.T., Lucchi, A., Ioriatti, C., Bagnoli, B., Steinhauer, R., Broadway, R., Stone smith, B., Hoffman, K., Clark, G., Whitmer, D. and R. Johnson. 2018. Area-wide eradication of the European grapevine moth, *Lobesia botrana* in California, USA. IN: Proceedings of the Third FAO-IAEA International Conference on Area-wide Management of Insect Pests: Integrating the Sterile Insect and Related Nuclear and Other Techniques. Vienna, Austria. 22-26 May 2017.
- Byrne, F.J., Grafton-Cardwell, E.E., Morse, J.G., Olguin, A.E., Zeilinger, A.R., Wilen, C., Bethke, J., and M.P. Daugherty. 2018. Assessing the risk of containerized citrus contributing to Asian citrus psyllid (*Diaphorina citri*) spread in California: residence times and insecticide residues at retail nursery outlets. *Crop Protection* 109:33-41
- Tofangsazi, N., Morales-Rodriguez, A., Daugherty, M.P., Simmons, G.S., and E.E. Grafton-Cardwell. 2018. Residual toxicity of selected organic insecticides to *Diaphorina citri* (Hemiptera: Liviidae) and non-target effects on *Tamarixia radiata* (Hymenoptera: Eulophidae) in California. *Crop Protection* 108:62-70
- Thomas, S.M., Simmons, G.S., and M.P. Daugherty. 2017. Spatiotemporal distribution of an invasive insect in an urban landscape: introduction, establishment and impact. *Landscape Ecology* 32:2041-2057
- Daugherty, M.P., Zeilinger, A.R., and R.P.P Almeida. 2017. Conflicting effects of climate and vector behavior on the spread of a plant pathogen. *Phytobiomes* 1:46-53
- Cassone, B.J., Kay, R.G., Daugherty, M.P., and B.J. White. 2017. Comparative transcriptomics of malaria mosquito testes: function, evolution, and linkage. *G3* 7:1127-1136
- Bayles, B.R., S.M. Thomas, G.S Simmons, E.E. Grafton-Cardwell, and M.P. Daugherty. 2017. Spatiotemporal dynamics of the Southern California Asian citrus psyllid (*Diaphorina citri*) invasion *PLoS One* 12:e0173226
- Byrne, F., Daugherty, M.P., Grafton-Cardwell, E.E., Bethke, J., and J. Morse. 2017. Evaluation of systemic neonicotinoid insecticides for the management of the Asian citrus psyllid *Diaphorina citri* on containerized citrus. *Pest Management Science* 73:506-514
- Poudel, M., E. Grafton-Cardwell, M. Daugherty, J. Almanzor, A. Washburn, G. Simmons, and J. Morse. 2016. Evaluation of Selected Insecticides for Asian Citrus Psyllid Control, 2014. *Arthropod Management Tests* 41:1-2
- Conlisk, E., Swab, R., Martínez-Berdeja, A., and M.P. Daugherty. 2016. Post-fire recovery in coastal sage scrub: seed rain and community trajectory. *PLoS One* 11:e0162777
- Coletta-Filho, H.D., Bittleston, L.S., Lopes, J.R.S., Daugherty, M.P., and R.P.P. Almeida 2015. Genetic distance may underlie virulence differences among isolates of a bacterial plant pathogen. *Journal of Plant Pathology* 97:465-469
- Rathé, A.A., Pilkington, L.J., Spohr, L.J., Hoddle, M.S., Daugherty, M.P., and G.M. Gurr 2015. Invasion pathway risk analysis for the glassy-winged sharpshooter (*Homalodisca vitripennis*): survival and reproductive success following simulated air transportation. *Biological Invasions* 17:2963-2973
- Daugherty, M.P., O'Neill, S., Byrne, F., and A. Zeilinger 2015. Is vector control sufficient to limit pathogen spread? *Environmental Entomology* 44:789-797

