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 (1995), University of California, Davis

PROFESSIONAL APPOINTMENTS

2018-present **Cooperative Extension Specialist**, Department of Entomology, University of California-Riverside
2015-2018 **Associate Cooperative Extension Specialist**, Department of Entomology, University of California-Riverside
2009-2015 **Assistant Cooperative Extension Specialist**, Department of Entomology, University of California-Riverside
2006-2009 **Postdoctoral Researcher**, Department of Environmental Sciences, Policy & Management, University of California-Berkeley

PUBLICATIONS & MANUSCRIPTS

Daugherty MP, Cooper ML, Smith RJ, Varela LG & RPP Almeida. 2024. Revisiting the epidemiological role of a native vector in Northern California vineyards. *Annals of the Entomological Society of America*, in press.

Ferrater JB, Gomez-Marco F, Yoshimoto AK, Greene TD, Simmons GS, Daugherty MP & PF Rugman-Jones. 2024. Development of a sterile insect technique as a control strategy for the Asian citrus psyllid, *Diaphorina citri:* establishing the effect of sterilizing X-rays on fecundity, fertility, and survival. *Journal of Economic Entomology* 117:1356-66

Zumbado-Ulate H, Schartel TE, Simmons GS & MP Daugherty. 2023. Assessing the risk of invasion by a vineyard moth pest guild. *NeoBiota* 86:169-91

Khan AK, Sicard A, Cooper ML, Daugherty MP, Donegan MA & RPP Almeida. 2023. Progression of *Xylella fastidiosa* infection in grapevines under field conditions. *Phytopathology* 113:1465-73

Benelli G, Lucchi A, Anfora G, Bagnoli B, Botton M, Campos-Herrera R, Carlos C, Daugherty MP, et al. 2023. European grapevine moth, *Lobesia botrana*, part i: biology and ecology. *Entomologia Generalis* 43:261-80

Benelli G, Lucchi A, Anfora G, Bagnoli B, Botton M, Campos-Herrera R, Carlos C, Daugherty MP, et al. 2023. European grapevine moth, *Lobesia botrana*, part ii: prevention and management. *Entomologia Generalis* 43:281-304

Grafton-Cardwell EE, Gu P & MP Daugherty. 2022. Impact of citricola scale *Coccus pseudomagnoliarum* (Hemiptera: Coccidae) on Valencia orange, *Citrus sinensis,* production and fruit quality. *Journal of Economic Entomology* 115:2121-24

Grafton-Cardwell EE, Gu P & MP Daugherty. 2022. Impact of *Icerya purchasi* (Hemiptera: Monophlebidae) on navel orange, *Citrus sinensis*, production and fruit quality. *Journal of Economic Entomology* 115:1627-36

Bayles BR, Thomas SM, Simmons GS and MP Daugherty. 2022. Quantifying spillover of an urban invasive vector of plant disease: Asian citrus psyllid (*Diaphorina citri*) in California citrus. *Frontiers in Insect Science* 2:783285

Beal DJ, Adams AG, Cooper ML, Varela LG, Smith RJ, Kron CR, Almeida RPP & MP Daugherty. 2021. Assessment of nymphal ecology and adult *Xylella fastidiosa* transmission biology of *Aphrophora* nr. *permutata* (Hemiptera: Aphrophoridae) in California vineyards. *Environmental Entomology* 50:1446-54

Grafton-Cardwell EE, Leonard JT, Daugherty MP & DH Headrick. 2021. Mating disruption of the California red scale, *Aonidiella aurantii* (Hemiptera: Diaspididae) in Central California citrus. *Journal of Economic Entomology* 114:2421-29

Grafton-Cardwell EE & MP Daugherty. 2021. Impact of insecticide treatments for *Phyllocnistis citrella* (Lepidoptera: Gracillariidae) on growth and yield of young *Citrus reticulata* mandarins. *Journal of Economic Entomology* 114:1226-33

Beal DJ, Cooper ML, Daugherty MP, Purcell AP & RPP Almeida. 2021. Seasonal abundance and infectivity of *Philaenus spumarius* (Hemiptera: Aphrophoridae), a vector of *Xylella fastidiosa* in California vineyards. *Environmental Entomology* 50:467-76

