



SUMMARY | PEST MANAGEMENT ADVISORY COMMITTEE RESEARCH GRANT REVIEW MEETING CALIFORNIA DEPARTMENT OF PESTICIDE REGULATION

February 13, 2020

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. Ken Everett, Department of Pesticide Regulation Acting Assistant Director | 5. Emily Buerer, Community Alliance with Family Farmers |
| 2. Brenna Aegerter, University of California Cooperative Extension | 6. Caroline Cox, Center for Environmental Health |
| 3. Steve Blecker, Department of Food and Agriculture | 7. Jonathan Evans, Center for Biological Diversity |
| 4. Whitney Brim-DeForest, University of California Cooperative Extension | 8. Jim Farrar, Statewide UCIPM Program |
| | 9. Terry Gage, California Agricultural Aircraft Association |

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|--|---|
| 10. Ken Giles, UCD Department of Biological & Ag Engineering | 15. Nick Lupien, California Association of Pest Control Advisors |
| 11. Jon Holmquist, Association of Applied IPM Ecologists | 16. Mel Machado, Blue Diamond Growers |
| 12. Anne Katten, California Rural Legal Assistance Foundation | 17. MaryLou Polek, USDA Agricultural Research Service |
| 13. Farzaneh Khorsandi, University of California, Davis, Department of Biological & Agricultural Engineering | 18. Nicole Quinonez, Consumer Specialty Products Association |
| 14. Kendra Klein, Friends of the Earth | 19. Margaret Reeves, Pesticide Action Network North America |
| | 20. Kevin Wright, California Agricultural Commissioners and Sealers Association |

California Department of Pesticide Regulation (DPR)

- | | |
|------------------|-------------------------|
| 21. Joe Damiano | 26. Rodney Jones |
| 22. John Gerlach | 27. Catherine Bilheimer |
| 23. Matt Fossen | 28. Jordan Weibel |
| 24. Jill Townzen | 29. Tory Vizenor |
| 25. Atefeh Nik | |

Facilitation Support

- | | |
|---------------------------|--------------------------|
| 30. Ariel Ambruster, CSUS | 31. Julia Van Horn, CSUS |
|---------------------------|--------------------------|

This document summarizes those portions of the meeting relevant to the Pest Management Advisory Committee’s grant consideration process.

2. Opening Comments and Background

Introductions and Chair’s Opening Comments

Ken Everett, DPR Acting Assistant Director and Chair of PMAC, welcomed everyone and thanked members of the PMAC, including new members, for joining the meeting. He noted that the Chlorpyrifos Alternatives Work Group had been formed to discuss alternatives to chlorpyrifos (CPF) and an action plan based on that group’s work would be available within the next few months.

DPR officials ascertained that a quorum of PMAC members was present in the room.

Background on DPR’s Pest Management Research Grant Program, Project Proposal Review, and Basic Procedures

Dr. Jill Townzen, Environmental Program Manager I, DPR, provided background on the Department’s Pest Management Research and Alliance Grant Programs and other relevant updates.

In an effort to make the PMAC grant review process more transparent, DPR made a number of procedural changes, including taking public comment both in the room and by phone remotely on each proposal and on the general discussion.

The Pest Management Research Grant Program process begins with a solicitation posted on the website by DPR. Applicants submit concepts, which DPR reviews to determine whether they meet the solicitation criteria. DPR then requests full proposal applications for those concepts that meet all eligibility requirements. PMAC members are asked to review the full proposals prior to and during their meetings. DPR also conducts an internal review of the full proposals.

Dr. Townzen noted the importance of receiving feedback from PMAC members ahead of the meeting so that it can be included in the discussion during the meeting. Following each PMAC meeting, a meeting summary is developed and posted publicly online. A memo to the DPR Director is also developed, presenting the PMAC’s recommendations as well as key comments submitted in writing ahead of the meeting and made during the meeting.

