



Western
Integrated
Pest
Management
Center

Western Integrated Pest Management Center

The Western IPM Center promotes the adoption of IPM practices to solve pest-management problems in agriculture, communities and natural lands in the West.

IPM is a science-based approach to pest management using pest biology, environmental information and all available technology to reduce pest damage to acceptable levels by the most economical means, while reducing the risk to people, property, resources and the environment.

Our address is:

Western IPM Center
UC ANR Building
2801 Second Street
Davis, CA 95618-7774

We serve 13 Western states and the Pacific Island Territories and are supported by a grant from USDA's National Institute of Food and Agriculture.

Director: Jim Farrar
(530) 750-1271
jffarrar@ucdavis.edu

Writer: Steve Elliott
(530) 750-1269
sfelliott@ucdavis.edu

Find us online at
www.wripmc.org



2013

ANNUAL REPORT

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From the Director

2013 was a year of change for the Western IPM Center. There were changes in Center personnel, our administrative home, Davis office location, Signature Programs and Center grants. The number and speed of changes at the Center this year were challenging at times, but I believe that overall this has been a year of renewal and growth. Even though our budget was pruned, there are positive signs of vigorous new IPM projects beginning to grow. Our commitment to the goals of improving the cost-benefit analyses of adopting IPM practices and reducing the environmental and human health risks associated with pests and pest management strategies did not change or diminish.



In fiscal year 2013, the USDA-National Institute of Food and Agriculture awarded us a new four-year grant to continue the work of the Western IPM Center. The new grant has three co-directors, each leading a Signature Program. Dr. Kassim Al-Khatib at University of California, Davis leads "Protocols for Responding to Invasive Species in the West." Dr. Peter Ellsworth at the University of Arizona leads "Crop Pest Losses and Impact Assessment Program." Dr. Paul Jepson at Oregon State University leads "Regional Infrastructure for Climate and Weather-based Decision Support Tools." Each of the Signature Programs made significant progress in their first year, and will be expanding their IPM support infrastructure to new audiences in the coming years.

This year's annual report is a new design. We have organized much of the report around the five objectives in our grant proposal to USDA-NIFA. The centerfold of the report is a full-color map illustrating some of the IPM connections the Center fosters. Although we are Western-focused, we collaborate with the other Regional IPM Centers as well. The results, impacts and potential future impacts of recently completed Center funded projects are described and demonstrate the breadth of IPM topics funded by the Center and the creativity of IPM project directors in the Western Region.

Thank you for your interest in our work and support of the Western IPM Center.

A handwritten signature in blue ink, appearing to read "Jim Fournier". The signature is fluid and cursive, written on a white background.

There were three significant changes for the Western IPM Center in 2013: a full staff turnover, new grant categories for Western IPM researchers, and a move to a new office two miles away.

Staffing

The staffing turnover began in mid-2012 with the retirement of longtime Center Director Rick Melnicoe and Associate Director Linda Herbst. At the end of 2012, Writer Diane Clarke also left.

Keeping the Center running through the last half of 2012 was Carla Thomas, who joined the Center in April while also serving as the associate director of the Western Plant Diagnostic Network. Carla not only managed to keep the Center functioning, but she she also helped hire and train the new staff. As Carla returns to the Western Plant



Carla Thomas

Diagnostic Network, we want to thank her for all she's done for the Center and IPM in the West and wish her the very best.

New Director Jim Farrar came in January from California State University, Fresno where he taught plant pathology and received the university's Excellence in Teaching Award in 2006.

Two weeks later, Writer Steve Elliott joined the Center, bringing nearly 30 years of journalism and public communication experience to the job.

The recruiting and hiring process for a new associate director was under way at the end of the year, and the new hire should join the Center in early 2014.

Funding

To both simplify the grants program and direct Western IPM Center funds where they can do the most good, we reduced the number of grant categories we offer researchers from six to four. The new categories are:

- Project initiation grants
- Work group grants
- Outreach and implementation grants
- IPM planning document grants

The project initiation, work group and outreach and implementation grants are all funded at a maximum of \$30,000 for one year. IPM planning document grants – which include pest management strategic plans and IPM practice evaluations – are funded up to \$15,000 for one year.

The Center continues to offer special issues grants for new or emerging pest threats that arise between grant cycles, and fund those for up to \$5,000 for one year.

The changes to the grants program were discussed by the Western IPM Center Advisory Committee and adopted by the Center's Steering Committee in June.

The idea is to direct the limited Center funding to where it can do the most good - at the beginning and at the end of projects.

At the beginning, project initiation grants can provide the preliminary and proof-of-concept data necessary for researchers to successfully compete for much larger Regional IPM, Agriculture and Food Research Initiative or other grants.

And at the back end, outreach and implementation grants can help IPM researchers close the loop and get the results of their studies into the hands of the growers, Extension specialists, pest managers and others to use it in real-world situations.

The categories were unveiled in the 2014 grant RFA posted in October 2013. Funded projects will be announced later in 2014.

Moving

On November 3, the Western IPM Center left the UC Davis campus for a two-mile trip to the new UC Agriculture and Natural Resources Building. The building, which used to be a roller rink, was completely renovated and now houses all the ANR staff that had been scattered in a half-dozen different locations. Stop by and visit us at our new address:

**Western IPM Center
UC ANR Building
2801 Second Street
Davis, CA 95618-7774**

Our phone numbers changed, too. Our new number are: Kassim Al-Khatib: 530-750-1249. Jim Farrar: 530-750-1271. Associate Director: 530-750-1270. Steve Elliott: 530-750-1269.



Our new home.

Center Objectives

The goal of the Western IPM Center is to improve the economic benefits of adopting IPM practices and to reduce the environmental and human health risks posed by pests and pest management strategies.

We support the National Roadmap for Integrated Pest Management and fund new science to increase food production, a priority for the USDA's National Institute of Food and Agriculture.

In 2013, the Center worked to fulfill five key objectives:

Objective 1) Establish and maintain information networks that engage extension and other IPM-related programs and expertise operating at the national, state and local levels.

Objective 2) Develop signature global food-security programs.

Objective 3) Build partnerships to address challenges and opportunities. Involve stakeholders in identifying needs and priorities for IPM in agriculture, food and natural resource systems and focus resources on addressing those priority needs.

Objective 4) Evaluate and communicate successes. Support evaluation efforts to document the impacts of IPM implementation throughout the region and communicate outcomes to stakeholders, funders and policy makers.

Objective 5) Manage funding resources effectively.

