

## Highlights of IPM Activities in the West: Accomplishments, Outcomes, Impacts, and Plans

In April, WERA-069, a multistate extension, education, and research committee focusing on IPM in the West, met in Santa Fe, New Mexico. At this meeting, western state Extension IPM Coordinators reported on recent and planned IPM activities in their states. Guam, a U.S. territory in the West, also presented a report. The following article highlights these reports for Guam and six western states. IPM activity reports for six more states will be included in the October edition of *The Western Front*.

### GUAM

Robert Schlub, Extension Plant Pathologist, University of Guam (UOG), coordinates IPM activities for Guam's Extension IPM Coordination and Support (EIPM-CS) program through the University of Guam Cooperative Extension Service's Plant Health and IPM Center. The Center includes a pest diagnostic facility and conducts outreach education programs to inform clientele about issues relating to Guam's unique agricultural challenges. These challenges include:

- Guam's average farm product market value is only \$21,405, which limits the availability of funds for equipment and chemicals.
- The majority of the farms are less than 2 acres in size and operate at a subsistence level.
- Farmers are highly dependent on a few high-value crops (mainly cucurbit and solanaceous crops).
- Farmers often grow a wide range of minor

use crops, for which there are very few registered chemicals.

The Plant Health and IPM Center's educational information and delivery are designed to minimize the environmental and economic impacts of plant cultivation, plant importation, and pest control activities on Guam's citizens. This is accomplished through pest diagnostics and education and research projects conducted by Guam Cooperative Extension and other federal and local agencies, including the Pesticide Applicator Training Program, the National Plant Diagnostic Network, the Guam Invasive Species Advisory Committee, the Western Sustainable Agriculture Research and Education program, the Western IPM Center, and the Pacific Islands Distance Diagnostics and Recommendation System. UOG's Plant Health and IPM Center provides support to university Extension agents and the 4-H program, farmers, plant nurseries, golf courses, students, instructors, the Guam Plant Inspection Station, Guam EPA, and the general public.

In 2010, the Center had direct contact with more than 4,500 adults and 1,700 youths on plant health-related issues. The Center identified more than 200 plant disease and plant pest samples, and as a result of these identifications, IPM strategies were implemented on farms and in gardens. In addition, Center staff conducted a half-day workshop for 20 UOG agriculture and entomology students on invasive species identification and reporting, and the Center continues to unravel the story behind Guam's dying ironwood trees, which began 8 years ago. Statistical analyses conducted

this year revealed that a complex of biotic and abiotic factors is responsible for the decline. Posters, brochures, and interactive displays are being used at workshops to inform the public about the decline and to teach proper tree care techniques to keep the decline from spreading.

Finally, the Center conducted two full-day IPM interactive displays for teachers, students, youth, farmers, homeowners, and the general public at Guam EPA's "Earth Day" and at UOG's "Charter

Day." Participants were given the opportunity to operate stereo microscopes to observe some of Guam's major insect and disease pests. The Center also conducted a 3-day training for Guam's agriculture professionals entitled "Soil and Plant Nutrients' Role in Disease Suppression." Participating instructors were from UOG, the Natural Resources Conservation Service, and the University of Florida.

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### WASHINGTON

#### State IPM Activities

**Spotted Wing Drosophila.** Washington State Extension IPM Coordinator Doug Walsh reported that in 2010, *Drosophila suzukii*, commonly called spotted wing drosophila or SWD, became a focus in Washington State as it moved north from California. Research on the pest, which attacks ripening fruit, was conducted in western Washington small fruits, central Washington orchards, and eastern Washington fruits, including juice and wine grapes. Research on biology, host preference, behavior, and management of SWD took place in fields and laboratories across the state and continued into 2011. Extension educators and researchers with Extension responsibilities taught a wide variety of audiences to identify and monitor SWD throughout the year and presented emerging research results. Information on SWD was added to the Washington State University (WSU) main

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A student of science and a participant of EPA's "Earth Day" peers through a microscope at the whilefly's (*Bemisia argentifolii*) tiny world.

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# Director's Comments

The federal budget process and outcomes continue to provide surprises to most of us. I wish I could say the process also provides amusement, but nothing is amusing about significant cuts to already-diminished budgets. The reality is that nearly all of us are contending with less support from federal and state sources. With regard to IPM, a lack of general public understanding of what IPM is, and why it should be important to them, has not been helpful in gaining support for our work.

The Regional IPM Centers were given a last-minute reprieve for FY2011, with funding for 1 additional year at \$2.99 million. This amount is 27 percent less than what we received in past years. The Regional IPM Centers' current funding cycles end on September 14, 2011. No-cost extensions are in place until March 14, 2012, with the possibility of 6 more months. The additional year's money begins a new funding cycle starting on September 15, 2011. Normally, this would be the start of a 4-year continuation award to the four Centers. (And in fact, on May 23, the House Appropriations Committee released the subcommittee draft of the FY2012 Agriculture Appropriations bill to be considered during a mark-up by the Agriculture Subcommittee. The draft includes the Regional IPM Centers at \$4 million.) But with the uncertainty of funding beyond 2012, my guess is that USDA-NIFA will issue an RFA for only 1 year. If it is a 1-year grant, the West will benefit most if the current Western IPM Center remains at the University of California for this additional year. Management costs and infrastructure would not need to be recreated, and salaries for staff would mostly come from the old grant. This would leave a significant pool of funds for sub-awards and other projects of importance to the West. As Linda Herbst and I are planning to retire in June 2012, I will be applying as a Co-Project Director with Dr. Kassim Al-Khatib, University of California Statewide IPM Program, who would take over full leadership of the Western IPM Center with Tom Holtzer after June.