- Zeilinger, A., and M.P. Daugherty 2014. Vector preference and host defense against infection interact to determine disease dynamics. *Oikos* 123:613-622
- Coletta-Filho, H., Daugherty, M.P., Ferreira, C., and J. Lopes. 2014. Temporal progression of *Candidatus Liberibacter asiaticus* infection in citrus and acquisition efficiency by *Diaphorina citri*. *Phytopathology* 104:416-421
- Rathé, A.A., Pilkington, L.J., Hoddle, M.S., Spohr, L.J., Daugherty, M.P., and G.M. Gurr 2014. Feeding and development of the glassy-winged sharpshooter, *Homalodisca vitripennis*, on Australian native plant species in the USA and implications for Australian biosecurity. *PLoS One* 9:e90410
- Rashed, A., Kwan, J., Baraff, B., Ling, D., Daugherty, M.P., Killiny, N., and R.P.P. Almeida 2013. Relative susceptibility of *Vitis vinifera* cultivars to vector-borne *Xylella fastidiosa* through time. *PLoS One* 8:e55326
- Gruber, B.R., and M.P. Daugherty 2013. Predicting the effects of seasonality on the risk of pathogen spread in vineyards: vector pressure, natural infectivity, and host recovery. *Plant Pathology* 62:194-204
- Rathé, A.A., Pilkington, L.J., Gurr, G.M., Hoddle, M.S., Daugherty, M.P., Constable F.E., Luck, J.E., Powell, K.S., Fletcher, M.J., and O.R. Edwards 2012. Incursion preparedness: anticipating the arrival of an economically important plant pathogen *Xylella fastidiosa* Wells (Proteobacteria: Xanthomonadaceae) and the insect vector *Homalodisca vitripennis* (Germar) (Hemiptera: Cicadellidae) in Australia. *Australian Journal of Entomology* 51:209-220
- Rathé, A.A., Pilkington, L.J., Gurr, G.M., and M.P. Daugherty 2012. Potential for persistence and within-plant movement of *Xylella fastidiosa* in Australian native plants. *Australasian Plant Pathology* 41:405-412
- Tsai, C.W., Daugherty, M.P., and R.P.P. Almeida 2012. Seasonal dynamics and virus translocation of *Grapevine leafroll-associated virus 3* in grapevine cultivars. *Plant Pathology* 61:977-985
- Daugherty, M.P., Gruber, B.R., Almeida, R.P.P., Anderson, M.M., Cooper, M.L., Rasmussen, Y.D., and E.A. Weber 2012. Testing the efficacy of barrier plantings for limiting sharpshooter spread. *American Journal of Enology and Viticulture* 63:139-143
- Daugherty, M.P. 2011. Host plant quality, spatial heterogeneity, and the stability of mite predator-prey dynamics. *Experimental and Applied Acarology* 9:311-322
- Daugherty, M.P., Rashed, A., Almeida, R.P., and T. Perring 2011. Vector preference for host infection status: sharpshooter movement and *Xylella fastidiosa* transmission. *Ecological Entomology* 36:654-662
- Rashed, A., Daugherty, M.P., R.P.P. Almeida 2011. Grapevine cultivar susceptibility to *Xylella fastidiosa* does not affect vector transmission success. *Environmental Entomology* 40:1192-1199
- Lopes, J.R.S., Daugherty, M.P. and R.P.P. Almeida 2010. Strain origin drives virulence and persistence of *Xylella fastidiosa* in alfalfa. *Plant Pathology* 59:963-971
- Daugherty, M.P., Lopes, J.R.S. and R.P.P. Almeida 2010. Strain-specific alfalfa water stress induced by *Xylella fastidiosa*. *European Journal of Plant Pathology* 127:333-340
- Daugherty, M.P., Lopes, J.R.S. and R.P.P. Almeida 2010. Vector within-host feeding preference mediates transmission of a heterogeneously distributed pathogen. *Ecological Entomology* 35:360-366