Our People

Co-Directors



Kassim Al-Khatib
University of
California, Davis



Peter Ellsworth
University of
Arizona



Paul Jepson
Oregon State
University

Center Staff



Jim Farrar
Director



Steve Elliott
Writer

Western IPM Center Comment Coordinators and their territories:

Jane Thomas, Washington State University: California, Oregon, Washington, Idaho, Montana, Utah and Alaska

Al Fournier, University of Arizona: Arizona, Nevada, New Mexico and the desert regions of California

Cathy Tarutani, University of Hawaii: Hawaii and the Pacific Territories

“Establish and maintain information networks that engage extension and other IPM-related programs and expertise operating at the national, state and local levels.”

Comment Coordination

One of the most valuable information networks built by the Western IPM Center is the multi-state collection of Extension specialists, growers, pest control advisors and others developed by our Comment Coordinators to provide up-to-date pest-management information when it’s requested by federal agencies including the EPA and USDA.

In 2013, this network provided responses to requests for comment regarding malathion for biting flies, pentachloronitrobenzene dips for bulbs, buprofezin use, malathion use, chloropyrifos volatilization, registration review and Endangered Species Act consultation, web-distributed labeling and a honey survey. In addition, our comment coordination

network also provided information to the Western Region IR-4 Project about several minor-use pesticides.

Also this year, the Western IPM Center began actively seeking new contacts for our comment coordination network. In the June newsletter, the Director’s Perspective focused on the process of comment coordination and requested contact information for anyone willing to participate in our network. And in August, we distributed a press release highlighting the Center’s role in providing comments to federal agencies and also requested contact information for people willing to join the network. The release was published in Ag Alert and several other publications.

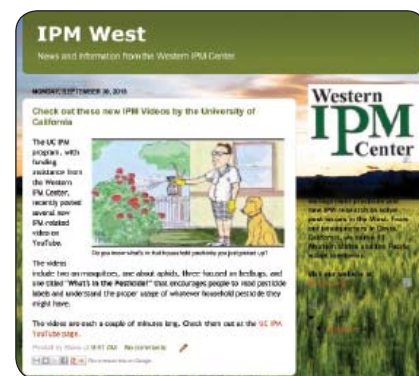
Social Media and Stakeholder Networks

To further expand our IPM networks in 2013, the Western IPM Center launched two social media efforts, a blog at IPMWest.blogspot.com and a Twitter feed at twitter.com/IPMWest. The blog features regular news and updates from our Center, and also frequently highlights new publications, activities and news from state IPM programs throughout the West, as well as the other regional centers.

On Twitter, we follow about 165 people in IPM, ag and governmental positions, and have quickly built a growing network of people following us. (About 70 at last count.) We post new material at least weekly on each site, and several of our posts have been reposted or published in traditional media outlets.

In 2013, we also improved our direct stakeholder engagement. First, we updated our contact list and removed non-functional email addresses. Then we surveyed the remaining 852 stakeholders to determine the types of information (RFAs, newsletters and annual reports, pest alerts, events, federal announcements and jobs) each would like to receive.

In addition, we created a “Subscribe” function on the homepage of our website to enable new stakeholders to easily sign up to receive our information. We’ve emailed these contact networks regularly throughout the year.



Pest Management Strategic Plans

Pest Management Strategic Plans are excellent vehicles to bring together networks of experts in a particular crop, and then deliver new information to a wide network of growers, extension specialists, federal regulators and others. In 2013, PMSPs were completed and posted to the national database for the following crops:

- Winter wheat in the Southern Great Plains
- Dry bulb storage onions for the United States

The Center also funded projects to complete pest management strategic plans on pears in Oregon and Washington and winter wheat in the Western Great Plains.

These PMSPs will provide pest managers, regulatory agencies and policy makers the on-the-ground information they need to make science-based decisions, and serve as benchmarks to measure pest management progress in these crops.

“Develop signature global food-security programs.”

In 2013, the Western IPM Center provided three signature global food-security programs. One focused on assessing the costs of pests and pest management practices, one expanded weather-based decision-support tools, and one developed protocols for managing invasive species.

Crop Pest Loss Assessment Workshops

The development of accurate, real-world data on crop pest losses and pesticide usage is vital to the agricultural industry. Quantifiable measurements of pesticide use, costs, pests, and yield and quality losses due to pests are our most objective tools for assessing IPM impacts in agriculture.

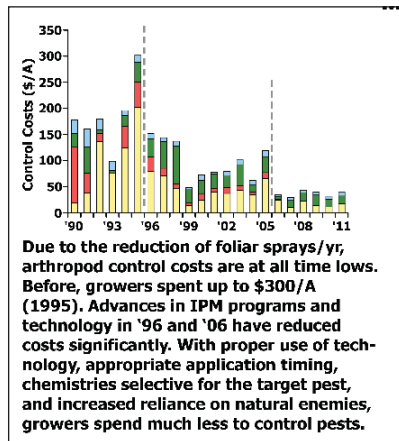
The Crop Pest Losses and Impact Assessment program began as a work group and became a signature program in 2012. The group is made up of Extension entomologists, county agents, farm advisors, pest control advisors, growers and ag industry representatives from Arizona and the low desert regions of California involved in the region’s major cropping systems, including head lettuce, melons and cotton.

Data are collected through interactive workshops attended by pest control advisors and other stakeholders throughout the growing regions. Surveys are mailed to those who could not attend in order to develop the most complete data possible.

Since becoming a Signature Program in September 2012, the Crop Pest Losses and Impact Assessment Program has run five crop pest losses workshops, four for cotton and one for lettuce, in Arizona and California. Fifty-six people attended.

The cotton survey yielded 25 responses, representing 49.1% of Arizona cotton acres in 2012. Response rates for the 2013 lettuce survey were similar to those from 2012, with an estimated 70% of Arizona lettuce acres represented.

These workshops provide a focal point for discussion about new and emerging pest management issues. For example, in 2012 cotton workshops, the brown stink bug was a topic of interest as a long-time minor pest that reached new levels of concern for pest managers.



Large reductions in pesticide applications have been seen in the crop pest loss surveys.

Another major issue was the detection and confirmation of glyphosate-resistant pigweed in central Arizona. In response, a new section was added to the weed portion of the survey to collect baseline data on grower practices related to management of this key weed in cotton systems.

Another major activity was the development of a computer-based version of the cotton survey, which was developed and deployed in beta form at three of the four cotton workshops. The program successfully captured participant data in a database for processing, and further refinements to this program are under way. While the program has been developed in a format that would allow online implementation in the future, face-to-face interactions are critical to maintaining data quality and good communication with stakeholders.

