

SUMMARY | PEST MANAGEMENT ADVISORY COMMITTEE RESEARCH GRANT REVIEW MEETING

CALIFORNIA DEPARTMENT OF PESTICIDE REGULATION

February 11, 2021

Produced by the Consensus and Collaboration Program, CSU Sacramento College of Continuing Education

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1. Attendance

Pest Management Advisory Committee (PMAC) Members

1. Steve Blecker, Department of Food and Agriculture
2. Jim Farrar, Director, Statewide UC IPM Program
3. Steve Scheer, California Agricultural Commissioners and Sealers Association
4. Brenna Aegerter, University of California Cooperative Extension
5. Tom Getts, University of California Cooperative Extension
6. Julia Inestroza, California Citrus Mutual
7. Jenny Broome, Driscoll Strawberry Associates, Inc.
8. Robert Ehn, CA Garlic and Onions Research Board
9. Emily Buerer, Community Alliance with Family Farmers
10. Eric Lauritzen, California Strawberry Commission
11. Caroline Cox, Center for Environmental Health
12. Kendra Klein, Friends of the Earth
13. Margaret Reeves, Pesticide Action Network North America
14. Jonathan Evans, Center for Biological Diversity
15. Anne Katten, California Rural Legal Assistance Foundation
16. Dave Tamayo, California Association of Sanitation Agencies
17. Jim Steed, Pest Control Operators of California
18. Nick Lupien, California Association of Pest Control Advisers
19. Jon Holmquist, Association of Applied IPM Ecologists
20. Renee Pinel, Western Plant Health Association
21. Nicole Quinonez, Consumer Specialty Products Association
22. Terry Gage, California Agricultural Aircraft Association
23. Keith Pitts, Marrone Bio Innovations, Inc.

California Department of Pesticide Regulation (DPR)

24. Val Dolcini, Director
25. Jesse Cuevas
26. Ken Everett
27. Aimee Norman
28. John Gerlach
29. Leslie Talpasanu
30. Matt Fossen
31. Jordan Weibel
32. Rodney Jones
33. Catherine Bilheimer
34. Tory Vizenor

Facilitation Support, CSU Sacramento

35. Ariel Ambruster
36. Julia Van Horn

2. Opening Comments and Background

Introductions and Chair's Opening Comments

Val Dolcini, Director, Department of Pesticide Regulation (DPR), welcomed everyone and thanked Pest Management Advisory Committee (PMAC) members for participating in the meeting.

Due to safety precautions related to COVID-19, the meeting was held remotely. Mr. Dolcini said that public comments and questions would be taken after each agenda item, via both the Zoom meeting platform and through email for those watching the meeting by webcast.

Mr. Dolcini gave an overview of DPR's current work related to the PMAC:

- California State Senate Bill (SB) 86 requires that DPR submit quarterly reports on the use of chlorpyrifos (CPF) since the ban of CPF came into effect last year.
- Assembly Bill (AB) 1788 limits the use of second-generation anticoagulant rodenticides, pending DPR evaluation of the rodenticides.
- DPR is working to revamp the mill assessment, creating a tiered system that would assess pesticides at different rates based on signal word labeling. Funding from the mill assessment would support the integrated pest management (IPM) grants program, community engagement, air monitoring, and other activities.
- Following recommendations from the CPF Alternatives working group, DPR is establishing a Sustainable Pest Management working group, which will include representatives from State government as well as stakeholders from around the state and will run for approximately 18 months.
 - One potential topic for the working group suggested by a PMAC member during the meeting: An important issue is development of a coordinated strategy across State agencies on funding projects that cut across multiple agencies' work. For example, the PMAC reviewed a proposal during this meeting that addresses an important need but might better be funded by a different agency.
- DPR is working on reevaluation of neonicotinoids and related proposed regulations.
- DPR will hold a public IPM achievement awards event February 18, 2021, at 1:30 p.m., to celebrate IPM work across California.

Zoom Orientation

The facilitator, Ariel Ambruster from the Consensus and Collaboration Program at California State University, Sacramento, oriented PMAC members and the public to the Zoom remote meeting platform. She noted that public comments and questions, taken after each agenda item, would be limited to three minutes each.

Quorum Count

Aimee Norman, Branch Chief, DPR IPM Branch, ascertained that a quorum of PMAC members was participating in the meeting, in accordance with the Bagley-Keene Act. Ms. Norman reminded PMAC members of their legal obligation to disclose any conflicts of interest. She noted that DPR received a conflict-of-interest disclosure ahead of the meeting from PMAC member Whitney Brim-DeForest, representing the University of California Cooperative Extension (UCCE), recusing herself from the full meeting due to her role as a co-principal investigator (PI) for one of the proposals under consideration; Tom Getts joined the meeting as her alternate.

