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WALNUT ORCHARD MANAGEMENT: PILOT PROJECTS, FIELD TESTING, ADAPTIVE RESEARCH AND PROBLEM SOLVING BY C.E. FARM ADVISORS AND SPECIALISTS

PROJECT LEADER:	Bruce Lampinen, UC Cooperative Extension Specialist, Department of Plant Sciences, UC Davis
COLLABORATORS:	Amaral, K. Aram, M. Culumber, R. Elkins, E. Fichtner, A. Fulton, P. Gordon, J. Hasey, L. Milliron, C. Reyes, J. Ott, K., Shackel, K. Jarvis-Shean, M. Yaghmour, G. Browne, C. Leslie, M. Contador, I. Kisekka, and E. Laca

Project status in 2024: Ongoing with annual review

PROJECT OBJECTIVES:

This recurring 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.

1. Evaluate performance of preemergence herbicides applied through chemigation in irrigation systems common in California.
2. Evaluate performance of preemergence and postemergence herbicides currently registered in tree nut orchards.
3. Continue research on herbicide fate in orchard soil environment, particularly in the context of preharvest intervals and herbicide residues.
4. Provide scientific expertise on walnut weed and herbicide issues to pest control industry, walnut and other commodity groups, and state and national regulatory bodies.

BACKGROUND

This project has been involved in cooperatively working with farm advisors, other specialists and researchers statewide in support of the overall walnut research effort. Due to the large amount of data collected under this project in the last 24 years, it is essential to summarize this data to summarize what has been learned from this project.

KEY FINDINGS

Canopy light interception versus yield relationship.

We have spent the last year or so refining this data set by cleaning up missing information at the various sites with the soil type as well as water holding capacity. We have also been updating the row orientation, and missing information on rootstocks and orchard age since this information was often not provided to us by growers and other researchers when we originally collected the data. Since September 2024, we have been working with Emilio Laca, who is a retired faculty member in our department whose specialty is statistics and analyzing large dataset like this. Emilio has been working with Loreto and me to go through each site looking for potential problems with the data including problems with sensors on the mobile platform lightbar that were giving incomplete data for various reasons. We have gone back and recalculated the data from many sites to clean this up and discard data that is unreliable. In addition to this, we have been working to incorporate the impacts of the time of year that the measurements were taken to help eliminate variability due to this. We are almost done with this and only have to go back to the earliest data that was collected with the first version of the lightbar and clean that up,.

Rewriting the iPAR iPhone app for estimating canopy light interception and yield potential.

We started the rewriting of the iPAR iPhone app for estimating canopy light interception and estimating yield potential in the fall of 2023, but we had problems continuing it this year due to the inability to pay the private company programmers due to problems with the new accounting system. We have been able to build a large library of images for processing which we can now start on. We could not have done that with the previous version of the app since the photos were required to be produced with the app. The rewritten app will be able to take in images from other cameras or the iPhone photo app. In addition, the new version of the app separates the right and left half of the image. This is important for almonds since the adjacent rows are often different varieties but it is also important for walnut research datasets where trials for rootstocks and varieties were often done in single rows.