Invasive Species Protocols

With its many international ports of entry and borders, Western states are under exceptional pressure from increasing introductions of exotic and invasive insects, weeds and plant diseases.

We must deal effectively with invaders in ways that are economically and environmentally acceptable and cause minimum disruption to IPM practices targeting other pests. To do this, coordinated cooperation and understanding of invasive species’ biology, ecology, and potential control and eradication strategies are critical.

The goal of the Invasive Species Signature Program is to improve prevention, detection and reporting – with rapid risk assessment and response – of new invasive species threats in the West.

The program will develop processes that ensure regional communication and collaboration for earlier detection and rapid response to manage, control or eradicate high priority invasive species. It brings together a working group of interested partners in the West – including federal, regional, state, and local entities – to address invasive insects, plants and plant pathogens,

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“Develop signature global food-security programs.”

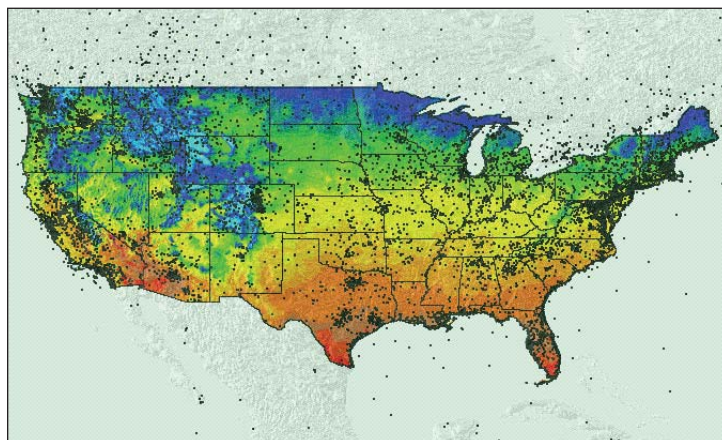
Linking Weather Data to Pest and Disease Models

The Climate and Weather-based Decision Support Tools Signature Program developed from a very successful work group on weather systems and has established web-based tools that bring together U.S. weather data with plant-pest and disease models to serve many decision-support needs in agriculture.

The system provides degree-day and hourly weather-driven models serving many IPM, regulatory and plant biosecurity uses for the full U.S., and specializes in IPM needs for the West. Weather data and forecasts are linked to the models for more than 16,000 U.S. weather stations.

The capacity of the system continues to be improved by addition of more weather station networks, and the use of the system continues to increase as measured by the number of pest model runs and map views generated. Some of the improvements to the Climate and Weather-based Decision Support Tools system this year include:

- Linked to multiple disease models to provide virtual weather networks and data for wine grape growers.



Degree-day maps are linked with pest and disease models to aid growers and pest managers.

Invasive Species Protocols

and to coordinate a rapid response to a few of the most threatening of these.

The Western IPM Center Invasive Species Signature Program is developing protocols for invasive weeds, insects and diseases. Subgroups focused on each area are developing those protocols, using current invasive species issues as models.

The plant pathogen subgroup selected *Candidatus Liberibacter solanacearum*, transmitted by psyllids, which causes zebra chip disease of potato and vein greening of tomato, and created “Guidelines for Forming and Conducting a Local or Regional Invasive Species Coordinating Group.”

The guidelines outline generally the ideal makeup of the coordinating group, the activities and responsibilities of members, and offers protocols for detection, response and mitigation, and recovery. It also highlights various challenges invasive species coordinating groups may encounter and offers some possible solutions.

Visit the program webpage at [www.wripmc.org/Research/Invasive Species Signature.html](http://www.wripmc.org/Research/Invasive%20Species%20Signature.html)




- Developed new phenology models for western flower thrips and Asian Citrus Psyllid in California.
- Provided Google Maps of the first incidence of potato late blight in the Columbia Basin for Washington State University.
- Added models for more invasive pests including: boxwood blight, brown marmorated stink bug, European grapevine moth, pine shoot beetle, light brown apple moth, cereal leaf beetle, gypsy moth and emerald ash borer.
- Developed a phenology model for Bauer spring wheat in Wyoming.
- Added a new Google Maps-based interface to run degree-day models, greatly improving accessibility to our models for all U.S. states. This is especially important for those without statewide weather networks or models.
- Developed a new interface so that any model and weather station in our system can be specified and run from remote web pages, such as county extension websites.
- Developed “virtual weather data” to fill in missing or flagged-as-suspicious weather data for all stations in all states.
- Developed modified leaf wetness estimations allowing foliar disease risk models to be generated from weather stations that do not have leaf wetness sensors.

Since the conversion from work group to signature program, the weather-based decision support program has leveraged an additional \$275,593 in grants.