- Prado, S.S., Hung, K.Y., Daugherty, M.P. and R.P.P. Almeida 2010. Indirect effects of temperature on stink bug fitness via maintenance of gut-associated symbionts. *Applied and Environmental Microbiology* 76:1261-1266
- Daugherty, M.P., Bosco, D. and R.P.P. Almeida 2009. Temperature mediates vector transmission efficiency: inoculum supply and plant infection dynamics. *Annals of Applied Biology* 155:361-369
- Daugherty, M.P. and R.P.P. Almeida 2009. Estimating *Xylella fastidiosa* transmission parameters: decoupling sharpshooter number and feeding period. *Entomologia Experimentalis et Applicata* 132:84-92
- Lopes, J.R.S., Daugherty, M.P., and R.P.P. Almeida 2009. Context-dependent transmission of a generalist plant pathogen: host species and pathogen strain mediate insect vector competence. *Entomologia Experimentalis et Applicata* 131:216-224
- Prado, S.S., Golden, M., Follett, P.A., Daugherty, M.P., and R.P.P. Almeida 2009. Demography of gut symbiotic and aposymbiotic *Nezara viridula* L. (Hemiptera: Pentatomidae). *Environmental Entomology* 38:103-109
- Daugherty, M.P. 2009. Different herbivore feeding modes promote coexistence: insights from a metabolic pool model. *Environmental Entomology* 38:667-676
- Daugherty, M.P., Welter, S. C., and C. J. Briggs 2007. Top-down and bottom-up control of pear psylla (*Cacopsylla pyricola*): Plant quality and the efficacy of the predator *Anthocoris nemoralis*. *Biological Control* 43:257-264
- Daugherty, M.P. and C.J. Briggs 2007. Multiple sources of isotopic variation in a terrestrial arthropod community: challenges for disentangling food webs. *Environmental Entomology* 36:776-791
- Daugherty, M.P., Harmon, J.P., and C.J. Briggs 2007. Trophic supplements to intraguild predation. *Oikos* 116:662-677
- Lloyd-Smith, J.O., Cross, P.C., Briggs, C.J., Daugherty, M.P., Getz, W.M., Latta, J., Sanchez, M.S., Smith, A.B., and A. Swei 2005. Should we expect population thresholds for wildlife disease? *Trends in Ecology & Evolution* 20:511-519
- Daugherty, M.P., and S.A. Juliano 2003. Leaf-scraping beetle feces are a food resource for *Ochlerotatus triseriatus*. *American Midland Naturalist* 150:181-184
- Daugherty, M.P., and S.A. Juliano 2002. Testing for context-dependence in a processing chain interaction among detritus-feeding aquatic insects. *Ecological Entomology* 27:541-553
- Daugherty, M.P., and S.A. Juliano 2001. Factors affecting the abundance of scirtid beetles in container habitats. *Journal of the North American Benthological Society* 20:109-117
- Daugherty, M.P., Alto, B.A., and S.A. Juliano 2000. Invertebrate carcasses as a resource for competing *Aedes albopictus* and *Aedes aegypti* (Diptera: Culicidae). *Journal of Medical Entomology* 37:364-372

#### **RECENT GRANTS OR AWARDS**

- Outstanding Faculty Award, UC Riverside Entomology Graduate Student Association, 2015.
- Plant-Insect Ecosystems Award from the Pacific Branch of the Entomological Society of America, April 2014

- Co-PI, Pierce's Disease Control Program, "Addressing knowledge gaps in Pierce's disease epidemiology: underappreciated vectors, genotypes, and patterns of spread", 07/2018 - 06/2020
- PI, California Department of Food & Ag, "Riverside County glassy-winged sharpshooter program – Temecula/Coachella Valley", 07/2015 - 06/2020
- PI, USDA-APHIS, "Development of IPM and biological control strategies for management of Asian citrus psyllid in California", 10/2015 - 09/2019
- PI, Pierce's Disease Control Program, Quantifying vine mealybug (*Planococcus ficus*) spatiotemporal dynamics: assessing invasion risk to refine management strategies", 07/2017 - 06/2020
- PI, USDA-APHIS, "Monitoring and control of European grapevine moth, *Lobesia botrana*", 09/2015 - 09/2018
- Co-PI, USDA-APHIS, "Determining optimum ACP sampling protocols in California to assess vector management treatments and improving prediction of HLB risk through ACP Ct value analysis", 12/2016 - 12/2018

