



# AGENDA

## California Avocado Commission Production Research Committee Meeting

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### Meeting Information

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**Date:** Friday, September 13, 2024

**Time:** 9:00 a.m.

**Location:** Hybrid Meeting

**Physical Meeting Location:**

University of California Cooperative Extension Ventura County  
669 County Square Drive, Suite 100  
Ventura, CA 93003

**Web Conference URL:**

<https://californiaavocado.zoom.us/j/5375836823?pwd=aURBZ3BELL29tclBRS1ZRY3QrMkhZQT09&omn=86177275664>

**Conference Call Number:** (669) 900-6833

**Meeting ID:** 573 583 6823

**Passcode:** 348652

**Meeting materials will be posted online at least 24 hours prior to the meeting at:**

<https://www.californiaavocadogrowers.com/commission/meeting-agendas-minutes>

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### Committee Member Attendance

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As of Monday, September 9, 2024, the following individuals have advised the Commission they will participate in this meeting:

- Danny Klittich, *PRC Chair*
- Allisen Carmichael
- Jim Davis
- Consuelo Fernandez
- Daryn Miller
- Ryan Rochefort

<b>Time</b>	<b>Item</b>
9:00 a.m.	<b>1. Call to Order</b> a. Roll Call/Quorum
9:05 a.m.	<b>2. Opportunity for Public Comment</b> Any person may address the Committee at this time on any subject within the jurisdiction of the California Avocado Commission.
9:10 a.m.	<b>3. Approval of Minutes</b> a. Consider approval of Production Research Committee Meeting Minutes of July 25, 2024
9:15 a.m.	<b>4. Research Program Director's Report</b>
9:25 a.m.	<b>5. Action Items</b> a. Finalize list of research and grower education priorities b. Open discussion of new or old business from PRC members
11:00 a.m.	<b>6. Adjourn Meeting</b>

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## **Disclosures**

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The times listed for each agenda item are estimated and subject to change. It is possible that some of the agenda items may not be able to be discussed prior to adjournment. Consequently, those items will be rescheduled to appear on a subsequent agenda. All meetings of the California Avocado Commission are open to the public and subject to the Bagley-Keene Open Meeting Act.

All agenda items are subject to discussion and possible action. For more information, or to make a request regarding a disability-related modification or accommodation for the meeting, please contact April Aymami at 949-341-1955, California Avocado Commission, 12 Mauchly, Suite L, Irvine, CA 92618, or via email at [aaymami@avocado.org](mailto:aaymami@avocado.org). Requests for disability-related modification or accommodation for the meeting should be made at least 48 hours prior to the meeting time. For individuals with sensory disabilities, this document is available in Braille, large print, audiocassette or computer disk. This meeting schedule notice and agenda is available on the internet at <https://www.californiaavocadogrowers.com/commission/meeting-agendas-minutes> and <http://it.cdfa.ca.gov/igov/postings/detail.aspx?type=Notices>.

If you have questions on the above agenda, please contact Tim Spann at [tim@spannag.org](mailto:tim@spannag.org) or 423-609-3451.

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## **Summary Definition of Conflict of Interest**

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It is each member's and alternate's responsibility to determine whether they have a conflict of interest and whether they should excuse themselves from a particular discussion or vote during a meeting. To assist you in this evaluation, the following *Summary Definition of Conflict of Interest* may be helpful.

A Commission *member or employee* has a conflict of interest in a decision of the Commission if it is reasonably foreseeable that the decision will have a material effect, financial or otherwise, on the member or employee or a member of his or her immediate family that is distinguishable from its effect on all persons subject to the Commission's jurisdiction.

No Commission member or employee shall make, or participate in making, any decision in which he or she knows or should know he or she has a conflict of interest.

No Commission member or employee shall, in any way, use his or her position to influence any decision in which he or she knows or should know he or she has a conflict of interest.