Visit the weather program webpage at <http://uspest.org/wea/>

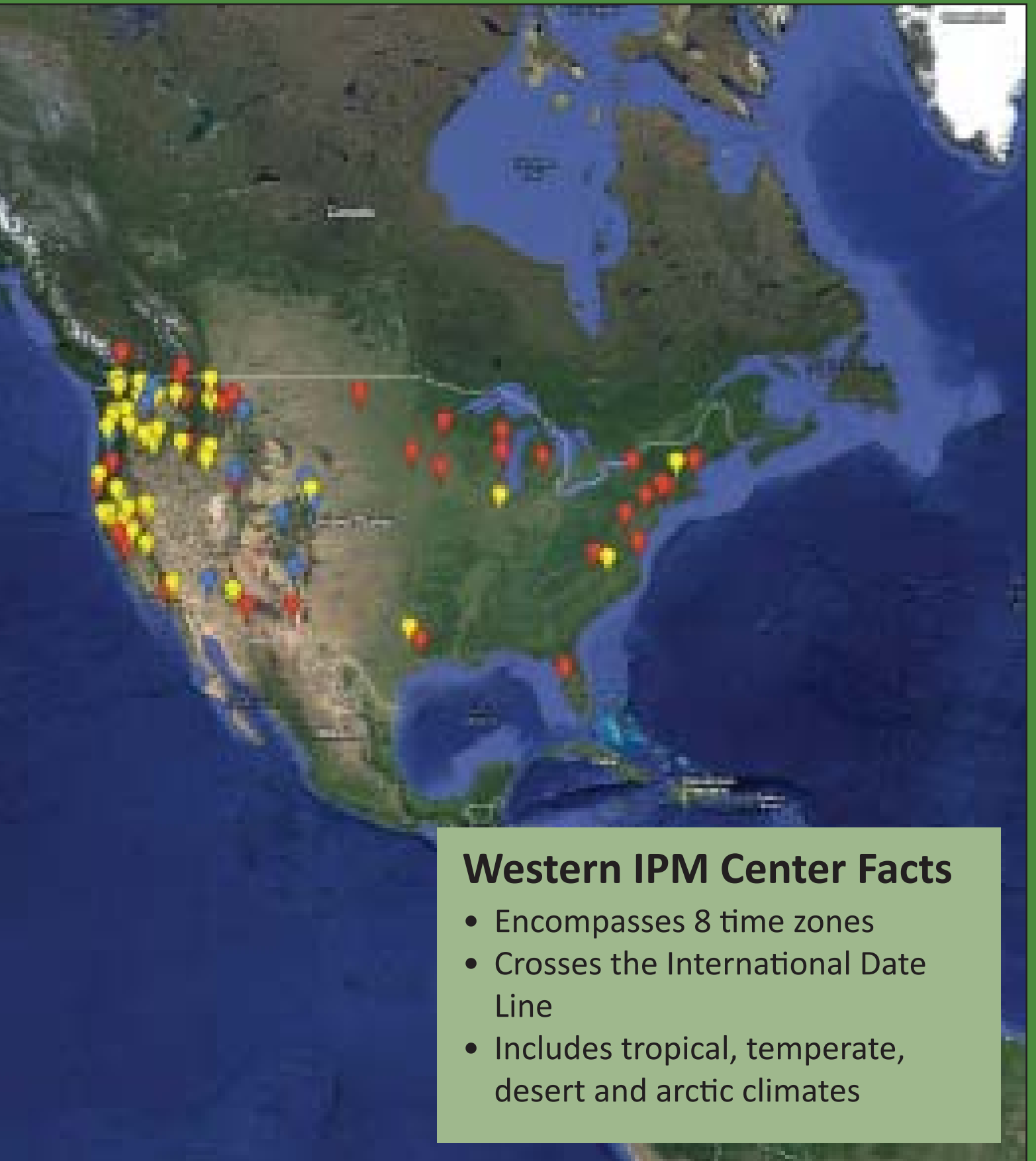
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Select Center Connections

-  Grant Project Directors and Collaborators
-  Center Signature Programs
-  State IPM Partners and Advisory Committee Members



Western IPM Center



Western IPM Center Facts

- Encompasses 8 time zones
- Crosses the International Date Line
- Includes tropical, temperate, desert and arctic climates

“Build partnerships to address challenges and opportunities. Involve stakeholders in identifying needs and priorities for IPM in agriculture, food and natural resource systems and focus resources on addressing those priority needs.”

With a small staff and limited resources, the Western IPM Center achieves its goals by setting priorities and working in partnership with government agencies, private organizations, tribal nations and academic institutions. Partnerships with these and other groups help promote wider adoption of IPM practices in the West.

We engage stakeholders in priority-setting through our Advisory and Steering Committees, which include representatives from large and small agricultural enterprises, non-profits, academic institutions and federal agencies.

Both committees met in September 2012 and again in June 2013 to provide input to the Center staff and leadership team. In response to that input, the Center made the following changes:

- The Center grant RFA strongly encouraged cooperation with IPM-related WERA groups and Western IPM Center Signature Programs.
- Multi-island or multi-tribe proposals are now considered multi-state proposals.
- The Center now actively engages with EPA Region 9 and USDA Forest Service tribal programs.

Also in response to stakeholder input, the Center is actively recruiting Advisory Committee members from underserved communities.

In January 2013, the Western IPM Center released a Center grants RFA that explicitly stressed the importance of documenting stakeholder input and support for proposed projects.

The RFA also strongly encouraged multi-state or multi-island projects, promoted leveraging funding from groups like the Western Associations of Agriculture Experiment Station Directors, WERA and the Center Signature Programs, and stressed the need for strong IPM assessment and evaluation plans. From the 2013 Center grants RFA, 14 projects were funded. **(See page 13)**

Finally, our leadership team is committed to meeting with stakeholders to build and expand partnerships throughout the West, and both the director and associate director each attended dozens of meetings with various groups throughout the region. The Center also collaborated nationally with the other regional IPM Centers to support their signature program areas.



The Functional Agriculture Biodiversity work group.

Annie Young-Matthews, NRCIS

Serving Underserved Communities

The Center funded multiple projects to serve underserved populations in the West, including the Western Region Tribal Work Group composed of five tribes in Nevada and along the north coast of California, and the Kuskokwim River Data Collection Work Group composed of 37 tribes in Alaska. It also funded a Special Issues project on “Invasive species and water quality training” to the Kuskokwim River Watershed Council in Alaska and a research project on cattle-grazing for control of spotted knapweed in Montana with one research site on tribal land.

Partnering with IR-4

Because specialty crops are so important to agriculture in the West, the Center began a more formal partnership with Western Region IR-4 in 2013 in which our comment coordinators, Co-Director Peter Ellsworth and Director Jim Farrar now participate in monthly calls with Western Region IR-4 staff. The calls keep our staff current with minor crops pesticide registration issues, and increase IPM input into the IR-4 process.

“Evaluate and communicate successes. Support evaluation efforts to document the impacts of IPM implementation throughout the region and communicate outcomes to stakeholders, funders and policy makers.”

Evaluate

The Western IPM Center embraced assessment and evaluation of the impacts of IPM implementation as a priority in 2013.

We funded and facilitated the IPM Adoption and Impact Assessment Work Group, composed of natural scientists, social scientists and economists from across the country. The group developed online trainings to show IPM researchers how to conduct basic impact assessments.

The training modules were published online in the fall, and the Center’s 2014 RFA not only contained evaluation language designed to coordinate with those modules, but also stressed impact evaluation as a critical funding criteria.

The Center requires awardees to submit progress and final reports in all of our competitively funded programs, describing project outcomes, potential impacts and impacts, and we post the reports on our website as well as in the national Interagency IPM Project Database at <http://projects.ipm.gov/>.

Finally, our Crop Pest Losses and Impact Assessment Signature Program described on page eight continues to break new ground in evaluating and documenting the impacts of IPM adoption.

Communicate

In 2013, the Western IPM Center significantly enhanced its outreach and communications efforts on multiple fronts.