Ms. Norman noted that Ex Officio members do not count toward quorum and affirmed that quorum had been attained. See above for the attendance list.

3. Research Grant Proposal Overview

Jordan Weibel, Research Grants Program Lead, DPR IPM Branch, reviewed Research Grant Program information. He presented a review of the 2020 IPM grants:

- Two Alliance Grants projects were funded, totaling \$390,308
 - *Fostering Reduced-Risk Pest Management for Sacramento's Hmong and Lu Mien Farms by Increasing Adoption of Integrated Pest Management, Improving Pesticide Efficiency and Safety, and Building an Agricultural Support Network* – Dr. Margaret Lloyd
 - *Development of An Interactive Training Facility for California's Structural Pest Management Professionals* – Dr. Andrew Sutherland
- Six Alternatives to CPF projects were funded between 2019-2020, totaling \$2,336,248
 - *Predictive Models of Pesticide Exposure and Impacts on Bees* – Dr. Neal Williams (2019)
 - *Efficacy and Optimal Use of Alternatives to Chlorpyrifos For Aphid and Whitefly Management in Cotton* – Dr. Ian Grettenberger (2020)
 - *Alternatives to Chlorpyrifos For Sugarbeet Production in The Imperial Valley* – Dr. Steve Kaffka (2020)
 - *A Sustainable Boric Acid Liquid Bait Delivery System (As Alternative to Chlorpyrifos Sprays) For the Management of Pest Ants in Agricultural Settings* – Dr. Dong-Hwan Choe (2020)
 - *Hydrogel Baiting Systems for Sugar-feeding Ants in California Grapes and Citrus* – Mr. David Haviland (2020)
 - *Taking Chlorpyrifos out of Citrus: Maximizing IPM of Argentine Ant and Sap Sucking Pests with Biodegradable Hydrogels, Infra-Red Sensors, and Cover Crops* – Dr. Mark Hoddle (2020)
- One Research project was funded, totaling \$56,913
 - *First Investigations into The Biology and Management of An Invasive Cockroach Species* – Dr. Andrew Sutherland

Mr. Weibel noted that some of the activities have been impacted by COVID, in particular the Lloyd project. He also noted that some funding from the 2020 Research Grants supported the Alternatives to CPF projects.

Mr. Weibel outlined the 2021 Research Grants solicitation. DPR received 13 proposal applications totaling \$2,187,719. Mr. Weibel noted that with \$500,000 of funding available, DPR would only be able to grant less than one quarter of the proposed funding.

2021-2022 Research Grant Summary of Proposals		
Proposal Short and Full Title	Principal Investigator	Budget
Mauck – Lettuce, Melon Immunity Priming Enhancing virus control in lettuce and melons by optimizing immunity priming approaches	Kerry Mauck	\$216,967

2021-2022 Research Grant Summary of Proposals		
Proposal Short and Full Title	Principal Investigator	Budget
Wang – Watermelon Fungal IPM Research toward potential of reducing soil fumigation in California's seedless watermelon using grafting and Trichoderma-containing biologics	Zheng Wang	\$109,055
Del Castillo – BMPs Vegetable Transplants Developing best management practices for diseases in newly emerging vegetable transplant production systems in California	Johanna Del Castillo	\$87,986
Westphal – Almond Nematode IPM Mitigating negative nematode infestation effects on productivity of almond without the use of soil fumigation	Andreas Westphal	\$353,809
Wilson – Driedfruit Beetle IPM for Fig Improved monitoring and mass-trapping to control driedfruit beetle in fig orchards	Houston Wilson	\$202,771
Keogh – Smart Mating Disruption in Almond Making mating disruption economically feasible using insect sensors	Eamonn Keogh	\$167,000
Lee – Sucralose Evaluation for Cockroaches Evaluation of an artificial sweetener as potential bait toxicant and an insecticide synergist against German cockroaches, an important indoor pest of public health	Chow-Yang Lee	\$110,938
Espino – Tadpole Shrimp Management in Rice Refining monitoring guidelines and management of tadpole shrimp on rice	Luis Espino	\$224,324
Finlinson – Urban Ground Squirrel IPM Reduced reliance on anticoagulant rodenticides through enhanced monitoring & control strategies for California ground squirrel populations near critical infrastructure	Wade Finlinson	\$75,900
Hewavitharana – Strawberry Crown Rot Enhanced integration of Macrophomina crown rot management practices in strawberry production	Shashika Hewavitharana	\$149,365
Hanson – South American Spongeplant Management Investigating South American spongeplant growth and phenology to develop targeted management	Brad Hanson	\$197,232
Wilson – Cannabis Pesticide Use and Insect Survey Survey of pest management practices and arthropod community in California cannabis production	Houston Wilson	\$217,622
Arnold – Walnut Crown Gall Field assessment of the various products marketed for the management of crown gall in walnuts	Kari Arnold	\$74,750

