



HERBICIDE PERFORMANCE AND SAFETY EVALUATIONS IN THE CONVENTIONAL WALNUT PRODUCTION SYSTEM: FIELD RESEARCH AND EXTENSION SUPPORT

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Objectives

- 1** Identify effective sequential herbicide application programs to control tough summer weed species as junglerice, threespike goosegrass, and sprangletop with preemergence herbicide registered in tree nut orchards.
- 2** Evaluate preemergence and postemergence herbicides currently registered in tree nut orchards for winter annual weed species.
- 3** Provide support for related field, laboratory, and greenhouse research with focus on the biology and management of suspected glyphosate-resistant threespike goosegrass.

Background

This project supports a research and extension team that addresses weed management issues such as new weeds, herbicide resistance, crop injury, and changing pesticide regulations that significantly impact orchard cropping systems. Rapid and accurate responses depend on having an experienced research team with direct knowledge of weed control tactics used in each crop. The broad weed management research and extension effort partially supported by this California Walnut Board project provides direct and practical benefits to walnut producers, pest control advisors, county-based cooperative extension advisors, as well as related orchard and nursery industries. Our statewide research and extension program is designed to balance the solutions-based research needs of orchardists and the crop protection industry with the need to develop an understanding of biological principles that impact weeds and weed control in these cropping systems. Results are routinely disseminated through conventional outreach venues such as industry conferences or trade shows, the UC Cooperative Extension network, as well as online resources such as the Weed Research and Information Center (www.wric.ucdavis.edu) and the UC Weed Science blog (<http://ucanr.edu/blogs/UCDWeedScience/index.cfm>). The walnut industry is one of the key stakeholder groups and cornerstone for this program; however, the majority of our research is broadly applicable to, and partially supported by, other commodities in the state as well as the pest control industry, and competitive state and federal grant programs.

Results & Discussion

- ▶ Team conducted herbicide research and demonstration trials in commercial orchards throughout the Central Valley.
- ▶ Published research on sequential herbicide programs for summer grass control in walnut orchards (Brunharo and Hanson 2020).
- ▶ Pilot studies of chemigation approaches that build on the sequential programs previously developed (initiated but delayed in 2020 due to COVID-19; will be ramped up in 2021 with Fresno State grad student cooperators).
- ▶ MS student D. Wolter finishing thesis data analysis of three seasons of threespike goosegrass research in California orchards.
- ▶ PhD student S. Haring coordinated weed control component of three large-scale orchard cover crop experiments from Corning to Bakersfield.
- ▶ PhD student K. Martin conducted field experiment on transfer of glyphosate and glufosinate to almonds during the harvest process (PHI info will be informative for walnut industry as well).
- ▶ PhD student K. Martin continued experiments on interactions of orchard herbicides, glyphosate impacts on soil microbial communities, and irrigation water quality or orchard herbicide fate.
- ▶ Published research on long-term impacts of glyphosate on tree micronutrient status to address long-running industry question (Osipitan et al. 2020).
- ▶ Team delivered over 15 extension presentations on weeds, weed control, and herbicide injury to California agricultural industry stakeholder groups (substantially reduced in 2020 due to COVID-19 limitations).
- ▶ Responded to hundreds of questions from growers, Farm Advisors, Pest Control Advisors, the agricultural chemical industry, and the state and federal regulatory community about weeds, weed control, and herbicide safety in orchard crops.
- ▶ Used California Walnut Board research grant investment to leverage at least 8x support for research and extension related to weed and herbicide issues in orchard cropping systems in California.

Extension Efforts

During 2020, in spite of COVID-19-related limitations, members of the Hanson lab group made over 15 extension presentations to tree nut growers, pest control advisors, and industry representatives as a part of the outreach efforts related to weed control and weed biology research in perennial crops. The research team has contributed to weed management articles in trade publications, podcasts, and online agriculture resources. Additionally, information from research supported by the California walnut, almond, rice, and tomato industries has been used to answer dozens of direct (email or phone) questions on herbicide performance, herbicide safety, and weed identification in tree, vine, and other crops in the state.