**CALIFORNIA AVOCADO COMMISSION  
PRODUCTION RESEARCH COMMITTEE  
MEETING MINUTES**

**July 25, 2024**

A meeting of the Production Research Committee (PRC) of the California Avocado Commission (CAC) was held on Thursday, July 25, 2024, with the following people participating:

**MEMBERS PARTICIPATING:**

Danny Klittich, Chair  
Jim Davis (9:05)  
Allisen Carmichael  
Consuelo Fernandez (10:00)  
Darren Haver  
Leo McGuire  
Daryn Miller (10:02)  
Ryan Rochefort

**CAC STAFF PARTICIPATING:**

April Aymami  
Ken Melban

**OFFICIALLY PARTICIPATING:**

Dr. Tim Spann, Spann Ag Research & Consulting

**GUESTS PARTICIPATING:**

Victor Araiza  
John Berns  
Ben Faber

**CALL TO ORDER**

Danny Klittich, Production Research Committee (PRC) Chairman, called the meeting to order at 9:00 a.m. with a quorum present.

**OPPORTUNITY FOR PUBLIC COMMENT**

There were no public comments.

**APPROVAL OF MINUTES OF May 23, 2024 PRODUCTION RESEARCH COMMITTEE MEETING**

**MOTION**

*To approve the minutes of the May 23, 2024 Production Research Committee meeting.*

*(McGuire/Rochefort) MSC Unanimous*

*Motion 24-7-25-1*

**RESEARCH PROGRAM DIRECTOR'S REPORT**

Dr. Spann told the Committee that CAC has a copy of Ms. Paloma Dadlani's M.S. Thesis on avocado lace bug, and if any of the Committee members were interested in that to let him know and he would provide them with a copy. Once the manuscripts from the thesis are published, CAC will be allowed to post the thesis on its website.

Dr. Spann let the Committee know that the contract with Andre Biscaro for updating the online irrigation calculator to include avocados had been completed and work had begun on that project.

Dr. Spann updated the Committee on the status of CIMIS station 62 in Temecula. Due to construction and other changes around that station, CIMIS will not be bringing that station back online. CIMIS is interested in finding a new grower cooperator to establish a new station in the Temecula area. The Committee asked Dr. Spann to put an announcement in the next GreenSheet newsletter to see if there was any interest from growers in cooperating and he agreed to do so.

Dr. Spann updated the Committee on the addition of past *From the Grove* articles to the searchable research library on the CAC website. A list of all past articles had been created and the process was underway to write a summary for each article and add them to the database.

## **DISCUSSION ITEMS**

### **A. Finalize list of research and grower education priorities**

Danny Klittich explained to the Committee how the research priorities list had been reorganized and structured to highlight the topics the Committee previously identified as high priorities within each topic. He then asked the Committee if there was anything missing from the list or if any items needed revising.

Two things were stressed by the Committee during the discussion. The first was the need for effective pesticide products for use against the avocado lace bug, especially for control in organic orchards. Additionally, it is critical that registered products be available for application both aerially as well as through the irrigation as a chemigation treatment.

The second item was the need for fungicides to be registered for use against avocado branch canker. Jim Davis explained that PCAs now have the flexibility to make off-label recommendations for products, but we need to know what fungicides are effective so PCAs can make those recommendations.

The Committee agreed to make final revisions to the priorities list and meet again for a final review and to develop a plan to share the list with the research community.

### **B. Open discussion of new or old business from PRC members**

Danny Klittich explained to the Committee that from his discussions with Chairman Cole he believes there is currently strong support for research from the Board and, due to the larger than estimated crop in the 2023-24 season, funds are available to support needed projects.

Jim Davis discussed the importance of past work that Dr. Mark Hoddle has done on scouting techniques for pests and developing pesticide treatment thresholds. This type of information is very important for management of new pests, such as the avocado lace bug.

Ben Faber shared with the Committee that red imported fire ants were found in Montecito and Jim Davis added that they are likely also in the south. They may not be a major pest issue for avocados due to the environment — leaf litter, mulch, etc. — within avocado groves.

Upcoming field days (CAS at Pine Tree Ranch in August) and other meetings (Avocado Café webinars, Sunblotch Viroid and Irrigation Tools meetings in September) were discussed and whether there was a need for additional financial support for these types of meetings. April Aymami explained that CAC provides annual sponsorship funds to CAS for their field days and others explained that there are currently no costs associated with webinars so there isn't a current need for more funding of these events.

A brief update on CAC's efforts to establish trials to get GEM and Lamb Hass varieties removed as hosts of fruit flies was provided by Ken Melban and Dr. Spann. Consuelo Fernandez stated that she could look at Brokaw Nursery sales record to try to identify growers of those varieties in Hawaii.