Twenty-three PMAC members reviewed the proposals ahead of the meeting and submitted scores for each proposal out of 100 possible points. Mr. Weibel shared the submitted scores, as presented in the following chart. As the chart illustrates, the average scores all fell within a fifteen-point range. Mauck – Lettuce, Melon Immunity Priming received the highest average score at 86.81, and Wang – Watermelon Fungal IPM ranked second at 85.57. The lowest scored proposals were Wilson – Cannabis Pesticide Use and Insect Survey at 73.00 and Arnold –

Walnut Crown Gall at 72.43. Mr. Weibel presented the scores in three bands that indicated the highest-scoring (two), lowest scoring (four), and mid-range (seven) proposals.

2021/2022 Research Grant Review Summary by Reviewer, Initial Review

Project	Rank	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	Avg	Budget
Mauck, Lettuce, Melon Immunity Priming	1	85	96	83	89	98	98	59	94	85	71	90	81	88	98	75	93	92	92	87	83	86	84		86.68	\$216,967
Wang, Watermelon Fungal IPM	2	86	87	75	93	99	78	93	89	90	73	85	81	95	100	70	82	92	84	93	74	78	58		84.32	\$109,055
DeI Castillo, BMPs Vegetable Transplants	3	84	89	93	84	90	99	57	92	84	69	78	78	80	88	60	72	95	84	72	85	86	55		80.64	\$87,986
Westphal, Almond Nematode IPM	4	90	84	85	88	80	85	60	93	75	76	96	88	66	93	45	80	89	80	87	70	86	45	45	79.14	\$353,809
Wilson, Driedfruit Beetle IPM for Fig	5	87	95	74	84	91	90	55	97	80	77	99	78	65	98	50	73	88	83	86	64	73	54		79.14	\$202,771
Keogh, Smart Mating Disruption in Almond	6	77	79	72	94	100	79	94	65	79	67	96	68	92	98	38	56	90	86	89	68	84	80		79.59	\$167,000
Lee, Sucralose Evaluation for Cockroaches	7	89	92		79	95	72	47	68	90	81	90	84	82	90	45	64	89	96	75	78	82	68	83	78.86	\$110,938
Espino, Tadpole Shrimp Management in Rice	8	95	88	85	88	89	68	24	91	90	81	97	77	55	88	50	73	94	81	82	87	78	68		78.59	\$224,324
Finlinson, Urban Ground Squirrel IPM	9	92	60	69	79	94	77	96	92	60	65	93	79	50	88	65	60	91	84	79	84	65	55	74	76.23	\$75,900
Hewavitharana, Strawberry Crown Rot	10	90	76	87	77	70	91	14	70	85	79	83	88	52	80	60	89	85	90	59	76	88			75.67	\$149,365
Hanson, South American Spongeplant Management	11	89	83	77	74	75	85	26	96	80	81	90	75	48	75	65	60	82	88	73	71	76	50		73.59	\$197,232
Wilson, Cannabis Pesticide Use and Insect Survey	12	89	90	69	78	84	55	17	94	80	68	85	76	49	90	80	42	89	77	68	66	87	30	93	71.05	\$217,622
Arnold, Walnut Crown Gall	13	81	75	69	82	93	75	41	92	71	70	80	72	53	80	35	81	90	52	77	76	76	54		71.59	\$74,750

4. Research Grant Proposal Discussion

Ms. Ambruster noted that the range of perspectives shared by the PMAC on merits, concerns, and areas needing clarification for each proposal are helpful to inform Director Dolcini's funding decisions as well as to provide feedback to the teams submitting proposals.

PMAC members discussed whether there was a bright line separating the proposals that the group would not consider funding. One member saw significant merit in some of the proposals that fell within the lower tier in the chart above, but said, since the group's scoring indicated that many PMAC members did not see merit in those proposals, it was agreeable to designate them as not recommended for funding. Three other PMAC members agreed. Another PMAC member said multiple members ranked the blue tier proposals highly and it would be helpful to hear discussion and consideration of all proposals. With no consensus, the group agreed with Ms. Ambruster's suggestion to move into discussing each proposal.

