Journal of Extension

Volume 58 | Number 3 Article 24

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Recommended Citation

Murray, K., Jepson, P., Bouska, C., Scherr, M., & Walenta, D. (2021). Integrated Pest Management Summit Reveals Barriers, Needs, and Goals for Agricultural Extension. *Journal of Extension, 58*(3). Retrieved from https://tigerprints.clemson.edu/joe/vol58/iss3/24

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Journal of Extension
www.joe.org

June 2020
Volume 58
Number 3
Article #v58-3a6
Feature

Integrated Pest Management Summit Reveals Barriers, Needs, and Goals for Agricultural Extension

Abstract

Integrated pest management (IPM) continues to be an area of great importance for agricultural Extension. However, there are barriers to implementation. To advance understanding of current status, barriers, and needs in IPM Extension, we organized a 1-day IPM summit for Oregon State University agricultural Extension faculty. Over 50 faculty attended from various departments and programs. We report on the process and highlight the top barriers, needs, and goals revealed. We hope to stimulate similar meetings among other agricultural Extension professionals and enhance Extension professionals' collective understanding of barriers to IPM to reveal pathways for progress.

Keywords: integrated pest management, sustainable agriculture, barriers to integrated pest management, agricultural Extension priorities

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Introduction

Integrated pest management (IPM) continues to be an area of both great importance and unique challenge for agricultural Extension programs. IPM is increasingly highlighted as a necessary solution to reduce the human health and environmental risks associated with pest management and increase ecosystem resilience and sustainability (Food and Agriculture Organization of the United Nations, 2014; Hertz-Picciotto et al., 2018; Pretty & Bharucha, 2015), and agricultural Extension programs are essential to ensuring implementation of IPM (Jepson et al., 2014). IPM has the potential to address the economic, environmental, and health risks associated with pests and pest management tactics on a national scale, and in the United States we have a National Roadmap that coordinates research and Extension programs to address these goals (U.S. Department of Agriculture, 2018). However, there are numerous barriers to progress in achieving widespread adoption of IPM, including a shortage of IPM expertise within agricultural Extension (Parsa et al., 2014). Because IPM is a multidisciplinary field addressed in a wide variety of settings and environments, close coordination across disciplines (including plant and animal sciences, pathology, pesticide science, engineering, economics, and behavioral and social sciences) is needed to deliver education on effective IPM strategies to stakeholders.

In Oregon, IPM as a risk reduction strategy is receiving increased attention among state legislators and advocacy groups and pest management stakeholders affiliated with agricultural, urban, school, and state agency settings. Oregon has passed legislation that mandates IPM in schools and state agency facilities, with university-based faculty identified as leaders for these efforts (Oregon Revised Statutes 634.650–634.705, 2019). Other states have passed similar legislation mandating IPM in schools, including California and Nevada (California Healthy Schools Act, 2000; Nevada Assembly Bill 205, 2019), with implementation relying heavily on university-based Extension faculty. Progress has occurred due to targeted efforts within these programs (Stock, Kowalewski, Gould, & Jepson, 2019), but much more work is needed to meet these state mandates.

State and federal funding for capacity development and programmatic activity in IPM is limited across the United States, and agricultural Extension agents are often attempting to address multiple contexts for IPM among their stakeholders (schools, urban areas, facilities, landscape management, farms). Needs for increased IPM education among those in agricultural industries alone are vast. Oregon is one of the lead states in the adoption of strategic planning for IPM, in partnership with key stakeholders, and it has developed an IPM-focused approach to consultation that addresses Extension, research, and policy needs (for examples, see Murray & Jepson, 2018a, 2018b; Murray, Jepson, Bouska, & Patten, 2017; Murray, Jepson, & Reitz, 2017; for the methodology, see Murray & Jepson, 2019). This wide array of priorities calls for increased communication and close collaboration so that agricultural Extension professionals can focus efforts on areas of greatest need while also leveraging opportunities for synergy across programs and disciplines.

In an effort to advance collective understanding of goals, barriers, and needs related to advancing IPM implementation across Oregon, we organized the 1-day Oregon IPM Summit (referred to hereafter as the IPM Summit) for Oregon State University Extension faculty in December 2018. Fifty-five faculty attended the event, representing numerous university departments largely within or connected to the College of Agricultural Sciences. Most of the participating faculty were involved in some aspect of delivering IPM education to stakeholders; others were research faculty with IPM interests and college administrators.

In this article, we outline the format and process of the IPM Summit to encourage similar conversations within agricultural Extension programs across the United States and elsewhere. We also report outcomes from the meeting, specifically the top barriers, needs, and goals identified by the IPM-focused group of faculty who attended the summit, to help elucidate pathways for advancement in IPM.

Meeting Format

The meeting was organized by an advisory group of five Extension faculty from both on- and off-campus locations (our author team). In an effort to recruit broad participation, we developed a flyer (see Figure 1) that was disseminated widely through departments and off-campus stations within the College of Agricultural Sciences. Also, department heads and station directors were asked to encourage their faculty to attend.