## **PROFESSIONAL ACTIVITIES**

### **Selected recent conference presentations, posters, invited seminars**

- "Invasion dynamics and the role of urban-ag spillover by the Asian citrus psyllid", Department of Biology, CSU Fullerton, 10/2019
- "Does associational susceptibility by an invasive herbivore and weed explain declines in a native shrub?" Essig Museum Brunch, UC Berkeley 4/2019
- "Understanding the effects of climate on Pierce's disease epidemiology", Pacific Branch meeting of the Entomological Society of America, San Diego, CA 4/2019
- "Does associational susceptibility by an invasive herbivore and weed explain declines in a native shrub?" Invaio Biosciences, Cambridge, MA 10/2018
- "Quantifying *Diaphorina citri* invasion dynamics in Southern California citrus groves", International Research Conference on Huanglongbing, Orlando, FL 3/2017
- "Reconstructing the Asian citrus psyllid invasion in California", California Asian Citrus Psyllid and Huanglongbing Research and Extension Summit, Riverside, CA, 10/2016
- "Management of *Diaphorina citri* in urban areas: how effective are residential treatments?" California Asian Citrus Psyllid and Huanglongbing Research and Extension Summit, Riverside, CA 10/2016
- "Epidemiological significance of vector behavior: interactions with plant resistance traits and climate", International Congress of Entomology, Orlando, FL 9/2016
- "Assessing the risk of nurseries contributing to Asian citrus psyllid spread in California", Pacific Branch of the Entomological Society of America, Honolulu, HI 4/2016
- "Linking associational susceptibility and invasional meltdown: Are an invasive herbivore and annual plant conspiring against a native shrub?" Department of Biology, San Francisco State University 3/2016

### **Selected recent extension presentations**

- "An update on glassy-winged sharpshooter and other invasive insects in California vineyards", Temecula Grape Day, Temecula, CA 4/2019

“Revisiting our understanding of Pierce’s disease epidemiology in the North Coast”, Sonoma County Grape Day, Santa Rosa, CA 2/2019

“Pierce’s disease epidemiology and management in North Coast vineyards”, Sustainable Ag Expo, San Luis Obispo, CA 11/2018

“Glassy-winged sharpshooter and Pierce’s disease: current status and management recommendations”, Yucaipa Valley Wine Alliance Workshop, Yucaipa, CA 8/2018

“Asian citrus psyllid and the citrus disease huanglongbing”, Annual Integrated Pest Management Training for Landscape Professionals, UCCE San Diego County, San Diego, CA 5/2018

“Glassy-winged sharpshooter and Pierce’s disease in Temecula: current status and management recommendations”, Temecula Valley Grape Day, Temecula, CA 4/2018

“*Xylella fastidiosa* diseases: tales of a generalist plant pathogen”, International Lilac Society, Riverside, CA 4/2018

“Understanding what is driving the Pierce’s disease epidemic: an update”, Sonoma County Vineyard Technical Group, Santa Rosa, CA 3/2018

“Understanding what is driving the Pierce’s disease epidemic: an update”, Napa County Vineyard Technical Group, Napa, CA 3/2018

“Biology and management of insect pests in the (rose) garden”, Raincross Rose Society, Riverside, CA 3/2018

*Online extension resources:*

ACP and HLB online course for retail nurseries: <http://class.ucanr.edu/>

ACP/HLB Distribution and Management: <http://ucanr.edu/sites/ACP/>

Temecula GWSS and Pierce's disease blog: <http://cizr.ucr.edu/temeculagwss/>

Center for Invasive Species Research, species accounts:

- European Grapevine Moth [http://cizr.ucr.edu/european\\_grapevine\\_moth.html](http://cizr.ucr.edu/european_grapevine_moth.html)
- Brown-marmorated stinkbug [http://cizr.ucr.edu/brown\\_marmorated\\_stinkbug.html](http://cizr.ucr.edu/brown_marmorated_stinkbug.html)
- Vine mealybug [http://cizr.ucr.edu/vine\\_mealybug.html](http://cizr.ucr.edu/vine_mealybug.html)
- Sudden oak death [http://cizr.ucr.edu/sudden\\_oak\\_death.html](http://cizr.ucr.edu/sudden_oak_death.html)
- Chytrid fungus [http://cizr.ucr.edu/chytrid\\_fungus.html](http://cizr.ucr.edu/chytrid_fungus.html)
- Argentine ant [http://cizr.ucr.edu/argentine\\_ant.html](http://cizr.ucr.edu/argentine_ant.html)

**Synergistic activities**

Co-chair, organizing committee for the California Asian Citrus Psyllid & Huanglongbing Research and Extension Summit

Member, Citrus Research Board’s HLB Data Analytic Tactical Operations Cell

Member, organizing committee for the Pierce’s Disease Research Symposium

Panel Member, NSF Graduate Research Fellowship Program

Judge, UC Master Gardener “Search for Excellence” competition