A PMAC member said there were many high-quality proposals in this round so it was frustrating that more could not be funded given the level of grant funds available.

A member asked whether and how the PMAC should consider cost in evaluating the proposals. DPR staff encouraged the PMAC to evaluate the cost and value of each proposal individually, considering whether the cost for a given proposal is justified, but not considering how the total funding available will be allocated.

Discussion of Proposals

PMAC members discussed the merits, concerns, and areas needing clarification for each project proposal, in the order of their initial ranking. Below is a summary of PMAC members' comments for each proposal. Comments reflect individual PMAC member observations, not consensus opinions. Thus, merits and concerns may occasionally appear to be contradictory.

Mauck – Lettuce, Melon Immunity Priming

Merits

- The proposal targets high value crops which cover a lot of acreage in California.
- It provides an alternative to prophylactic application of pesticides.
- The approach is potentially transferable to other crops, further broadening its impact.
- Existing solutions are not sufficient, so this kind of research is needed to provide a more robust IPM solution.
- The approach combines induced systemic resistance with other tools, a promising approach that we are starting to see more.
- Immunity priming is a new approach and there are many biostimulants that have the potential ability to be applied this way.
- The proposal is well-written.
- The targeted disease is often misidentified, leading to indirect impacts on other industries, including pesticide use and conflict within the grower community.
- The proposal includes support from the commodity board.
- A novel approach that would develop needed efficacy data.
- The project cost is justified: expensive tools are required to understand the effects of efforts to build up resistance in a plant, the project addresses three viruses in two crops over three seasons, and it has the potential to reach additional commodities beyond those targeted.

Concerns

- The proposal does not indicate support from the registrants; projects should demonstrate buy-in, and matching funds may be appropriate.
- The potential solution is complicated.
- There is a lot of work to do to piece together effective strategies.
- Product efficacy was not addressed in the proposal; efficacy data is critical, particularly for a project with a large budget.

Clarifications

- To what extent does the approach affect virus transmission versus vector

attractiveness?

Wang – Watermelon Fungal IPM

Merits

- Alternatives to fumigation are a high priority for this committee, reducing impacts on human health, water, and soil microbial diversity.
- The project presents an innovative approach to a fumigation alternative.
- The incorporation of a biopesticide/biostimulant to address soil-borne diseases is appreciated.
- Grafting is used widely in Europe and is being adopted in the United States in some areas where watermelon is grown back-to-back. Though it is less common in the U.S., it is proving to be cost-effective.
- While there may be some risk in the proposal due to the unknowns, the research will help answer important questions.
- Growers are already committed to participating in the project.
- The proposal can deliver a real impact at a reasonable price.
- The use of plug transplant watermelons will allow Trichoderma to be added to plug production as well as through irrigation.
- The proposal identifies and addresses some of the past and potential challenges.
- While Trichoderma will not single-handedly eliminate soil-borne diseases, it is likely to help plants be more robust.

Concerns

- The cost and complexity of grafting raises questions about the practicality and efficacy of the approach.
- The cost of grafting may also inhibit adoption, so reduction in fumigant use may not pan out.
- The project may be overly complex, involving both grafting and biologics.

Del Castillo – BMPs Vegetable Transplants

Merits

- Clean stock practices in transplants are critical to prevent introduction of pathogens into fields.
- The proposal applies an IPM systems approach through a systematic assessment of risk.
- It is reasonably priced and important.
- Use of transplants is expanding in California and issues around this practice are a relative blind spot for the research community.
- Fungicides are a somewhat overlooked area and DPR IPM grants have not historically funded many projects related to potential replacements.
- The project is likely relevant to cultivation of tomatoes, onions, and garlic, where there is concern that transplants may be impacting soil health.
- BMPs for transplants are very important.

- While the project is not novel, it addresses the basics of how to intelligently ensure success of transplanting while reducing pesticide use and it demonstrates the value of a low-tech approach.

Concerns

- The project may be addressing something that is not an issue.
- Transplants have been used in many crops for decades, so BMPs are likely already established.
- The problems and solutions are likely easy to predict so the project may not be impactful.
- The project is unlikely to result in dramatic reduction in pesticide use.
- The project risks substituting currently used pesticides for others due to the focus on fungicide and pesticide testing.
- Many greenhouses already use intense sanitation practices rather than pesticides.
- The proposal does not list which fungicides will be tested. This is critical information to ensure that current practices are not replaced with those that are more toxic.