Schartel TE, Cooper ML, May A & MP Daugherty. 2021. Quantifying *planococcus ficus* (Hemiptera: Pseudococcidae) invasion in Northern California vineyards to inform management strategy. *Environmental Entomology* 50:138-48

Zorzenon FPF, Tomaseto AF, Daugherty MP, Lopes JRS & MP Miranda. 2021. Factors associated with *Diaphorina citri* immigration into commercial citrus orchards in Sao Paulo State, Brazil. *Journal of Applied Entomology* 145:326-35

Simmons GS, Varela L, Daugherty M, Cooper M, Lance D, Mastro V, Cardé RT, Lucchi A, Ioriatti C, Bagnoli B, Steinhauer R, Broadway R, Stone Smith B, Hoffman K, Clark G, Whitmer D & R Johnson. 2021. Area-wide eradication of the invasive European grapevine moth, *Lobesia botrana* in California, USA, pp. 581–96. *In J. Hendrichs, R. Pereira & M. J. B. Vreysen (eds.), Area-wide integrated pest management. Development and field application. CRC Press, Boca Raton, FL, USA*

Byrne F, Daugherty MP & EE Grafton-Cardwell. 2020. Rapid uptake and retention of neonicotinoids in nursery citrus trees as a safeguard against Asian citrus psyllid (*Diaphorina citri*) infestation. *Crop Protection* 138:105345

Schartel TE, Bayles BR, Cooper ML, Simmons GS, Thomas SM, Varela LG & MP Daugherty. 2019. Reconstructing the European grapevine moth (Lepidoptera: Tortricidae) invasion in California: insights from a successful eradication. *Annals of the Entomological Society of America* 112:107-17

Daugherty MP & RPP Almeida. 2019. Understanding how an invasive vector drives Pierce's disease epidemics: seasonality and vine-to-vine spread. *Phytopathology* 109:277-85

Lillian S, Redak RA & MP 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* 48:114-21

Lillian S, Redak RA & MP 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 AR, Daugherty MP & RPP. Almeida. 2018. Plant water stress and vector feeding preference mediate transmission efficiency of a plant pathogen. *Environmental Entomology* 47:1471-8

Sicard A, Zeilinger AR, Vanhove M, Schartel TE, Beal DJ, Daugherty MP & RPP Almeida. 2018. *Xylella fastidiosa*: insights into an emerging plant pathogen. *Annual Review of Phytopathology* 56:181-202

Daugherty MP, Almeida RPP, Smith RJ, Weber EA & AH Purcell. 2018. Severe pruning of infected grapevines has limited efficacy for managing Pierce's disease. *American Journal of Enology & Viticulture* 69:289-94

Cooper ML, Daugherty MP, Jeske DR, Almeida RPP & KM Daane. 2018. Incidence of grapevine leafroll disease: effects of grape mealybug (*Pseudococcus maritimus*) abundance and pathogen supply. *Journal of Economic Entomology* 111:1542-50

Byrne FJ, Grafton-Cardwell EE, Morse JG, Olguin AE, Zeilinger AR, Wilen C, Bethke J & MP 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 MP, Simmons GS & EE 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 SM, Simmons GS & MP Daugherty. 2017. Spatiotemporal distribution of an invasive insect in an urban landscape: introduction, establishment and impact. *Landscape Ecology* 32:2041-57

Daugherty MP, Zeilinger AR & RPP Almeida. 2017. Conflicting effects of climate and vector behavior on the spread of a plant pathogen. *Phytobiomes* 1:46-53

Cassone BJ, Kay RG, Daugherty MP & BJ White. 2017. Comparative transcriptomics of malaria mosquito testes: function, evolution, and linkage. *G3* 7:1127-36

Bayles BR, Thomas SM, Simmons GS, Grafton-Cardwell EE & MP Daugherty. 2017. Spatiotemporal dynamics of the Southern California Asian citrus psyllid (*Diaphorina citri*) invasion *PLoS One* 12:e0173226