### **ADJOURN MEETING**

Danny Klittich, Production Research Committee (PRC) Chairman, adjourned the meeting at 11:00 a.m.

Respectfully submitted,

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Timothy Spann

### **EXHIBITS ATTACHED TO THE PERMANENT COPY OF THESE MINUTES**

EXHIBIT A July 25, 2024 Production Research Committee AB 2720 Roll Call Vote  
Tally Summary



**CALIFORNIA AVOCADO COMMISSION**  
**Production Research Committee**  
**AB 2720 Roll Call Vote Tally Summary**

*To be attached to the Meeting Minutes*

<b>Meeting Name:</b> <i>California Avocado Commission  Production Research Committee  Meeting</i>	<b>Meeting Location:</b> <i>Hybrid  In-person – Ventura County  Cooperative Extension Office,  Ventura  Online – Zoom</i>	<b>Meeting Date:</b> <i>July 25, 2024</i>
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<b>Attendees Who Voted</b>	<b><u>MOTION</u></b> <b><u>24-7-25-1</u></b>
Danny Klittich, Chair	<i>Did not vote</i>
Jim Davis (9:05)	<i>Absent</i>
Allisen Carmichael	<i>Yea</i>
Consuelo Fernandez (10:00)	<i>Absent</i>
Darren Haver	<i>Yea</i>
Leo McGuire	<i>Yea</i>
Daryn Miller (10:02)	<i>Absent</i>
Ryan Rochefort	<i>Yea</i>
<b><i>Outcome</i></b>	<b><i>Unanimous</i></b>

The California Avocado Commission Production Research Committee is excited to present the research community with the following list of research topics. This list of topics is intended to provide researchers with a starting point for forming research projects that directly benefit the avocado growers of California. These topics represent areas of knowledge where further work is needed to provide actionable information to avocado growers. The Production Research Committee welcomes discussion around topics of interest and hopes this is the first step in developing meaningful research that benefits the avocado growers of California for years to come.

Best,

Danny Klittich, PhD  
Chair of the Production Research Committee  
California Avocado Commission

# CAC Production Research Priorities

## Cultural Methods

### High Priority Topics:

1. Pollen sprays for avocado orchards: Do they work?
  - a. Dusting/spraying of pollen has been done in the avocado industry for decades. Some growers swear by it and others feel that it is not needed. Controlled replicated studies are needed. Methods could include embryo genotyping to verify cross-pollination. Application methods could also be assessed by comparing liquid (AvoSolutions) or dry applications.
2. Updated Cost Studies;
  - a. Farming is a business and costs vary depending on operation size and location. A project updating the 2011 Cost Study, providing reference formats for cost analysis, and general reference information to growers would be of value.
  - b. Updated avocado cost studies - UC Davis, Riverside, Cal Poly SLO for northern growing regions. Possible senior Projects using 2011 Cost study updated with pricing
3. "Above Average Grower" Survey
  - a. The annual California production average is between 5000-7000 pounds per acre however there are growers who consistently outperform this average with 10-year average yields exceeding 12,000 pounds per acre. A project that quantifies what practices and/or conditions allow for this level of success would provide a framework for growers to invest in their operations and build future yields.
4. Leaching Fractions with Modern Rootstocks and Water Sources



- a. Reclaimed water is becoming more available but differs chemically from well and surface water sources. Work assessing how management techniques may need to differ when using these water sources may be of interest.
- 5. Nitrogen planning and nitrate credits
  - a. Nitrogen regulations may impact avocado growers in the future. Many wells and some reclaimed water may contain high nitrate levels, however this nitrogen source does not seem to be 100% plant usable. Work assessing the efficiency of nitrate in well water as a nitrogen source is needed. How does a fertilizer program need to be adjusted for these nitrates?
- 6. Investigate and Evaluate Current Research into Soil Health;
  - a. USDA has conducted considerable research into soil health, somewhat at the cornerstone of sustainability. The objective is the building of organic matter. Quantitatively OM translates into higher crop yields. How does this research relate to commercial avocado production in California, and if so the best approach to evaluate it and ultimately educate growers for their application.