We began by developing a communications strategy that identified key clients, stakeholders and audiences and identified ways to best reach each one. We then set about improving our existing communications methods and executing the new strategy. Immediate improvements were made to the Center website at www.wripmc.org and to the Center’s email database to allow us to deliver ongoing email updates to subscribers who have asked for certain types of information.

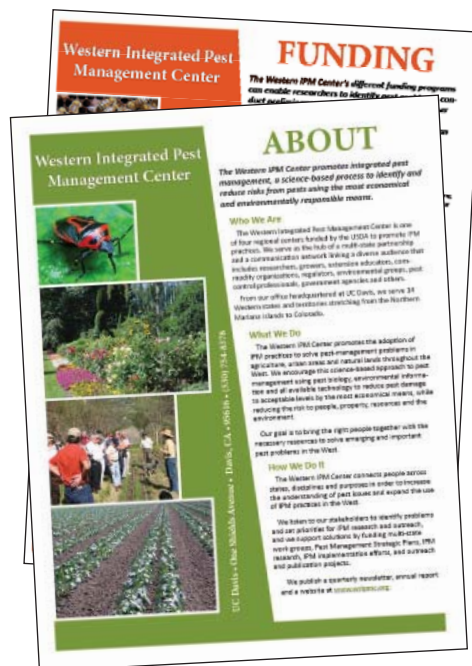
We also redesigned and refocused our informational fliers and newsletter to directly communicate the Center’s success and real-world impacts to a general audience. The design is clean and modern, and the writing is aimed at a general audience by explaining the science, avoiding jargon and acronyms and using a conversational tone. Newsletters and our new annual report focus on impacts and showing people the Center is making a positive difference in the real world.

To reach growers, commodity groups and interest groups, we began distributing press releases to industry and trade publications to highlight Western IPM Center accomplishments and the results of our funding. We distributed five press releases beginning in May, and had more than 15 stories appear in various ag or landscaping trade magazines and websites as a result. The most widely published release was about the water quality protection slides created as a Western IPM Center Signature Project.

We also instituted an outreach program to introduce the Center and its work to the elected Senators and Representatives from our region, sending each of them an introductory letter and a copy of the summer newsletter and the About flier.

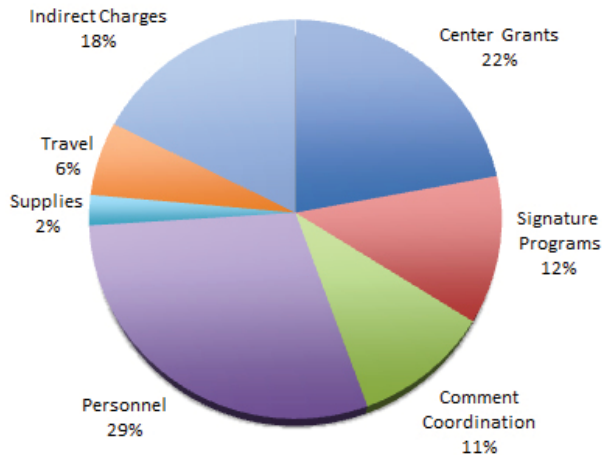
Finally, to expand the number of ways we reach stakeholders, we instituted an active social media campaign that includes a blog at ipmwest.blogspot.com and a Twitter feed at twitter.com/IPMWest. Both are updated at least weekly with news from or about the Center, as well as news from our state IPM

partners. The result of these efforts has been to raise the profile of the Center significantly.



“Manage funding resources effectively.”

The Western IPM Center is funded by the USDA’s National Institute of Food and Agriculture.

Center Spending by Category

Spending from Oct. 1, 2012 to Sept. 20, 2013

Federal Budget Cuts

For 2014, Congress reduced the USDA budget so ours went down too, by \$73,716. Our goal in absorbing the cut was to protect the core functions of the Center:

- Coordinating responses to requests for comment from EPA
- Providing our three Signature Programs,
- Funding the Center grants program.

Here’s how we did it.

A portion of the budget reduction came through reduced indirect charges from the University of California because a smaller budget means smaller indirect.

Some of the reduction came from the lower salaries of our new, more junior-ranking staff as compared to the previous staff. The remainder was taken from the Center travel budget and a small amount from the Center grants program.

Because of the reduced travel budget, the Center team will not be able to meet in-person with as many stakeholders next year, but will use electronic communication to stay in touch. In fact, that’s already happening. We helped two federal officials participate in our Center Advisory Committee meeting in June using the free Google Hangout service, and will continue to explore and employ technology to stay connected going forward.

Leverage

Western IPM Center funding has proven to be very effective over the years at leveraging additional funding for IPM research and outreach in the West.

Since the founding of the Center, we have directly funded just over \$2 million in project grants, and those projects leveraged more than \$28.2 million in additional funding - a **\$14 return for every dollar invested**.

Here’s the breakdown by category:

IPM Issues Research Projects

Amount Funded: \$980,071
Leverage Reported: \$7,322,093
Return: **\$7** per dollar invested

Outreach Projects

Amount Funded: \$69,334
Leverage Reported: \$789,959
Return: **\$11** per dollar invested

Pest Management Strategic Plans and Crop Profiles

Amount Funded: \$427,432
Leverage Reported: \$9,503,445
Return: **\$22** per dollar invested

Signature Programs

Amount Funded: \$123,810
Leverage Reported: \$1,224,559
Return: **\$10** per dollar invested

Special Projects

Amount Funded: \$59,422
Leverage Reported: \$805,428
Return: **\$13.50** per dollar invested

Work Groups

Amount Funded: \$355,773
Leverage Reported: \$8,600,931
Return: **\$24** per dollar invested

2013 Funded Grants

In 2013, the Western IPM Center received 41 proposals from throughout the West and provided \$311,592 in funding for 17 projects.

From developing an IPM curriculum for elementary school teachers to determining if cattle grazing and bio-control insects can control spotted knapweed, the funded proposals show the great diversity of the West.