Byrne F, Daugherty MP, Grafton-Cardwell EE, Bethke J & J Morse. 2017. Evaluation of systemic neonicotinoid insecticides for the management of the Asian citrus psyllid *Diaphorina citri* on containerized citrus. *Pest Management Science* 73:506-14

Poudel M, Grafton-Cardwell E, Daugherty M, Almanzor J, Washburn A, Simmons G & 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 & MP Daugherty. 2016. Post-fire recovery in coastal sage scrub: seed rain and community trajectory. *PLoS One* 11:e0162777

Coletta-Filho HD, Bittleston LS, Lopes JRS, Daugherty MP & RPP Almeida. 2015. Genetic distance may underlie virulence differences among isolates of a bacterial plant pathogen. *Journal of Plant Pathology* 97:465-9

Rathé AA, Pilkington LJ, Spohr LJ, Hoddle MS, Daugherty MP & GM Gurr. 2015. Invasion pathway risk analysis for the glassy-winged sharpshooter (*Homalodisca vitripennis*): survival and reproductive success following simulated air transportation. *Biological Invasions* 17:2963-73

Daugherty MP, O'Neill S, Byrne F & A Zeilinger. 2015. Is vector control sufficient to limit pathogen spread? *Environmental Entomology* 44:789-97

Zeilinger A & MP Daugherty. 2014. Vector preference and host defense against infection interact to determine disease dynamics. *Oikos* 123:613-22

Coletta-Filho H, Daugherty MP, Ferreira C & J Lopes. 2014. Temporal progression of *Candidatus* Liberibacter asiaticus infection in citrus and acquisition efficiency by *Diaphorina citri*. *Phytopathology* 104:416-21

Rathé AA, Pilkington LJ, Hoddle MS, Spohr LJ, Daugherty MP & GM 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 MP, Killiny N & RPP Almeida. 2013. Relative susceptibility of *Vitis vinifera* cultivars to vector-borne *Xylella fastidiosa* through time. *PLoS One* 8:e55326

Gruber BR & MP 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 AA, Pilkington LJ, Gurr GM, Hoddle MS, Daugherty MP, Constable FE, Luck JE, Powell KS, Fletcher MJ & OR 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* 51:209-20

Rathé AA, Pilkington LJ, Gurr GM & MP Daugherty. 2012. Potential for persistence and within-plant movement of *Xylella fastidiosa* in Australian native plants. *Australasian Plant Pathology* 41:405-12

Tsai CW, Daugherty MP & RPP Almeida. 2012. Seasonal dynamics and virus translocation of *Grapevine leafroll-associated virus* 3 in grapevine cultivars. *Plant Pathology* 61:977-85

Daugherty MP, Gruber BR, Almeida RPP, Anderson MM, Cooper ML, Rasmussen YD & EA Weber. 2012. Testing the efficacy of barrier plantings for limiting sharpshooter spread. *American Journal of Enology & Viticulture* 63:139-43

Daugherty MP. 2011. Host plant quality, spatial heterogeneity, and the stability of mite predator-prey dynamics. *Experimental & Applied Acarology* 9:311-22

Daugherty MP, Rashed A, Almeida RPP & T Perring. 2011. Vector preference for host infection status: sharpshooter movement and *Xylella fastidiosa* transmission. *Ecological Entomology* 36:654-62

Rashed A, Daugherty MP & RPP Almeida. 2011. Grapevine cultivar susceptibility to *Xylella fastidiosa* does not affect vector transmission success. *Environmental Entomology* 40:1192-9

Lopes JRS, Daugherty MP & RPP Almeida. 2010. Strain origin drives virulence and persistence of *Xylella fastidiosa* in alfalfa. *Plant Pathology* 59:963-71

Daugherty MP, Lopes JRS & RPP Almeida. 2010. Strain-specific alfalfa water stress induced by *Xylella fastidiosa*. *European Journal of Plant Pathology* 127:333-40

Daugherty MP, Lopes JRS & RPP Almeida. 2010. Vector within-host feeding preference mediates transmission of a heterogeneously distributed pathogen. *Ecological Entomology* 35:360-6

Prado SS, Hung KY, Daugherty MP & RPP Almeida. 2010. Indirect effects of temperature on stink bug fitness via maintenance of gut-associated symbionts. *Applied & Environmental Microbiology* 76:1261-66