Dr. Townzen reviewed details for the current round of funding and noted that the PMAC would conduct discussions today on two separate sets of proposal applications. The 2020-2021 Pest Management Research Grant Program has two funding sources: \$2.1 million is allocated for projects that identify, develop and implement safer, practical and sustainable **Alternatives to Chlorpyrifos (CPF)**, funded via the State general fund. The DPR fund has \$500,000 available for research projects that develop methods or practices that contribute to an integrated pest management system and may **reduce risks** associated with pesticides.

DPR has already funded one Alternatives to CPF project, leaving \$1.8 million available. Remaining funding could more than fully cover the two proposals that were submitted under the Alternatives to CPF solicitation. Dr. Townzen noted that discussion on the Alternatives to CPF proposals will therefore focus on whether each proposal is of sufficient quality to merit funding, rather than ranking their quality comparatively. The reduced risk proposal discussion will follow PMAC’s usual procedure, reviewing scores given ahead of the meeting, discussing, and then re-ranking the proposals. After each discussion, a roll-call vote will be taken to determine agreement on whether recommendations and rankings reflect the discussion.

| 2020-2021 Alternatives to Chlorpyrifos Grant Summary of Proposals | | |
|---|------------------------|-----------|
| Proposal Short and Full Title | Principal Investigator | Budget |
| Grettenberger – Alternatives to CPF for Aphid and Whitefly Efficacy and optimal use of alternatives to chlorpyrifos for aphid and whitefly management in cotton | Ian Grettenberger | \$373,477 |
| Kaffka – Alternatives to CPF for Sugarbeet Alternatives to chlorpyrifos for sugarbeet production in the Imperial Valley | Stephen R. Kaffka | \$408,263 |

| 2020-2021 Research Grant Summary of Proposals | | |
|---|----------------------------------|-----------|
| Proposal Short and Full Title | Principal Investigator | Budget |
| Shearer – Field Sanitation Enhanced field sanitation to reduce insecticide use and fruit damage in California strawberries | Peter W. Shearer | \$193,242 |
| Sutherland – Invasive Cockroach Species First investigations into the biology and management of an invasive cockroach species | Andrew Sutherland | \$56,913 |
| Choe - Western Drywood Termite Use of enzymatic- and microbial-based methods to determine the age of fecal pellets for effective IPM decision-making against the Western drywood termite, <i>Incisitermes minor</i> (Blattodea: Kalotermitidae) | Dong-Hwan Choe | \$230,800 |
| Hewavitharana – Crown Rot Management Enhanced integration of <i>Macrophomina</i> crown rot management practices in strawberry | Shashika S. Hewavitharana | \$154,104 |
| Jawed - Compact Mobile Robots Compact mobile robots for integrated pest management in row crops | Mohammad Khalid Jawed | \$250,000 |

Jordan Weibel, Environmental Scientist, DPR, reviewed the concepts and proposal applications funded in 2019-2020 and those submitted for 2020-2021. In 2019-2020, the grant projects funded included two Alliance grant projects, totaling \$367,091, and four research grant projects, totaling \$659,633.

For 2020-2021, nine Alliance Grant and seven Alternatives to CPF grant concepts were submitted. Principal investigators whose proposals meet eligibility criteria will be asked to submit full proposal applications, which will be discussed at the next PMAC meeting in May.

In addition to this Research Grant meeting and the Alliance Grant meeting in May, a third PMAC meeting will be held in August 2020 to review and update the PMAC charter and discuss how DPR and PMAC members understand the role of the PMAC.

Grant Program Procedures

The facilitator, Ariel Ambruster from the Consensus and Collaboration Program at California State University, Sacramento, reviewed the role of PMAC in the grant funding process: to advise DPR on the grant funding decisions.

Ms. Ambruster reviewed the meeting ground rules and procedures. She affirmed the importance of hearing the diverse perspectives of the PMAC members.