Westphal – Almond Nematode IPM

Merits

- There is a strong emphasis on non-chemical management tools through cover crops and cultural control.
- The proposal teases out the complexities of the system to make cover crops feasible in a challenging setting.
- It takes a systematic and thoughtful approach, starting with control trials in greenhouses before moving to on-farm application.
- This is an important target crop with extensive acreage.
- The strong team of researchers contribute to a high likelihood of success.
- Nematodes are an enormous issue in almonds, exacerbated by the increasing practice of replanting almonds in fields where they were previously grown.
- There is a large potential impact through reducing fumigation, which uses high-risk chemicals.
- Use of cereal rye is an innovative approach.
- While the costs seem high, they reflect the actual rate within the UC system.
- The proposal addresses the knowledge gap related to irrigation use in cover crops, which can be a real or perceived barrier to adoption.

Concerns

- Some aspects of the budget are concerning, including overall cost and in particular the 45% fringe benefits rate.
- The project cost is high relative to its potential impact.
- The project is complex.
- A PMAC member opined that PMAC funds should not be used for unregistered

chemicals, but the project includes efficacy testing for a new nematicide that is not yet registered. The proposal claims it is low toxicity but does not present supporting information nor does it address whether the nematicide has the potential to be a groundwater contaminant.

- The proposal does not address issues related to cover crops, which may harbor pests and create humidity that can contribute to fungal pressure.
- The proposal includes only one support letter, which is particularly low given the scale of the project.
- There are barriers to adoption related to cover crops' water use as well as possible competition and insect buildup.

Wilson – Driedfruit Beetle IPM for Fig

Merits

- The proposal addresses a huge problem for which there are no existing solutions or IPM toolbox.
- California produces more than 99% of the figs grown in the U.S., so the problem likely will not be addressed without support from the State.
- The two existing pesticides that can be used to address this problem are of concern.
- It proposes an innovative approach using crop phenology, rather than calendar date, to time the intervention.
- Mass trapping does not work in many systems due to population numbers, but if it were able to work in this context, it would be very helpful.
- The project connects to the IR-4 program to support registration of the new tools if they are successful.
- The proposal is well-written with a clear design and strong support letters. It addresses an important issue.
- Figs are an underserved commodity that lacks tools.
- Though figs do not represent a large amount of acreage within the state, the percentage of those that are treated is likely high. The project could make a big difference for this small commodity.
- The proposal is a classic IPM approach of monitoring and establishing thresholds.
- California fig growers are facing pressure from the international market.

Concerns

- The labor cost for trapping may present a barrier to adoption.
- The proposal does not establish the scale of the problem – total acreage of figs and the likely overall change to organophosphate (OP) use.
- The project includes pyrethroids as an alternative to OPs, but there are significant environmental and human health concerns about these as well.
- Overall project cost is high relative to its potential impact.
- There are more pressing pesticide issues in California.

Keogh – Smart Mating Disruption in Almond

Merits

- Making mating disruption more widely adoptable is good, and it is exciting technology for use in almonds and other crops.
- The project will shed light on the economic feasibility of this biologically based option.
- It is important to have public research on this technology as there is a lot of proprietary information around existing solutions.
- There is a strong cost-benefit ratio.
- There is a potential for significant impact given the large acreage and amount of pesticides applied to almonds.
- It proposes an innovative approach using computers to target mating disruption.
- There are increasing applications of remote sensing, but it has not yet been integrated into a full IPM system.
- There is a potential to expand the approach to other crops, particularly walnuts, given the pest overlap and adjacent acreage.
- The proposal is well-written.
- It has significant potential for social and environmental benefit.

Concerns

- Use of puffers is already an established IPM practice.
- The project focuses on a single company's product and will benefit that company. DPR should not fund projects that are essentially research and development (R&D) for commercial companies. There is potential for this proponent to access private R&D funding.
- If the project is an overall program, it should look at other mating disruption materials as well.
- The cost-benefit calculation in the proposal was based on an analysis that averaged efficacy across orchards of various sizes and shapes, so the approach already works better than indicated in some settings and this extra work may not be needed.
- Development of the puffer technology for field application is not yet completed; it may present unexpected challenges.
- The study design, particularly regarding the field experiments, lacks detail.
- The proposal does not provide clarity on the extent of support and investment others are making in this technology and application. It is important there be an indication that others see value in the approach.

Clarifications

- PMAC members and staff discussed the need for clear DPR guidelines regarding projects that benefit a particular company. One PMAC member suggested that proposals clearly state when this is the case but did not believe it should be disqualifying. Another said it is important to see an indication that others see potential in the proposed approaches and technologies, through other related projects since DPR grants cannot rely on

matching funds. A PMAC member said that the company producing the product was co-founded by the PI and was established as a spinoff of their research work.