Daugherty MP, Bosco D & RPP Almeida. 2009. Temperature mediates vector transmission efficiency: inoculum supply and plant infection dynamics. *Annals of Applied Biology* 155:361-9

Daugherty MP & RPP Almeida 2009. Estimating *Xylella fastidiosa* transmission parameters: decoupling sharpshooter number and feeding period. *Entomologia Experimentalis et Applicata* 132:84-92

Lopes JRS, Daugherty MP & RPP Almeida. 2009. Context-dependent transmission of a generalist plant pathogen: host species and pathogen strain mediate insect vector competence. *Entomologia Experimentalis et Applicata* 131:216-24

Prado SS, Golden M, Follett PA, Daugherty MP & RPP Almeida. 2009. Demography of gut symbiotic and aposymbiotic *Nezara viridula* L. (Hemiptera: Pentatomidae). *Environmental Entomology* 38:103-9

Daugherty MP. 2009. Different herbivore feeding modes promote coexistence: insights from a metabolic pool model. *Environmental Entomology* 38:667-76

Daugherty MP, Welter SC & CJ 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* 43:257-64

Daugherty MP & CJ Briggs. 2007. Multiple sources of isotopic variation in a terrestrial arthropod community: challenges for disentangling food webs. E*nvironmental Entomology* 36:776-91

Daugherty MP, Harmon JP & CJ Briggs. 2007. Trophic supplements to intraguild predation. *Oikos* 116:662-77

Lloyd-Smith JO, Cross PC, Briggs CJ, Daugherty MP, Getz WM, Latto J, Sanchez MS, Smith AB & A Swei. 2005. Should we expect population thresholds for wildlife disease? *Trends in Ecology & Evolution* 20:511-9

Daugherty MP & SA Juliano. 2003. Leaf-scraping beetle feces are a food resource for *Ochlerotatus triseriatus*. *American Midland Naturalist* 150:181-4

Daugherty MP & SA Juliano. 2002. Testing for context-dependence in a processing chain interaction among detritus-feeding aquatic insects. *Ecological Entomology* 27:541-53

Daugherty MP & SA Juliano. 2001. Factors affecting the abundance of scirtid beetles in container habitats*. Journal of the North American Benthological Society* 20:109-17

Daugherty MP, Alto BA & SA Juliano. 2000. Invertebrate carcasses as a resource for competing *Aedes albopictus* and *Aedes aegypti* (Diptera: Culicidae). *Journal of Medical Entomology* 37:364-72

PROFESSIONAL AWARDS & RECENT GRANTS

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, NIFA, “Evaluation of the risk of huanglongbing in cold-hardy citrus production systems”, 9/2024 - 9/2027

PI, USDA-APHIS, “Refining estimates of effective detection trap density for the box tree moth, *Cydalima perspectalis*”, 6/2022 - 5/2025

PI, USDA-APHIS, “Measuring impact of residential & biocontrol activities on ACP populations in HLB quarantine & commercial citrus buffer treatment areas”, 9/2021 - 9/2022

PI, USDA-APHIS, “Analysis and program support for the European Grapevine Moth, *Lobesia botrana*, and related moth pests of grapevines”, 9/2020 - 8/2023

PI, California Department of Food & Ag, “Temecula valley glassy-winged sharpshooter monitoring program”, 7/2020 - 12/2023

PROFESSIONAL ACTIVITIES

Selected recent conference presentations and seminars

“Getting more out of program data: quantifying insect invasion dynamics and optimizing surveillance strategies”, APHIS PPQ Science & Technology webinar, 9/2024

“Effectiveness of Asian citrus psyllid management in huanglongbing quarantine zones in residential Southern California”, International Research Conference on Huanglongbing, Riverside, CA 3/2024

“Using geospatial tools to understand the factors driving insect invasions”, Department of Plant Pathology, UC Davis, 4/2023

“Assessing the risk of invasion by a vineyard moth pest guild”, Pacific Branch Meeting of the Entomological Society of America, Seattle, WA, 4/2023