Outreach and Publications

IPM curriculum for elementary school teachers in the West 2013-2014

Deborah Young, Colorado State University

Training health inspectors in school IPM

Aimee Code, Northwest Center for Alternatives to Pesticides

Integrated pest management guide for medusahead in the Western United States

Joseph DiTomaso, University of California Davis

Promoting IPM to urban audiences through YouTube

Mary Louise Flint, University of California Davis

IPM for low-income residents: Stopping harmful self-treatment for bed bugs

Josh Vincent, Northwest Center for Alternatives to Pesticides

Work Groups

Western Region tribal work group

Nina Hapner, Kashia Band of Pomo Indians of the Stewart's Point Rancheria

IPM adoption and impacts assessment work group

Neil McRoberts, University of California Davis

Kuskokwim River tribal work group

Patrick Samson, Kuskokwim River Watershed Council

Pest Management Strategic Plans

Pest Management Strategic Plan for winter wheat in the Western Great Plains

Frank Peairs, Colorado State University

IPM Issues – Outreach and Implementation

Integrating agricultural conservation practices into Idaho and Washington farms

Gwendolyn Ellen, Oregon State University

IPM Issues – Research

Developing IPM components to address emerging virulent strains of the hop powdery mildew fungus

Ann George, Washington Hop Commission

Fungicide-free management program for the control of *Microdochium patch* on putting greens

Alexander Kowalewski, Oregon State University

Effect of micronutrients on Iris yellow spot virus of onion

Claudia Nischwitz, Utah State University

Can high-density cattle grazing be integrated with bio-control insects to suppress spotted knapweed?

Jeffrey Mosley, Montana State University



Spotted knapweed

Special Issues

A workshop on maximum residue levels, a critical issue for integrated pest management and international trade of U.S. agricultural products

Lori Berger, California Specialty Crops Council

Pest Management Strategic Plan for pears in Oregon and Washington

Joe DiFrancesco, Oregon State University

Invasive species and water quality training

John Oscar, Kuskokwim River Watershed Council

Impacts of 2012 Grants

Adopting IPM in Oregon Schools

PI: Aimee Code, Northwest Center for Alternatives to Pesticides

This project developed an online, video-based curriculum to help Oregon school districts exclude and manage mice, a common school pest. It helped school districts fulfill requirements of Oregon's school IPM law, and was also viewed and used by school personnel and others throughout the West.

The videos were posted on YouTube where they are available to download for free. They cover:

Exclusion methods for preventing mouse infestations

Sanitation measures to eliminate sources of food, water and harborage for mice

Proper trapping techniques and protocols for cleaning up dead mice and their waste.

Impacts Reported:

The video curriculum was circulated widely to Oregon school districts, IPM organizations and public housing providers. While scheduled outside of the grant period, these videos will be used at 10 trainings for approximately 85 percent of Oregon's IPM coordinators.

Because of these videos, school maintenance staff, pesticide applicators, property managers and others have easy access to IPM strategies for controlling mice in urban buildings such as schools. While the IPM techniques outlined are not new, they were not widely known nor had they been distilled in video form before.

Since the publication of the videos, stakeholders in several states including Oregon, Washington, Arizona and Texas have indicated they plan to use the mouse control videos in future IPM trainings. This project has increased knowledge of effective IPM techniques for mouse control, resulting in safer and healthier indoor environments, fewer mouse infestations and fewer adverse health impacts as a result of exposure to mice, mouse waste or rodenticides.

Potential Impacts:

The response from IPM practitioners from around the country indicates these videos will likely have an impact beyond Oregon into other states in the West and elsewhere. Furthermore, the information in the videos is largely applicable to other urban buildings, and it is probable that these same strategies will be implemented in apartment buildings, hotels, restaurants, storage facilities and other areas where mice can be problematic.

The increased use of IPM techniques will continue to reduce occurrences of adverse health impacts, including asthma, among

students and school staff and low-income residents who are exposed to mice, mouse waste or rodenticides used to control mice.

IPM Outreach for Control Methods in an Urban Environment

PI: Elena Cronin, 4-County Cooperative Weed Management Area



Through this project, the Clackamas, Clark, Multnomah and Washington County Cooperative Weed Management Area around Portland put together fact sheets identifying 10 common invasive species and spelling out IPM-based control strategies for each.

Impacts reported:

Fact Sheets were created for the following species:

American Pokeweed, Blackberry, English Ivy, Garlic Mustard, Giant Hogweed, Lesser Celandine, Old Man's Beard,

Spurge Laurel, Water Primrose and Yellow Archangel. Each fact sheet includes an overview of the plant, pictures and descriptions of how to identify it, lookalikes, information on when to remove it, preferred and alternative control methods and cautions specific to each species or control method. Most of the control methods outlined in the fact sheets stress manual and mechanical control, increasing awareness of IPM practices and presenting herbicides as one of an array of available tools.

The group also held five two-hour trainings around the Portland metro area, attended by 60 people, and printed 2,000 copies of each fact sheet, including 500 each in Spanish. They are available for download at www.4countycwma.org.

Potential Impacts:

These urban IPM fact sheets may increase the effectiveness of invasive species control by increasing local partners' outreach capacity while minimizing the duplication of effort in creating outreach materials. Partners are able to reallocate those resources to fund more on-the-ground control efforts.

The implementation of IPM practices is already being felt throughout the 4-County Cooperative Weed Management Area. Partner organizations have begun to distribute fact sheets to larger urban stakeholders, including cities, watershed councils and conservation districts, and these entities have a new resource for initiating conversations with urban landowners.

In addition to being a tool for outreach, the new fact sheets serve as a jumping-off point for new outreach efforts, such as the City of Portland's website re-organization, and the translation of the fact sheets into Spanish increase the accessibility of effective control measures to the historically underserved Spanish-speaking residents in our area.

Integrated Pest Management Education and Outreach for Public Housing in Western States

PI: Dawn Gouge, University of Arizona

This project developed a workshop curriculum for public housing residents and managers and provided 13 on-site trainings at low-income housing sites in Arizona, Colorado, Oregon and Washington. In addition, it created state-specific training materials and three bed bug outreach publications and one online video.

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Impacts Reported:

- Created state-specific IPM training materials for Public Housing Authority and shelter management teams.
- Created state-specific IPM training materials for public housing residents – in English, Somali and Vietnamese.
- Created outreach materials for low-literacy populations, available at www.wripmc.org
- Developed Arizona Bed Bug Law informational brochure, available at <http://cals.arizona.edu/pubs/insects/az1563.pdf>
- Developed a bed bug tri-fold brochure at <http://cals.arizona.edu/pubs/insects/az1580.pdf>
- Developed a bed bug trap video at <http://www.sustainableplaces.org/general-ipm/how-to-make-a-bed-bug-trap>

State-Specific Impacts – Oregon

Oregon's Multnomah County Health Inspectors and Washington County Public Housing Authority employees are trained in IPM techniques that they are sharing with their low-income clients.