3. Alternatives to Chlorpyrifos – Rankings Based on Reviewers’ Scoring

Twenty-two PMAC members reviewed and scored the two Alternatives to CPF proposals and submitted information prior to the meeting. The numeric scores were converted to ranks, where 1 was the most highly regarded proposal and 2 was the least. These ranks were averaged, as presented in the following chart. Grettenberger was the more highly ranked of the two proposals, with an average ranking of 1.36 compared to 1.64 for Kaffka.

| 2020/2021 Alternatives to Chlorpyrifos 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 | Avg | High | Low | \$ |
| Grettenberger - Alternatives to CPF for Aphid and Whitefly | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.36 | 1 | 2 | \$373,477 |
| Kaffka - Alternatives to CPF for Sugarbeet | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1.64 | 1 | 2 | \$408,263 |

4. Alternatives to Chlorpyrifos – Discussion of Proposals

Ms. Ambruster noted that DPR has sufficient funding for both projects, so discussion of proposal quality would focus on whether each project is of sufficient quality to be recommended for funding. No PMAC members needed to recuse themselves for any proposal.

Ms. Ambruster asked whether the PMAC considered either of the proposals to not be of sufficient quality to be recommended for funding. PMAC members did not remove either proposal from consideration prior to the discussion.

Discussion of Proposals

PMAC members discussed the merits, concerns, and areas needing clarification for the two project proposals, 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. There were no public comments on either of the proposals.

During the discussion, PMAC members requested clarification on the purpose of the Alternatives to CPF funding, and how it relates to the PMAC focus on IPM. DPR staff said the Alternatives to CPF funding focuses on developing short-term tools that farmers can utilize as they transition away from CPF. These may include, but are not required to include, IPM approaches.

Grettenberger – Alternatives to CPF for Aphid and Whitefly

Merits

- The project addresses an issue that is known to be critical.
- There are significant economic implications to agriculture if an effective alternative to CPF is not identified.
- The proposal is well written and the experimental design is easy to follow.
- The proposal is timely and transferable and will keep IPM relevant within cotton production.
- Deliverables are straightforward and costs are reasonable.
- The proposal is comprehensive, considering ground, air, and sequential treatments.
- This is a thoughtful, systematic approach, scaling from small trials, narrow options, and building to field operations, accounting for application differences.
- The proposal addresses the need for a near-term emergency response to cancellation of CPF.

Concerns

- Extensive monitoring of timing and schedules will be required.
- The proposal does not incorporate IPM approaches, focusing only on testing alternative pesticides. It's important to focus on funding projects that support transitioning away from dependence on harmful chemicals through system-based approaches that reduce the need for pesticides rather than input substitution.
- Some of the pesticides included in this study are of high concern for pollinators and other beneficial insects – the project trades human health impacts for ecosystem impacts.
- The proposal states that biological insecticides are best used in tank mixes but does not cite evidence for that claim.
- The study includes pesticides that are not registered in California.
- Treatment with CPF is used as the scientific control for the study, although it could not be a back-up option.

Kaffka – Alternatives to CPF for Sugarbeet

Merits

- CPF is the most-used pesticide for sugarbeet, so an alternative is critical for this crop.
- This addresses concerns related to pollution of the Salton Sea.
- The proposal has strong stakeholder support, so it is likely to lead to grower adoption.
- Sugarbeet is a marginally profitable crop, so the economic impact of CPF cancellation would be significant for growers.
- The project incorporates IPM strategies such as delayed planting.

Concerns

- Many of the CPF substitutes included in the study have adverse health impacts (pyrethroids) or ecosystem impacts (neonicotinoids and sulfoxaflor).
- The study includes products that are not registered for sugarbeet use in California.
- It does not focus on IPM approaches and includes other problematic pesticides.
- The proposal does not explain what seed treatments will be used, though seed treatment is included in all of the interventions in the trial. There is strong evidence of the toxicity and persistency of neonicotinoids, which are the likely seed treatment.
- The proposal lacks sufficient IPM alternatives, such as bioparasites, naturally occurring predators, or improving the quality of the seedbed.
- Are sugarbeets, a small commodity in California, of sufficient importance to warrant the funding? On the other hand, these growers are not likely to be able to fund this research themselves, given the size of the crop and its marginal profitability.
- The control groups in the experimental design are variable.
- The project includes many collaborators, creating more room for error or inconsistency.
- The project does not include known IPM approaches for leafhopper, such as parasites used in grape production.
- The method of application of CPF alternatives should be considered.