Lee – Sucralose Evaluation for Cockroaches

Merits

- DPR should prioritize structural pest control processes and products, as it is a setting where many people come in direct contact with pesticides. Though pesticide use is split roughly 50/50 between agricultural and structural use, this is the only structural pest control proposal received.
- It is exciting to see a new tool for structural pest control that is potentially less harmful to pest control operators, the public, and the environment.
- The research has the potential to be very impactful for human health, serving a large population and reducing public exposure.
- This is a promising approach; artificial sweetener has been successfully used as bait in a control program for spotted wing drosophila.

Concerns

- The research is too narrowly focused on German cockroaches.
- The experiments are all lab-based with no experiments in typical use scenarios.

Clarifications

- Could this strategy be employed by homeowners or by pest control operators only?
- Is this new strategy needed, or do sugar baits with boric acid already meet the need?
 - In response, a PMAC member said that there is a hypothesis that the artificial sweetener works as a bait while also having a toxic impact on the pest.
 - Another member said it would be useful for professionals to have another tool in their box while also providing a less toxic option for consumers.

Espino – Tadpole Shrimp Management in Rice

Merits

- The project would impact both urban and agriculture by controlling a pest in the field and minimizing use of products that impact water for downstream users.
- This is a strong team, proposal, and data.
- The strongest aspect of the proposal is the monitoring improvement to understand at what stage the pest becomes a biological control.
- Pyrethroids are a significant problem; the project provides a win-win by decreasing both pyrethroids and herbicides.
- The potential to provide weed control in rice fields is important as herbicides are a significant issue for downstream water users including urban water agencies.

Concerns

- Transplanting may be too expensive to be widely adopted, although if insecticide resistance is developing it may be used despite the cost.
- The proposal is based on the false premise that pyrethroids are used in rice to control tadpole shrimp; they are used instead against worms and water weevils.
- A seven-day water hold is already used to prevent pyrethroids from impacting water quality; most pyrethroids have a three to five day half-life.
 - In response, other PMAC members said that there is still concern about impacts of pyrethroids through sediment, derivatives, and accumulation.

Finlinson – Urban Ground Squirrel IPM

Merits

- With the passage of AB 1788, there is a need for increased alternatives to anticoagulant rodenticides. DPR should encourage research related to AB 1788, whether by funding this proposal or through other efforts.
- Use of drone technology is a novel approach to reduce costs.
- There are strong partners to provide on-the-ground data and inform alternatives.
- There are potential applications far beyond the scope of the proposal and huge impact of the technological approach.
- The approach is innovative.

Concerns

- The project price is too high.
- The proposal did not follow the requested format, making it difficult to assess the proposal and its cost.
- The experimental design is unclear, preventing PMAC from assessing whether to fund the project.
- The proposal does not clearly demonstrate how the project will reduce rodenticide use. Further vetting of the benefits is needed.
- The project lacks details not only on its approach but also on possible alternatives.
- The proposal is not sufficiently fleshed out, yet the area needs research, so the team should complete a more refined proposal in the future.

Clarifications

- The budget amount is unclear and is listed differently in different documents.
 - DPR staff confirmed that the amount listed in one of the initial ranking tables was incorrect and stated that the project budget is \$330,413 total. The mistake occurred because the team did not properly fill out the budget information so DPR had to derive some of the data, and it was not initially calculated correctly.
- Does the improper completion of the budget disqualify it?
 - Staff said that DPR has not yet made a decision on this and asked PMAC members to share their perspectives.
 - A PMAC member suggested the proposal not be disqualified from consideration,

as the budget amounts were listed within the proposal.

Hewavitharana – Strawberry Crown Rot

Merits

- The target pathogen is of growing importance and is migrating north along the coast due to climate change.
- There has been little research on host resistance for this complex pathogen, which has multiple genes involved in resistance.
- The proposal is significantly improved from the previous proposal submitted by this team, with a stronger IPM approach.
- The project is aligned with research previously funded by DPR.
- While the crop termination approach is combined with pre-plant fumigation in current applications in Florida, increased effectiveness could reduce inoculant for future growing seasons, thus reducing chemical use over time despite increasing its application in the short term.
- The project builds on work that applied this approach in other pathogen systems.
- There is a strong PI.
- It is important to flesh out this rotational approach, which could benefit leafy greens as well as strawberries.
- Macrophomina and fumigants are important targets with complicated dynamics and limited options.