The residents of one apartment with eight occupants stopped harmful self-treatment that included multiple foggers in small spaces and spraying beds with outdoor chemicals. With the help of a skilled pest management professional, they effectively eliminated a bed bug infestation. New protocols are also in place to minimize any reinfestation. The owner, who runs other apartments, is also now aware of how to prevent and control bed bug infestations.

State-Specific Impacts – Colorado

Colorado State University has established protocols to address bed bugs in dormitories and apartments using heat treatment whenever possible.

Home health nurses and Healthy Sustainable Homes volunteers in Fort Collins increased their understanding of bed bug infestations and share that information when visiting low-income homes.

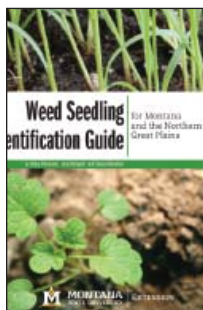
Potential Impacts:

Potential impacts of the project are increased use of materials by IPM practitioners in other states, improved quality of life due to lower pest exposure for public housing residents, improved environmental health due to improved pest management practices, and improved home and working environment for shelter and public housing residents and staff.

Weed Seedling Identification Guide for Montana and Northern Great Plains

PI: Fabian Menalled, Montana State University

This project developed a weed seedling identification guide for noxious and common weeds in the Northern Great Plains, filling a gap in available guides and aiding weed identification at the seedling stage when they are most vulnerable to IPM practices.



& OUTREACH

Impacts Reported:

The guide provided identification tools for 73 species, including 60 broadleaf and 13 grass species. Each species received one page in the guide, which includes a photo of the cotyledons, first true leaves, rosettes (where applicable), mature plants and seeds.

The guide was targeted at a broad audience including ranchers, growers and landowners, and distributed throughout Montana and the Northern Great Plains through Montana State University Extension offices, and promoted at conferences and extension presentations.

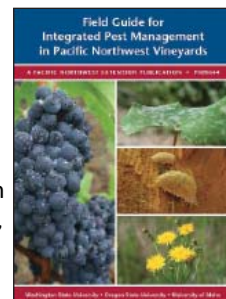
Potential Impacts:

Potential impacts include much easier, less costly and more effective weed control at the seedling or juvenile stage compared to when the plant matures. Controlling weeds during these early stages may release neighboring desired vegetation from competitive suppression by the weed, thereby improving overall plant community vigor. Finally, improper identification can result in misapplication of a management tactic such as herbicides or failure to adequately control the weedy plant species at the time that it is most vulnerable to the implementation of IPM practices.

Development of a Field Guide for IPM in Grapes for the Pacific Northwest

PI: Michelle Moyer, Washington State University

This project created a Field Guide for Integrated Pest Management in Grapes in the Pacific Northwest. Grapes are the highest-value horticultural crop in the United States, and in the Pacific Northwest there were few consolidated information sources on pest, disease and weed identification and control in vineyards. The field guide covers those topics, provides an introduction to pest biology and highlights control tactics using cultural and chemical strategies. It covers IPM programs, pesticide resistance mitigation and pesticide safety.



Impacts Reported:

One of the major industry groups, the Washington Association for Wine Grape Growers, agreed to direct-distribute the guide to their 450 grower-members, which covers approximately 90 percent of the total wine-grape acreage in the state of Washington. (A few Oregon and Idaho growers are also members of the Association.) This initial distribution will place a copy of the IPM manual in the hands of managers covering close to 50 percent of the wine grape acreage in the Pacific Northwest, providing direct, convenient access for growers to this management resource.

Chateau Ste. Michelle, the largest single winery and vineyard operation in Washington, representing 70 percent of the state's wine grape acreage and about 31,000 total wine-grape acres in the Northwest, has already held a private training session with the manual, so their viticulturists, viticulture technicians and interns can learn to design and implement integrated pest management programs.

Potential Impacts:

The field guide is being considered as a curriculum supplement in undergraduate, graduate, and associate programs across the Pacific Northwest, thus contributing to training the next generation

Continued next page

Impacts of 2012 Grants

of viticulturists. Other potential impacts include the reduction in unnecessary pesticide and fertilizer applications and the number of exposure events for handlers. A solid knowledge of pest biology and general vineyard maladies will indirectly contribute to improvement of the health and safety of vineyard employees and neighbors.

IPM Practitioner's 2012 Directory of Least-Toxic Pest Control Products

PI: William Quarles, Bio-Integral Resource Center



This project produced the latest issue of the IPM Practitioner's Directory of Least-Toxic Pest Control Products, a resource that the Bio-Integral Resource Center has produced for 20 years. The online and print directory lists specific product descriptions of more than 2,200 products produced by more than 600 suppliers. It is compiled by IPM technical experts and organized in concert with the IPM decision-making process.

The directory gives contact information to suppliers of bio-control products, traps, pheromones, physical controls, tools, barriers and least-toxic chemical control products. It is a valuable asset for anyone trying to practice IPM and reduce pesticide exposures.

Impacts Reported:

More than 800 copies of the 52-page print publication were distributed, with an additional 400 available for future conferences and trainings. The online version is available at www.birc.org/Directory.htm When the link was published in the BioPesticides Industry Alliance newsletter, 60 percent of the readers clicked through to see or download a copy of the directory.

Potential Impacts:

Potential Impacts of the directory include the increased use of reduced-risk products. Many times growers would like to use a reduced risk method, but are unable to find a specific product. Where there are a number of possible products, the most effective products with the lowest risks are listed. Non-toxic products such as biological controls and physical controls are listed first. Chemical controls are listed last. When the option is area spray versus baits, bait products are listed, sprays are not. Potential impacts should be less toxic exposure, a cleaner environment and a healthier community.

Part of this project was increasing awareness of available IPM products. The ready availability of commercial bio-controls, including predators, parasitoids and nematodes, may not be apparent to many IPM practitioners. Commercial listings of beneficial insects may lead greenhouse managers and others to experiment with releases of bio-controls instead of using toxic pesticide sprays. Turf managers might experiment with nematodes for control of beetle grubs. Some practitioners may not have been aware of bio-pesticide alternatives. Access to the directory will make them aware of new *Bacillus thuringiensis* formulations, and new bio-pesticides such as Grandevo. Some may not have heard of the botanical fungicides such as Regalia that can lead to less chemical contamination of food products.

Western Region Functional Agricultural Biodiversity Work Group and Tour

PI: Gwendolyn Ellen, Oregon State University

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This work group served as the network base for a multi-state, multi-year program in agricultural biodiversity. It shared the results of work group activities and collaborations at an annual regional meeting, and conducted the Fourth Annual Biodiversity Working Tour & Short Course for Farmers.