**Other Topics of Interest:**

- 7. Rootstock trials for high carbonate and salinity conditions (Do we have enough areas with high carbonates issues that would make it worth establishing a trial?)
- 8. Tree stress monitoring tools review
- 9. Use of sulfur for soil acidification. Rates and timing by soil general type (injection of sulfuric acid vs. sulfur burner vs soil applied dry sulfur).
- 10. Does mulch have effects in frost areas? Does it make it colder or warmer?
- 11. Is pulse irrigation better than other methods? Do avocados like it or are their roots too saturated too often?
- 12. Can you apply too much fertilizer that it will harm the tree? Can you oversalt an avocado tree to the point of killing it with common fertilizer?
- 13. Precision Farming; Introduce the concepts of precision farming into avocado production in California

## Irrigation

**High Priority Topics:**

- 14. Small farm automation cost analysis: many different systems exist that integrate soil moisture sensors and weather stations with automatic valves and computers to manage irrigation more efficiently and effectively. How does efficient irrigation improve grove performance (yield, phytophthora levels, pest pressure, fertilizer uptake efficiency, etc.). If automation doesn't improve these then does it ever make economic sense to invest in these systems? At what scale does it make economic sense for growers to invest in these systems?
- 15. Determine practical cultural practices to help mitigate chloride in groves and pursue promising technologies for this problem.

- a. Salinity in general, and chlorides specifically, are especially detrimental to avocado production. What cultural practices or promising technologies exist to practically manage salinity and chlorides in California avocado groves?
16. The CIMIS system provides valuable data to the agricultural community. Unfortunately, we have lost several stations in the avocado growing regions of California which has reduced the system's utility to avocado growers. Work is needed to place new stations or develop and test alternative systems (local stations, small on-farm stations, satellite-based modeling, etc.) support and advocacy needed
17. *Update/code a simple irrigation calculator tailored for avocado growers (Andre at VC UCCE funded in 2024)*

**Other Topics of Interest:**

18. Irrigation Planning/Management tool including water budgeting tool
19. Small farm automated valves
20. Determine appropriate timing and duration of leaching irrigation for different levels of salinity in irrigation water, soil type, effects of winter rains, weather, etc. to maintain a healthy soil solution for avocado trees.


## Pest Research

**High Priority Topics:**

21. Avocado Lace Bug: Dr. Mark Hoddle recently completed detailed work on the biology of the avocado lace bug in California. Important follow-up work is now needed to develop management practices for this pest of increasing importance to avocado growers.
  - a. Develop effective scouting methods to accurately assess lace bug populations in avocado groves.
  - b. Determine treatment thresholds for lace bugs based on feeding damage and predicted damage based on the new biology and lifecycle data so that timely control measures can be implemented.
  - c. Conduct pesticide efficacy trials, with particular emphasis on organic options, for the avocado lace bug.
22. Fruit flies: California has seen an unusually high number of fruit fly invasions in recent years. Hass avocados are recognized by the USDA as a non-host of fruit flies in their mature, hard green state on the tree, but this status cannot be extended to other varieties without data to support each variety's non-host status.
  - a. Data are needed for GEM, Lamb Hass and other minor varieties to establish their non-hosts status. Ideally, these data will be collected in areas where fruit fly species of importance (Oriental fruit fly, Mediterranean fruit fly, Mexican fruit fly, Queensland fruit fly) are naturally occurring, in cooperation with local cooperators, to avoid having to establish colonies in quarantine facilities in California.

23. Avocado thrips degree day model: the data for the existing degree day model for avocado thrips were collected about 25 years ago. Compared to current techniques for this type of work, these data are very outdated and do not reflect changes in population biology or climate that have taken place over the past 25 years.
  - a. Updated data, similar to what was recently completed for the North American bean thrips, for the degree day model of avocado thrips is needed to help avocado growers more effectively manage this pest.
24. The U.S. avocado market has grown exponentially over the past several decades. As a result, many avocado producing countries are trying to gain access to the U.S. market. However, imported fruit poses a risk of introducing unknown pests and diseases that could be detrimental to the California avocado industry. Most known avocado pest risks are only known due to previous CAC-funded field surveys in potential export countries, but it has been more than a decade since any such work has been conducted.
  - a. Countries that are likely to gain access to the U.S. market in the near future need to be identified and field surveys of commercial groves and wild populations (if they exist) of avocados should be surveyed for pests and diseases. New pests and diseases will then need to be identified and their biology understood to ascertain the potential risk of invasion through commercial fruit export.