Figure 1.

Oregon Integrated Pest Management Summit Flyer

We developed an agenda for the meeting (see Figure 2) that reflected our intention to be open and inclusive in our effort to seek broad input regarding the barriers, strengths, opportunities, challenges, and needs associated with IPM adoption. We also sought consensus on top goals for advancing the research and implementation of IPM. The meeting was facilitated by the statewide IPM coordinator (author Katie Murray), and meeting outcomes were captured via the help of multiple note takers who also acted as rapporteurs.

Figure 2.

Oregon Integrated Pest Management Summit Agenda

Oregon IPM Summit
December 14, 2018
Corvallis, OR
Meeting Agenda

8:30 am	Continental breakfast, networking
9-9:45 am	Welcome and introductions: Katie Murray, Statewide IPM Coordinator
9:45-10:45 am	Flash Talks: Barriers to IPM
10:45 am	Break (sign-ups for IPPC affiliate faculty list)
11-11:30 am	Group exercise: Strengths, Opportunities, Challenges, and Needs of Statewide IPM at OSU
11:30 am-12 pm	IPM at OSU: Goal-setting discussion
12-1 pm	Lunch and networking (on-site)
1-2 pm	Breakout sessions (five concurrent sessions): Discussions of current status and major needs/priorities *Biologically based IPM: led by Jana Lee* *Organic IPM: led by Nick Andrews* *Invasive/emerging pests: led by Silvia Rondon* *Pesticide risk reduction: led by Paul Jepson* *Monitoring and diagnostics: led by Melodie Putnam*
2-2:40 pm	Full group: breakout session summaries and discussion
2:40-2:50 pm	Break
2:50-3:45 pm	Roundtable discussions: Networking and planning to address top priorities
3:45-4:30 pm	Full group: Roundtable reports
4:30 pm	Closing comments, meeting evaluation
4:45 pm	Adjourn

Meeting Outcomes

Barriers to IPM Adoption

Achieving a deeper and more nuanced understanding of the barriers to IPM adoption is critical to finding solutions. Extension faculty have a unique perspective on these challenges based on their close engagement with pest management decision makers. Eighteen Extension faculty participants came prepared to offer 3-min flash talks to the group regarding their perceptions of the barriers to IPM adoption. We included a sign-up process for this as part of the event registration process.

Of many barriers, several were mentioned with high frequency. They included

- lack of decision-support tools and real-time access to tools and resources for farmers, including tools to support field diagnostics (i.e., correct identification of pest, disease, or weed problem);
- low level of confidence in the efficacy of alternatives to traditional pest management among pest management decision makers;
- limited access to and understanding of biologically based pest management tools (such as the predators and parasites of crop pests); and

- lack of action/economic thresholds to support viable long-term and in-season pest management decision making.

Other people addressed barriers such as lack of education in critical areas, including pesticide resistance and resistance management, pollinator protection, pest monitoring, and crop rotation, and options for lower risk chemistries and nonchemical approaches. Many faculty also pointed to an absence of IPM-related expertise in research and Extension related to certain critical fields, including economics and the social sciences.

Several faculty addressed barriers related to scale, including stakeholders' having responsibility for large and varied geographic areas and the diversity of cropping systems in Oregon. Others reported barriers related to individual behavior and decision making, including resistance to change, misperceptions about IPM, and an overemphasis on pesticides.

Finally, Extension faculty identified barriers that were industry focused. These included low or no thresholds for pest presence in many industry contracts; private industry dominance of grower and pest manager education; the high cost of lower risk chemicals, biopesticides, and biological control agents; and the high number of minor crops in Oregon, which are less well served by industry and regulation (i.e., attracting fewer pesticide registrations).

A number of internal barriers, related to Oregon State University's institutional context, also were noted. These included (a) lack of integration among IPM disciplines; (b) contraction of faculty because of retirement and lack of replacement; and (c) resource limitations for Extension faculty, including decreased programmatic funding and access to capacity development.

Reported Strengths, Opportunities, Challenges, and Needs

Using large sheets of poster paper for each category and sticky notes for each meeting participant, we acquired detailed information through a group exercise that captured the participants' perspectives on major strengths, opportunities, challenges, and needs related to IPM in Oregon.

Reported strengths included

- dedicated and engaged faculty with accumulated and diverse expertise across disciplines;
- well-developed networks, including strong communities of growers and professionals, and strong partnerships across campus, research stations, other universities, and the U.S. Department of Agriculture;
- a number of statewide initiatives for IPM, including those related to urban areas, master gardener efforts, pollinators, and agriculture; and
- stakeholder engagement, including confidence and support from agriculture industry groups.