Concerns

- Adding another application of fumigant is not consistent with IPM, increasing exposure for workers and residents.
- Use of fumigants for crop termination is detrimental to soils.
- The project should look at other crop termination options, such as herbicides.
- The proposal does not provide sufficient information on how the cover crop would be used.
- The proposal's 20% yield increase target seems unrealistic in a crop that has been researched and optimized over decades.
- The proposal does not sufficiently clarify the extent of the pathogen in crop cultivation areas.
- This approach requires at least one season in which the cash crop is rotated out.

Clarifications

- Why does the proposal not include barley, cereal rye, or other cover crops?
 - A PMAC member said that the focus on wheat builds on previous work looking at a range of cereals as cover crops. However, the best cover crops vary depending on the target pest; other research is being pursued currently to identify the best cover crop for macrophomina control in particular.
- The proposal does not adequately clarify the feasibility of incorporating a wheat crop

rotation.

- A PMAC member said that wheat crop rotations have been adopted in strawberry breeding plots and have shown to build up a healthier soil microbial community and reduce the amount of the disease.

Hanson – South American Spongeplant Management

Merits

- This approach targets a new invasive species.
- It is proactive, aiming to control the problem before it becomes widespread.
- The team is strong.
- The study is well-designed.
- The project will establish the best timing for control.
- The proposal uses phenology for early detection and rapid response.
- It leverages the UC facility.
- The project develops understanding of the pest's biology, which is critical to identifying potential tools to address it. While it does not use typical IPM tools, IPM is broader than a set of tools and having basic information is a prerequisite for implementing effective IPM solutions.

Concerns

- The project is not truly IPM as the herbicides used are not low risk.
- There is a high project cost.
- There may be information on basic plant biology and phenology already available, although the proposal states that this is unknown.
- The proposal does not clearly demonstrate the impact of the weed.
- This may not be the most appropriate funding source for this early work documenting basic information and risk. The project may fit better within the California Department of Food and Agriculture's invasive species grant program.

Wilson – Cannabis Pesticide Use and Insect Survey

Merits

- Cannabis is a big industry, yet there is very little information available about it. The project takes a very important first step at addressing a significant need.
- The same team applied for an Alliance Grant in 2020 and the main feedback the PMAC provided at that time was that the proposal would be a better fit for a Research Grant.
- The project uses an innovative design that addresses the challenges related to researching this crop, including the ban on UC employees entering properties where cannabis is grown.
- The project would provide a fundamental base upon which to set up an IPM program for cannabis.
- The proposal includes many strong support letters.
- A grower survey is an important starting point for cataloguing pests and developing a

strategic plan to address them.

- There are many complex policy issues impacting the options available to growers, with very few tools registered for use on cannabis, despite the industry's growth.
- The two pieces of the proposal seem fairly separate, so that DPR may be able to fund only the survey component.
- The proposal addresses a very important issue, given the human health impacts on consumers and workers, in particular given the indoor cultivation of cannabis.

Concerns

- This is a high cost for a survey.
- Bioassays may not be an appropriate screening mechanism.
- The project should develop a pest management strategic plan.

Arnold – Walnut Crown Gall

Merits/Concerns

- The proposal addresses a widely distributed pathogen that causes an important disease in walnuts.
- Existing tools to address the pathogen are not sufficient, though there are many products that claim to control it. There are no recent efficacy trials against the disease.
- The project addresses long-term effects by covering multiple years.
- There is a need for controlled evaluation of the many products that claim to control this pathogen.

Concerns

- It is not clear that this research would be efficacious.
- The proposal lists commercial product names but not active ingredients and does not describe the products well.

There were no public comments on any proposal or prior to PMAC developing its recommendations.

5. Decision on Recommendations

Following discussion, PMAC members were asked to re-rank the proposals and submit their re-rankings via email for compilation. After taking a short break, quorum was confirmed.

Mr. Weibel presented tables of the initial ranking and the re-ranking, reviewing the changes. The top two proposals remained consistent, with Mauck – Lettuce, Melon Immunity Priming remaining first and Wang – Watermelon Fungal IPM second. Beyond these, the majority of the proposals moved up or down two places in the ranking.