- Agronomic aspects, such as planting dates and seedbed quality, are not addressed.
- The proposal is too expensive.

PMAC members asked for more information about additional Alternatives to CPF proposal applications they will consider in May, and the relationship to the day's proposals. In response, Dr. Townzen affirmed that additional proposals will come before PMAC in May. Seven concepts were submitted and a subset of those that meet the funding criteria will submit full proposals for consideration.

PMAC members raised the following questions and issues, with Dr. Townzen's answers shown below:

- Can today's proposals be reconsidered during the May meeting?
 - Those who submitted proposals for this round were told that they would be notified by the end of March whether they had been awarded grants, so DPR would like to honor this commitment. However, DPR will consider this option.
- Some of the work in the current proposals is slated to begin in summer 2020, so it is important for the teams to know as soon as possible whether they have received the funding.
- What is the project that already received Alternatives to CPF funding?
 - The project by Neal Williams looks at the impact on bees of pesticides that may be used as CPF alternatives.
- What is the timeframe for Alternatives to CPF funding?
 - Proposals could be considered during one additional grant cycle to allow researchers a full three years to use the funding awarded.
- Is this a limited, one-time pot of funding?
 - Yes, with a total of \$2.1 million.
- Why are some proposals being considered now rather than in May?
 - DPR put out the initial solicitation for proposals to be considered during this meeting. DPR did not receive enough eligible proposals, and so launched the later extra cycle.
- If these proposals were reconsidered in May, how delayed would the funding determination be?
 - The proposers would find out whether they received funding in July rather than March, and would lose some of the three years available for implementation.

The PMAC then prepared to make individual written tallies of their funding recommendations for each proposal.

A PMAC member asked whether there was a way to register a "maybe" vote. Dr. Townzen said that PMAC members could vote yes, no, or abstain for each proposal, using the abstain option to indicate "maybe."

The results of this tally are shown in the table below, with "1" denoting yes, "0" denoting no, and "N/A" denoting abstain or maybe. For the Grettenberger – Alternatives to CPF for Aphid

and Whitefly proposal, fifteen recommended funding, four did not recommend funding, and none abstained; for the Kaffka – Alternatives to CPF for Sugarbeet proposal, nine recommended funding, ten did not recommend funding, and two abstained.

| 2020/2021 Alternatives to Chlorpyrifos Review Summary by Reviewer, Re-Score | | | | | | | | | | | | | | | | | | | | | | |
|---|----|----|----|----|-----|----|----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------|
| Project | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 | R11 | R12 | R13 | R14 | R15 | R16 | R17 | R18 | R19 | R20 | R21 | \$ |
| Grettenberger - Alternatives to CPF for Aphid and Whitefly | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | \$373,477 |
| Kaffka - Alternatives to CPF for Sugarbeet | 1 | 1 | 0 | 0 | N/A | 1 | 0 | N/A | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | \$408,263 |

PMAC members were given an opportunity to express final comments.

A member expressed concern about the use of taxpayer funds to support individual industries, particularly when there are policy concerns related to harmful environmental and human health impacts of the industry.

Ms. Ambruster opened the floor for public comment. A member of the public asked whether it is possible for PMAC to vote to fund only a certain portion of a proposal. DPR staff said that it is not possible.

DPR staff affirmed that the memo to the Director would include PMAC’s request to re-evaluate these proposals in the context of the other Alternatives to CPF proposals to be considered in May, as well as other comments made during the discussion.

Ms. Ambruster asked PMAC members to take a roll call vote to affirm that the vote tally and discussion are representative of the process and range of perspectives of PMAC members and are to be forwarded as the PMAC’s recommendation to the Director.

The roll call vote was taken; all PMAC members present and participating remotely voted yes.

5. Pest Management Research Grants – Rankings Based on Reviewers’ Scoring

Ms. Ambruster reviewed the solicitation focus and selection criteria for the Pest Management Research Grant Program. The criteria are:

- Projects that develop methods or practices to reduce risks associated with pesticides of high regulatory concern and/or that are considered high-risk.
- Projects that can be incorporated into or contribute to an IPM system by addressing refined decision-making for pest management, enhanced integration of pest management practices, improvement of application technologies, increased cost effectiveness of reduced-risk practices, and modeling or meta-analyses to advance IPM.
- The overall quality of the proposal.