The top opportunities (those mentioned with highest frequency) included

- existing interest in new tools among stakeholders (i.e., grower openness to new management tools and management techniques that are not pesticide based as well as concerns regarding resistance and efficacy that provide further opportunities for education and regulatory constraints that lead to interest in pesticide alternatives);

- opportunities for sharing successful IPM stories and projects in an effort to promote more peer-to-peer sharing of IPM information;

- use of IPM as a common platform for engaging other groups and disciplines on campus, including forestry, natural resources, and community-focused programs; and

- use of existing and popular pesticide recertification courses to develop and deliver an IPM-focused curriculum.

A long list of challenges touched on broader themes, including

- industry-related challenges, such as the proliferation of private researchers and consultants and lack of new IPM-compatible management tools coming from industry;

- internal challenges related to Extension infrastructure and capacity, including lack of interdisciplinary communication and integration, lack of comprehensive analysis and understanding of the economics of pest management, and time and resource constraints; and

- economic and social challenges, including the importance of attending to grower profitability, semantics around IPM and pesticide use that can be polarizing, and the urban-versus-rural divide.

The top needs (those mentioned with highest frequency) included

- increased opportunities for communication and collaboration among faculty;

- more IPM-focused training and capacity development opportunities for faculty;

- increased research and data on the economics of pest management, including the economic impacts of pests and the economic impacts of chemical and nonchemical management;

- more long-term data sets supporting IPM, including economic and field trial data for chemically focused versus alternative strategies; and

- more explicit IPM training in the Pesticide Safety Education Program and pesticide license recertification trainings for pesticide handlers and applicators.

Top Goals for IPM

Using an open-discussion format, the group reached consensus on five top goals for IPM. These goals are as follows:

1. Develop long-term data sets to include monitoring data, IPM strategic planning data, databases of crop pest losses, data on management approaches, IPM adoption data, and long-term field trial results.

2. Build capacity in IPM program evaluation, including process as well as metrics, derived from expanded IPM strategic planning and crop pest loss assessment processes, among other sources of data.

3. Develop a strong interdisciplinary and collaborative network to assist and support faculty in programmatic work and evaluation that includes more social scientists and economists.

4. Increase integration across disciplines to advance comprehensive decision support tools and encourage a more systems-based approach to pest management that prioritizes system resilience.

5. Develop more detailed and holistic crop-specific information to reinforce the decision-support resource base for different cropping systems and management options (e.g., resources could include biocontrol, pesticide efficacy, and risk information to enable consideration of the costs and benefits of different approaches).

Concurrent Small-Group Roundtable Discussions

Participants self-selected into small groups organized around one of five main thematic areas within IPM: pesticide risk reduction, monitoring and diagnostics, invasive and emerging pests, biologically based IPM, and IPM in organic systems. Concurrent discussions took place, and within these small groups, participants identified challenges, priorities, and action steps for each of the five areas. Group leaders were solicited from among the meeting participants and asked to facilitate the discussions. Participants will revisit these thematic groups annually or modify them according to group priorities and preferences.

Discussion: Applications for Extension

Agricultural Extension plays a critical role in delivering IPM education to stakeholders across a wide variety of contexts, including many in urban settings outside of agriculture. The need for interdisciplinary, systems-based approaches to IPM, including involving social science and economics as well as plant and pest specialties, makes it necessary to coordinate closely across faculty and programs, and across research and Extension, to best utilize and leverage collective knowledge and expertise across programs, contexts, and stakeholders.

Our consultation with over 50 agricultural Extension faculty tasked with the delivery of IPM education across settings revealed a number of areas of need for accelerating progress in IPM. These include increased communication across faculty, increased resources (financial resources as well as IPM-related resources), professional capacity development in IPM for agricultural Extension faculty, and more tools and resources that support IPM decision making. Consensus was achieved across disciplines regarding the goals and pathways forward. Given the rising focus on IPM, and state mandates requiring IPM in new settings, these stated needs should become top priorities.

In Oregon identification of the pathways to progress is further strengthened by having access to IPM strategic plans developed with industry partners. Together, these assessments of faculty and stakeholder

needs provide a powerful basis for identifying the most critical steps for advancing IPM adoption at the state level and beyond.

Extension faculty can easily become isolated in large states with multiple, diverse agricultural regions such as Oregon and other western states. We cannot underestimate the value to individual faculty members of meetings that address complex issues of common importance. IPM represents a multifaceted challenge, and it can only evolve through active engagement and participation from multiple stakeholder groups and representatives of multiple disciplines. University-based faculty have a valuable perspective on the needed solutions and are a critical component of the IPM equation. The success of our summit in capturing consensus reveals the value of cross fertilization and interdisciplinary thinking about these complex challenges. Such a summit also benefits individual faculty, who need access to a multitude of perspectives and expertise, as well as more direct bridging between research and Extension, in order to meet the IPM needs of their stakeholders.

Now is a critical time for other groups to be organizing similar conversations so that the barriers to IPM, as well as potential solutions, can be better understood on a larger scale. We hope this article provides a basis for planning and organizing similar summits that can serve to identify barriers to IPM implementation and lay groundwork for advancing progress in this increasingly important area.

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