“Understanding the effects of climate on Pierce’s disease epidemiology”, American Phytopathological Society Annual Conference, Pittsburgh, PA, 8/2022

“Careers in cooperative extension”, UCR Ecology Group, Riverside, CA, 4/2022

“Using geospatial tools to understand the factors driving insect invasions”, Geospatial Meetup, UC Riverside, 1/2022

Published datasets

Daugherty MP. 2024. Trap counts and natural infectivity of blue-green sharpshooter. Dryad. https://doi.org/10.5061/dryad.59zw3r2h9

Selected recent extension presentations & workshops

“Effectiveness of Asian citrus psyllid management in huanglongbing quarantine zones”, California Association of Pest Control Advisers, Temecula, CA 8/2024

“Update on Temecula GWSS monitoring”, Temecula Valley Winegrowers Association, Temecula, CA 10/2023

“Vineyard pest monitoring and identification”, Temecula Valley Small Winegrowers, Temecula, CA 6/2023

“Biology and management of insect pests in the garden”, West LA Chapter of the California Rare Fruit Growers, Santa Monica, CA, 6/2023

“Sharpshooter monitoring in Southern California vineyards”, Temecula Valley Small Winegrowers, 5/2023

“Managing glassy-winged sharpshooter in Southern California vineyards”, Pierce’s Disease Workshop, San Diego County Farm Bureau, Escondido, CA, 2/2023

“Revisiting blue-green sharpshooter’s role in Pierce's disease epidemiology”, Current Issues in Vineyard Health, UC Davis, 12/2022

"An update on invasive landscape pests in Southern California", IPM for Landscape Professions Workshop, San Diego, CA, 5/2022
"Update on glassy-winged sharpshooter & other invasive vineyard pests", Temecula Valley Grape Day, 4/2022
"An update on invasive insects in California: some successes, but more new problems", Redlands Horticultural Improvement Society, Redlands, CA 3/2022
"Asian citrus psyllid and the citrus disease huanglongbing", UC Master Gardener Emerging Tree Pest Workshop, 2/2022
"Understanding vine mealybug invasion dynamics", Silverado Sustainable Viticulture Summit, 1/2022

Selected recent extension publications or public outreach

Daugherty & Morgan. 2024. Effectiveness of Asian citrus psyllid management in huanglongbing treatment zones in residential Southern California. Topics in Subtropics, Spring 2024, 5 pages
Leonard et al. 2022. Mating Disruption Eases California Red Scale Problems. *Citrograph*, Winter 2022, pp 36-40
Grafton-Cardwell & Daugherty. 2022. Citrus Leafminer Affects Growth and Yield of Young Tangos. *Citrograph*, Winter 2022, pp 42-48
Interview, Progressive Crop Consultant, citrus leafminer IPM, 06/2022

Online extension resources:
ACP/HLB Distribution and Management: http://ucanr.edu/sites/ACP/
Temecula GWSS and Pierce's disease blog: https://temeculagwss.ucr.edu/
Napa County-wide monitoring for blue-green sharpshooter: https://uccevitculturenapa.wixsite.com/uccevitnapa/data-dashboards

Center for Invasive Species Research, species accounts:

- Emerald ash borer https://cisr.ucr.edu/emerald-ash-borer
- Japanese beetle https://cisr.ucr.edu/japanese-beetle-popillia-japonica
- European Grapevine Moth http://cisr.ucr.edu/european_grapevine_moth.html
- Brown-marmorated stinkbug http://cisr.ucr.edu/brown_marmorated_stinkbug.html
- Vine mealybug http://cisr.ucr.edu/vine_mealybug.html
- Sudden oak death http://cisr.ucr.edu/sudden_oak_death.html
- Chytrid fungus http://cisr.ucr.edu/chytrid_fungus.html
- Argentine ant http://cisr.ucr.edu/argentine_ant.html

Synergistic activities

Member, Citrus Research Board's Asian Citrus Psyllid Biological Control Taskforce
Member, Asian Citrus Psyllid Technical Review Team
Editorial Board Member & Review Editor, Frontiers in Insect Science, Invasive Insect Species Section
Panel Member, USDA-NIFA Pests and Beneficial Species
External reviewer for multiple student dissertations at international universities