There are five proposals, with a total amount requested that exceeds the available funding of \$500,000. No PMAC members recused themselves for any proposal.

Twenty-two PMAC members reviewed and scored the five proposals prior to the meeting. The numeric scores were converted to ranks, where 1 was the most highly regarded proposal and 5 was the least. These ranks were averaged, as presented in the following chart. Shearer – Field Sanitation was the top ranked proposal with an average score of 1.86, followed by Sutherland – Invasive Cockroach Species with 2.76, Choe – Western Drywood Termite with 2.81, Hewavitharana – Crown Rot Management with 3.00, and Jawed – Compact Mobile Robots with 4.18.

| 2020/2021 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 | Avg | High | Low | \$ |
| Shearer, Field Sanitation | 1 | 3 | 1 | 2 | 5 | 1 | 2 | 1 | 1 | 2 | 1 | 3 | 1 | 1 | 3 | 3 | 3 | 1 | 2 | 1 | 2 | 1 | 1 | 1.86 | 1 | 5 | \$193,242 |
| Sutherland, Invasive Cockroach Species | 2 | 2 | 4 | 1 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | NA | 1 | 4 | 4 | 5 | 1 | 3 | 3 | 3 | 2.76 | 1 | 5 | \$56,913 |
| Choe, Western Drywood Termite | 3 | 4 | 2 | 4 | 1 | 2 | 5 | 2 | 3 | 4 | 2 | 5 | 1 | 2 | NA | 1 | 1 | 2 | 4 | 3 | 5 | 4 | 2 | 2.81 | 1 | 5 | \$230,800 |
| Hewavitharana, Crown Rot Management | 4 | 1 | 3 | 3 | 3 | 5 | 1 | 4 | 4 | 5 | 4 | 1 | 5 | 4 | 1 | 4 | 2 | 5 | 1 | 4 | 1 | 2 | NA | 3.00 | 1 | 5 | \$154,104 |
| Jawed, Compact Mobile Robots | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 1 | 5 | 4 | 4 | 5 | 2 | 5 | 5 | 3 | 3 | 5 | 4 | 5 | 4 | 4.18 | 1 | 5 | \$250,000 |

6. Reduced Risk Grants – Discussion of Proposals

Ms. Ambruster asked whether the PMAC wished at the outset to identify any proposals that were not of sufficient quality to be recommended for funding PMAC members discussed identifying two of the proposals to recommend against funding, but did not reach consensus.

PMAC members then discussed the merits, concerns, and areas needing clarification for the five project proposals, 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. There were no public comments on any proposal.

Shearer – Field Sanitation

Merits

- The proposal is straightforward and well written.
- The project clearly engages an IPM approach so is well fitted to the PMAC charge.
- It addresses a clear economic impact.
- The project clearly meets the grant focus on pesticides that are high risk or of high regulatory concern.
- The cost analysis in the project will help growers decide whether to implement the approach.
- Labor costs are an important consideration and are incorporated into the analysis.
- The project will provide good data regarding the impact of field sanitation on management of spotted wing drosophila, even if the analysis finds that this particular approach does not pencil out economically.
- The project includes training for workers, which is likely to contribute to retention of

labor. The data collected will help clarify how this approach might affect labor issues.

Concerns

- The project focuses on gathering data that is more “nice to know” than “need to know.”
- Labor availability and reliability are likely to continue to be limited, which may make the project challenging to implement.
- Consider implementing a similar approach using automated methods rather than by hand. Harvesting demand may outweigh IPM research for labor use.
- The proposal does not make a clear case for the statewide impact of the problem.

Requested Clarifications

- Workers should be included in the project to a greater extent, particular as the targets of education and training.
- As workers are generally paid by produce picked, it is unclear if compensation for this work would be sufficient to attract enough labor.