2021/2022 Research Grant Review Summary by Reviewer, Re-Rank

Project	Rank	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	Avg	Budget
Mauck, Lettuce, Melon Immunity Priming	1	4	1	1	1	4	8	2	6	3	3	1	3	1	1	1	1	3	2	9	2	8	-	-	3.10	\$216,967
Wang, Watermelon Fungal IPM	2	1	4	2	6	3	7	3	2	1	1	2	2	2	2	2	2	1	5	8	9	11	-	-	3.62	\$109,055
Keogh, Smart Mating Disruption in Almond	3	7	11	3	11	5	13	1	12	2	2	4	4	3	4	8	3	2	9	3	4	1	-	-	5.33	\$87,986
Del Castillo, BMPs Vegetable Transplants	4	2	2	7	4	8	9	7	13	4	8	9	1	5	3	7	10	6	1	12	1	2	-	-	5.76	\$353,809
Lee, Sucralose Evaluation for Cockroaches	5	3	12	4	3	1	1	8	4	8	4	6	11	4	5	3	5	7	10	7	8	10	-	-	5.90	\$202,771
Westphal, Almond Nematode IPM	6	8	5	5	9	11	6	4	5	5	7	5	5	8	6	5	7	4	6	4	5	12	-	-	6.29	\$167,000
Wilson, Driedfruit Beetle IPM for Fig	7	5	3	11	5	12	4	5	11	6	6	3	12	9	7	4	6	5	3	2	7	13	-	-	6.62	\$110,938
Espino, Tadpole Shrimp Management in Rice	8	6	9	8	7	9	5	6	1	11	5	8	8	10	11	9	4	8	12	1	11	3	-	-	7.24	\$224,324
Hewavitharana, Strawberry Crown Rot	9	12	13	13	10	2	10	10	7	13	12	12	6	6	8	6	9	13	4	11	6	4	-	-	8.90	\$75,900
Wilson, Cannabis Pesticide Use and Insect Survey	10	9	8	10	2	6	12	9	3	12	10	10	13	13	12	13	13	12	13	5	3	9	-	-	9.38	\$149,365
Finlinson, Urban Ground Squirrel IPM	11	10	10	6	13	7	11	11	9	7	9	7	10	11	13	10	11	9	8	6	13	7	-	-	9.43	\$197,232
Arnold, Walnut Crown Gall	12	13	7	9	12	10	3	12	10	9	11	13	7	14	10	12	9	10	7	10	12	5	-	-	9.76	\$217,622
Hanson, South American Spongeplant Management	13	11	6	12	8	13	2	13	8	10	13	11	9	12	9	11	12	11	11	13	10	6	-	-	10.05	\$74,750

A PMAC member proposed that the full suite of feedback, including the initial and re-ranks as well as the range of perspectives shared by the PMAC on merits, concerns, and areas needing clarification, be shared with DPR for consideration.

The floor was opened for public comment. None were made.

A roll-call vote was taken on the proposal. With nineteen of the twenty participating PMAC members in favor, the proposal was approved.

6. Charter Update Discussion

Lynette Komar, Staff Counsel, DPR Office of Legal Affairs, presented a proposed PMAC charter revision for review. Based on PMAC feedback from the November 2020 meeting, DPR revised recusal and conflict of interest language for UC salaried staff, instead stating that members must comply with all laws that govern financial interest conflicts and listing relevant laws at the end of the charter. Staff encouraged PMAC members to contact DPR ahead of any meeting if they believe they have a conflict of interest, are unsure whether they have a conflict of interest, or have any confusion about the policy. PMAC members were also encouraged to consult their own legal counsel.

A PMAC member said their concerns about the language regarding conflicts of interest and recusal requirements had been addressed with the change presented.

A PMAC member shared concern that the duties of the PMAC had narrowed to reviewing and making recommendations on grant proposals. The PMAC previously provided broader guidance on the subject of pest management and its interaction with the registration of pesticides. This broader scope is reflected in the charter, though not in PMAC's recent activities. The member said DPR is missing an opportunity to get broader input from the PMAC, and perhaps the PMAC could provide input on the issues that the new working group would address.

A PMAC member said that the group had previously been engaged more as a sounding board in development of the grant programs, as well as proposal review.

Leslie Talpasanu, DPR Environmental Program Manager, said that the PMAC has focused on grant review for a number of years, as DPR has multiple committees working on pesticide use, registration, and other issues that the PMAC once engaged on.

Director Dolcini said that DPR has attempted to balance applying the comprehensive expertise the PMAC provides with being mindful of members' time.

Ms. Talpasanu and Director Dolcini invited PMAC members to share any specific topics they would like the PMAC to address so that DPR can add those to the PMAC's long-term calendar.

Ms. Talpasanu said that additional time would be allotted in a future PMAC meeting to further discuss the charter.

7. Closing Remarks

Director Dolcini thanked participants for their input.

The next PMAC meeting will focus on discussion of the Alliance grant proposals and will take place on May 13, 2021.