Impacts Reported:

Half the agricultural support staff respondents (six total) stated the workshop changed how they will advise farmers about farm-management practices in order to support beneficial insects. Five have incorporated beneficial insect habitat enhancement into already-existing trainings in Farm Bill programs. Three will advise farmers to consider pesticide impacts on beneficial insects in future pest control decisions, to adjust management practices where possible to increase beneficial insect numbers, and to provide resources needed by native pollinators to increase pollination services for crops. Finally, half are now advising farmers to create new habitat for beneficial insects through insectary plantings, bee box nests, beetle banks and the like.

Two out of the three farmer respondents stated they would change farming practices to support beneficial insects. One will consider pesticide impacts on beneficial insects in future pest-control decisions. Two adjusted their tillage, mowing and other management activities to decrease disturbance to beneficial insect populations when possible. All will provide resources needed by native pollinators to increase pollination services to their farms. All intend to create new habitat for beneficial insects through insectary plantings, bee box nests, beetle banks, etc., which incorporate native plantings on their farms. All will propagate native plants on their farms. Additionally, one farmer is improving his no-till rotations. Another is building a large storage of high-value compost and extractions for field applications to increase soil health and biodiversity.

Potential Impacts:

Because functional agricultural biodiversity is composed of conservation biological control measures, which are important components of integrated pest management and an alternatives to pesticide use, we expect this project to have a profound positive effect on regional adoption of conservation practices by farmers – anywhere from 100 to 1,000,000 acres across the Western U.S. – which in turn regionally affects populations of beneficial insects, and results in a reduction of pesticide use. These regional effects decrease the environmental health risks of pest management.

A potential impact of posting four years of surveys showing the associations of native plants and beneficial insects in Oregon's Willamette Valley is that more farmers in this area will be using

Impacts of 2012 Grants

native plants in on-farm habitat enhancements. They will be aided by this resource to understand the documented relationships between beneficial insects and native plants. More use of local native plants means more local pollen and nectar resources for the beneficial insects which prefer native plants over exotic weeds. Also, the increase in native plants will bring with them an increase in their associated native pollinators, making the Willamette Valley rich in native pollinators and beneficial insects.

Western Region School IPM Implementation and Assessment Work Group

PI: Carrie Foss, Washington State University

This workgroup developed an outdoor school IPM curriculum focused on turf and landscaped areas of school grounds, then conducted a pilot training in Salt Lake City on September 25, 2012. In addition to representatives from the Environmental Protection Agency and Utah Department of Agriculture and Food, 27 school representatives attended, including participants from five of Utah's largest school districts representing almost 170,000 students.

Impacts Reported:

An outdoor school IPM curriculum was developed and piloted, including handouts and presentations.

Pilot training participants showed increased knowledge for most of IPM concepts in pre- and post-test evaluation, with a 33% increase for one question.

Potential Impacts:

The attendees were committed to implementing the outdoor IPM strategies covered in the training, and we expect that the school districts we trained in outdoor IPM will be motivated to improve their diagnostic skills and rely more on cultural management options. Increased implementation of school IPM in the West will reduce risks to children and school personnel from pests and pest management practices.

Guide to the Submerged and Floating Aquatic Plants of the Northern Rocky Mountain Region

PI: Bryce Christiaens, Missoula County Weed District

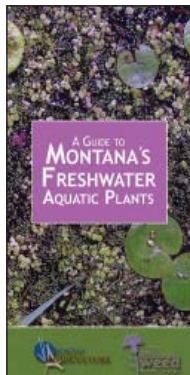
This project developed a non-technical, picture-heavy key and plant guide to the submerged and floating plants of the Northern Rockies, including plants that have the potential to invade these aquatic systems.

Impacts Reported:

The inclusion of an aquatic plant key in The Guide to Montana's Freshwater Plants, as well as an online version found at: missoulaeduplace.org/submergedaquaticplantkey.html, has led to an increased willingness by the public to participate in volunteer monitoring.

Potential Impacts:

Potential impacts of this project include increased volunteer monitoring using interested people recruited from lakeshore homeowners' associations, local sporting groups, businesses oriented toward outdoor tourism and other user groups that rely on healthy water bodies for their own benefit.



SPECIAL PROJECTS

Weeds Across Borders "Because Weeds Know No Boundaries" Tour

PI: Anna Lyon, Okanogan County Noxious Weed Control Board

This project used Western IPM Center funding to host an international noxious weed field tour in Washington and British Columbia for 31 elected state, provincial and local officials and agency policy makers. Participants heard presentations that highlighted weed-control efforts on both sides of the border, including integrated pest management to newer herbicides that are more effective at lower-use rates. Prevention was also a large part of the tour, as participants had to repeatedly brush off their shoes and trousers when leaving noxious weed sites to avoid transporting weed seeds to other areas.

Impacts Reported:

More than two dozen local, state and provincial officials and policy makers were educated about successful weed-control strategies and the importance of noxious weed control programs and funding.

Potential Impacts:

Increased awareness of the importance of noxious weed control and the need for dedicated noxious weed control funding may open the door for new funding.

Isolation of *Ralstonia solanacearum* strains and their role in decline of ironwood on Guam

PI: Robert Schlub, University of Guam

This project presents the first evidence that bacteria are involved in the ironwood tree decline disease complex on Guam. The *Ganoderma austral* wood-rotting fungus, along with termites, were considered the predominant factors, however, bacteria associated with heart rot and vascular wilt are emerging as significant biotic factors. *Ralstonia solanacearum* and two other bacterial species were consistently recovered in cultures isolated from discolored wood tissue and bacterial ooze.

Impacts Reported:

For the first time, there is definitive evidence that *Ralstonia solanacearum* is associated with declining ironwood trees on Guam. The *R. solanacearum* strain from Guam is the Phylotype One strain characteristic of Asian *Ralstonia* strains and is associated with a second bacterium, *Klebsiella variicola*, which produces abundant ooze in declining trees.

This work resulted in two abstracts from talks given at the Annual Meeting of American Phytopathological Society and a presentation at the 60th Annual Western International Forest Disease Work Conference.

Potential Impacts:

Previously, the *Ganoderma* fungus along with termites was considered the predominant factors in Guam ironwood decline. Now that it has been demonstrated that bacteria also play a major role in the disease complex, the approach to control and reclamation of trees will be significantly changed. Discoveries from this project provide the groundwork for future research and recovery.



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