Sutherland – Invasive Cockroach Species

Merits

- This is a cost-effective proposal.
- It is a classic IPM approach.
- IPM requires accurate identification of the pest. This project would support that and provide important information to the public.
- It is a straightforward proposal.
- The project will help minimize exposure to pesticides by ensuring that they are not used indoors for a pest that lives outdoors.

Concerns

- This is a study that registrants will carry out themselves in order to determine whether they can add a new pest to their products’ labels, so DPR grant funding may be better spent on studies that will not otherwise be carried out.
- The proposal does not justify need and identify the significance of the issue.
- Hypotheses are not informed by any pilot study.
- Given the insect’s lifecycle, it is not clear that the research will be able to be effectively implemented in the time of the funding cycle.
- As compared with other proposals, the reduced-risk impact of this project is not the highest.

Choe – Western Drywood Termite

Merits

- The proposal targets an important high-risk pesticide as well as major pest.
- This is an innovative concept and research.

- The field test kit could be widely useful if it is shown to be effective.
- The project could have a significant impact by informing consumer decision-making and ensuring that pesticide use is more targeted.
- The postdoctoral researcher supporting the work has already been identified.
- There are significant potential benefits for a relatively small grant.
- The lab has a history working in termite biology and has received past grants for related work.
- The test kit may be useful to prevent second rounds of treatment by helping determine whether a pesticide application was effective.

Concerns

- There might be significant potential liability issues for pest companies.
- Commercialization of products has a high cost, so it is unlikely that this approach will be successfully commercialized, even if it is effective.
- The culturing media identified are not appropriate.
- The proposal does not identify sample distribution and collection methods.
- Test results that determine pellets are old will still not be able to definitively conclude that there are no active termites. Termites can be very transient so they may be active in a different part of a structure. Additionally, it is not possible to access all the locations where termites may be active. This contributes to possible liability issues.
- Past techniques for termite management have faced adoption challenges despite being shown to be effective.

Requested Clarifications

- The proposal does not include information about the pricing of the technology if it were to be commercialized. This is an important consideration for potential adoption.
- Are these tests necessary to determine the age of fecal matter? Might it be possible to identify age through visual means alone?

Hewavitharana – Crown Rot Management

Merits

- The project addresses a significant problem in terms of the pest, the crop, and the fumigants used.
- The target pesticides are important.
- It is an interesting IPM approach focused on prevention by targeting the overwintering structure of the fungus to prevent soil-borne inoculant.
- This is a clear IPM approach by stopping the spread of the disease.
- It educates undergraduate and graduate students on the importance and use of IPM.

Concerns

- Rather than substituting a harmful product, the proposal focuses on changing the timing and application method of the existing product.

- The proposal does not address cultural practices, biological controls, and other IPM options. It does not demonstrate why pesticides need to be used in this case.
- The experimental treatments are unclear.
- The proposal does not make the extent of crown rot and its impact clear.
- The statistical design is problematic.
- The project may lead to an increase, rather than decrease, in pesticide use with two fumigations per year rather than a single application.
- There is not clear consensus that the proposal takes an IPM approach, whereas there are other proposals on the table about which there is consensus that the approach is IPM.

Requested Clarifications

- Does the study focus on reduction of pesticide use?
- Some of the diagrams and text in the proposal do not align.

Jawed – Compact Mobile Robots

Merits

- Involving engineers and robotics in pest management, and particularly IPM, would be beneficial.
- The project presents an interesting approach.
- Utilizing robots addresses timely issues related to the tight agricultural labor market.
- The project is at the cutting edge of weed science management research.
- Though high risk, the project has the potential to be of high impact if successful.

Concerns

- The project does not include any collaborators with plant science, agronomy, weed identification, spray application, or other similar backgrounds.
- The majority of the testing would be conducted in North Dakota, which has a very different agricultural context than California.
- The proposal does not address the existing, significant public and private investment in use of robotics for similar applications and does not reflect good understanding of what is already known. It underestimates how complicated and challenging this work is and will not be a good investment for State funds.
- The project is neither IPM nor reduced risk. It uses glyphosate, with potentially more frequent application because application decisions will be made by unsupervised robots.
- The approach is impractical and unlikely to be adopted due to the large number of robots needed for the area covered, along with associated cost barriers for small operations and management barriers for large operations. Each robot needs to be able to cover a larger area for the approach to be practical.
- The proposal is overly ambitious given the length of the grant cycle.
- There are significant challenges related to automated weed identification and detection of pathogens.