#### **Other Topics of Interest:**

25. Persea mite bio-control
-  26. How can we measure overall tree stress levels to observe how heavy pest presence impacts productivity/fruitfulness? Dendrometers? NDVI?
27. Find out the impact on leaf productivity of both Persea Mite and Avocado Brown Mite in order to develop a treatment threshold to prevent both damage to tree health and over-spraying of miticides.
28. Make field studies to determine naturally occurring biocontrol agents currently active for both Persea Mite and Avocado Thrips as possible candidates for insectary mass-rearing and release.
29. Elucidate the role of *Eusieus hibisci*, a common predatory mite on avocados throughout California, in controlling Avocado Thrips and if there is a link between numbers of *E. hibisci* found in an orchard and the severity of Avocado Thrips pressure.

## Ag Chem Product Research

#### **High Priority Topics:**

30. Avocado thrips and persea mite management: Abamectin has been the primary tool for managing avocado thrips and persea mite for decades and concern about resistance is growing.
  - a. A survey of thrips and mite populations for abamectin resistance throughout California avocado groves would be helpful to pest control advisors for making informed decisions about abamectin use.

- b. What insecticides are most effective against perse mite and avocado thrips that can be used in lieu of abamectin?
  - c. What are the best timing, rate, adjuvants to use in combination with pesticides for most effective control of mites and thrips? Are any products effective if applied through chemigation?
  - d. What new bee-safe products are available to replace neonics?
  - e. What products are effective for control in organic production systems?
31. Resistance management of chemical controls for Phytophthora. How best to rotate phosphites, Orondis and Ridomil for maximum effect and control of resistance management.
- a. Are any phytophthora populations in California avocado groves showing resistance to currently registered products?
  - b. Do other active ingredients exist that could be added to the suite of products available for phytophthora management?
32. *CDPR approval for Indaziflam (Alion)*
33. *CDPR approval for Rimsulfuron (Matrix). (Currently funded through IR-4)*
34. Avocado Branch Canker (Dothiorella canker, Botryosphaeria canker): recent research projects have done a good job of identifying the suite of pathogens causing branch canker in California avocado groves.
- b. Research is needed to screen fungicides for control and work with manufacturers to get products registered (ex. Syngenta Topsin)
  - c. Cultural management practices for branch canker control: pruning, when to prune, how to prune, sanitation practices, tree removal/when to remove trees.

#### **Other Topics of Interest:**

35. *Herbicide Resistance Management; Survey industry for new herbicides with potential in avocados. (Funded with Peggy Mauk, concluded in 2023)*
36. Evaluate Microbes that convert or fix atmospheric nitrogen to plant utilizable nitrate nitrogen. Rationale: Source of nitrogen with the potential of being more economical than nitrogen produced via petroleum and natural gas, both now and in the future. (ex: Pivot Bio, Kula Bio, Azotic Technologies, Joyn Bio, Max Plans Institute for Terrestrial Microbiology, New Leaf Symbiotic, Intrinsyx Bio, Novozymes, Corteva Utrisha)
37. Evaluate Microbes that enhance the availability and utilization of phosphate by plants. Phosphate is very immobile within the soil, certain microbes can enhance uptake and reduce the quantities of phosphate applied. (ex: Novozymes, AgBiome, BioConsortia, Bayer, Stoller, Valent BioSciences, Verdesian, Lallemand Plant Care, Symborg)
38. Humic Acids; Humates are known to provide a carbon source for stimulating the soil microbiome, which in turn provides for enhanced uptake of macro, secondary and minor elements. Research into evaluating what microbes are stimulated (UC Santa Barbara Ph.d. project) and their efficacy in taking up nutrients by humic acid...objective is to reduce the quantities of fertilizer.
39. Deer Control; Deer cause significant damage to newly planted groves (and established) each year. Several candidate sprays are being advertised. Set up and evaluate deer repellants in randomized trials. Establish project to survey for potential repellants

40. Additional research into alternative weed control methods for new orchards.
41. Preemergent herbicide use on new orchards assessing impacts on tree establishment.