- The technology would be very susceptible to theft, especially given that the robots would not be human supervised.
- The choice of crop in the study is not relevant to California agriculture.
- The projected 90% pesticide use reduction is unrealistic.
- Technology for weed identification is coming, with two major companies having developed technology recently, but it is not yet available.

7. Recommendations for Funding

Ms. Ambruster opened the floor for public comment prior to PMAC’s funding recommendation; there were no public comments.

Based on the discussion, PMAC members re-ranked the five proposals. Re-ranking results are shown in the table below. Shearer – Field Sanitation remained the top ranked proposal with a new average score of 1.35, followed by Choe – Western Drywood Termite with 2.55, Sutherland – Invasive Cockroach Species with 2.75, Hewavitharana – Crown Rot Management with 3.35, and Jawed – Compact Mobile Robots with 5.00.

| 2020/2021 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 | Avg | High | Low | \$ |
| Shearer, Field Sanitation | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 4 | 1 | 2 | 1.35 | 1 | 4 | \$ 193,242 |
| Choe, Western Drywood Termite | 2 | 4 | 2 | 2 | 2 | 4 | 2 | 1 | 3 | 3 | 2 | 2 | 4 | 2 | 3 | 3 | 3 | 2 | 1 | 2 | 4 | 2.55 | 1 | 4 | \$ 230,800 |
| Sutherland, Invasive Cockroach Species | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 4 | 2 | 2 | 3 | 3 | 3 | 3 | 1 | 2 | 4 | 3 | 2 | 3 | 3 | 2.75 | 1 | 4 | \$56,913 |
| Hewavitharana, Crown Rot Management | 4 | 2 | 4 | 4 | 4 | 3 | 4 | 2 | 4 | 4 | 4 | 4 | 2 | 4 | 4 | 4 | 2 | 4 | 3 | 4 | 1 | 3.35 | 1 | 4 | \$ 154,104 |
| Jawed, Compact Mobile Robots | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5.00 | 5 | 5 | \$ 250,000 |

Ms. Ambruster asked if the PMAC now wished to identify those proposals it would not recommend for funding. A PMAC member proposed that the bottom two proposals (Hewavitharana, Jawed) not be recommended for funding. Another PMAC member opposed the proposal, so there was not consensus in support.

A PMAC member proposed that the bottom proposal (Jawed) not be recommended for funding, and that the PMAC’s comments and rankings be passed along to the Director for his consideration in making funding decisions. The PMAC reached consensus in support of this proposal.

Through a roll call vote, the PMAC consented unanimously that the re-rankings and summary of their discussion accurately reflect their range of views for funding recommendations.

8. Grant Program Process Feedback

Ms. Ambruster noted that there was not time to discuss Grants Program process feedback. However, a meeting focused on grant program process is scheduled for August 2020.

During the earlier discussion of proposals, PMAC members raised the following items for further discussion in August:

- What is the role of the PMAC's mandate to promote IPM when considering proposals under funding grant programs that have different priorities?
- Does DPR have a role arbitrating disagreements among PMAC members, particularly regarding scientific conclusions such as ecosystem impacts of seed treatments with neonicotinoids? For example, might DPR staff share studies they recommend that PMAC consider?
- How does the PMAC determine whether a project qualifies as IPM?

9. Closing Remarks

Acting Assistant Director Everett thanked PMAC members for their feedback and affirmed that the discussion, as well as the proposal rankings, provided DPR with the information needed to make funding decisions. He also thanked DPR staff for their work behind the scenes supporting the Grants Program and the PMAC.

The next round of grants, for the Alliance Grant program as well as the second round of Alternatives to CPF, will be sent to PMAC members for evaluation on April 8, 2020 and discussed at the next PMAC meeting on May 14, 2020.