I would like to take this opportunity to thank all our supporters who wrote letters and spoke with Congressional representatives on behalf of the Regional IPM Centers. It is clear that you made a difference and helped obtain the additional funding.

There are several looming issues for programs relying on federal funding. Consolidation of funding lines has long been a goal of the National Institute

of Food and Agriculture (NIFA). While the latest budget did not reflect much consolidation, efforts will likely continue. Several programs were eliminated, and many saw reductions in appropriations. Land-grant universities are experiencing severe state funding cuts and rely on federal funds for many research and extension programs. As a consequence, land-grant support for regional programs is not as great as support for funds that flow directly into states.

Court decisions relating to endangered species and water quality will continue to affect pest management options. Court-ordered buffer zones in the West have made pest management more difficult for growers near waterways. USEPA and NOAA's National Marine Fisheries Service must now consult and agree on mitigation measures. Agreement is proving to be elusive!

Legislated pesticide registration seems to be a new concept. In California, the legislature is considering reversing the recent state registration of iodomethane, in spite of the fact that the Department of Pesticide Regulation gave it the most scientific scrutiny of any previous pesticide registration.

The western IPM coordinating group (WERA-069) recently held our annual meeting in Santa Fe, New Mexico. Each member presented a state/territory report on IPM activities. I am pleased to present in this issue, and continuing into our October issue, these reports. They highlight many of the important IPM activities throughout the western region. I believe the work is impressive, particularly in light of budget and staffing cuts of the past few years. As a caution, these are the very programs and activities that could be eliminated with further state and federal budget cuts.

The Western IPM Center has proposed a symposium on "Regional IPM Center-Supported Outreach Activities with Impacts on Human Health and the Environment, and the Economic Benefits of Adopting IPM Practices" at the 7th International IPM Symposium to be held in Memphis, Tennessee, in March 2012. We will have speakers representing various projects throughout the United States that will discuss impacts of their projects.

Finally, as many of you know, Dr. Roger Beachy has left his position as Administrator of NIFA. I am hopeful the new Administrator will be more supportive of continuing the Regional IPM Centers.

—Rick Melnicoe

## More than \$16 Million Leveraged from Western IPM Center Grants

Western IPM Center competitive grants have been funding IPM projects throughout the western region since 2004. In many cases, these projects produced data and results that were used later in garnering additional funding from other sources, thus multiplying the effectiveness of the original grant amount. This additional funding has been used in the advancement of IPM in production agriculture; residential, urban, and institutional settings; research and extension programs; natural resource and wildland spaces; and public areas throughout the United States. Western IPM Center funding has resulted in at least **\$16 million** in leveraged funds, representing more than a **\$9 return for each \$1 awarded**.

### Pest Management Strategic Plans (PMSPs) and Crop Profiles

PMSPs and Crop Profiles funded by the WIPMC have yielded more than **\$2 million** in leveraged funding through WIPMC's Addressing Western IPM Issues program, the Oregon Raspberry and Blackberry Commission, and the USDA-National Institute of Food and Agriculture (USDA-NIFA) Crops at Risk program and Regional IPM Program (Western Region).

**Rate of Return: \$5 for every \$1 awarded.**

### Work Groups

Leveraged funds resulting from WIPMC-funded work groups have totaled more than **\$6.2 million** via the Western Sustainable Agriculture Research and Education program (WSARE), the Southwest Consortium on Plant Genetics and Water Resources, the National Plant Diagnostic Network (NPDN), USEPA's Pesticide Registration Improvement Renewal Act (PRIA 2) program and Pesticide Environmental Stewardship Program, USDA's National Resources Conservation Service, the Oregon Association of Nurseries, the Oregon Department of Agriculture, WIPMC's Addressing Western IPM Issues program, and USDA-NIFA's Specialty Crop Research Initiative program, National Extension Integrated Pest Management

Special Projects program, Agriculture and Food Research Initiative program, Regional IPM Program (Western Region), Risk Avoidance and Mitigation Program, and Specialty Crop Research Initiative program.

**Rate of Return: \$20 for every \$1 awarded.**

### Addressing Western IPM Issues

Funding leveraged through WIPMC-funded "Addressing Western IPM Issues" grants has totaled more than **\$7.2 million** through the Western Sustainable Agriculture Research and Education program (WSARE), the California Department of Pesticide Regulation's Pest Management Alliance Grant program, the Idaho Potato Commission, the Arizona Specialty Crop Block Grant Program, the Bullitt Foundation, private industry support, the Montana Department of Agriculture's Montana Noxious Weed Trust Fund and Montana Alfalfa Seed Committee, U.S. Environmental Protection Agency Region 8, USDA Forest Service, USDA-Agricultural Research Service State Partnership Potato Program, USDA Natural Resources Conservation Service, Walnut Marketing Board, USDA-NIFA's Risk Avoidance and Mitigation Program, Pest Management Alternatives Program, Regional IPM Program (Western Region), National Research Initiative, Specialty Crop Research Initiative, and Critical Issues: Emerging and New Plant and Animal Pests and Diseases Program.

**Rate of Return: \$8 for every \$1 awarded.**

### Special Projects

WIPMC funding in the Special Projects grants program has leveraged more than **\$643,000** through USEPA Region 10, the Washington Specialty Crop Block Grant program, WIPMC's Addressing Western IPM Issues program, and USDA-NIFA's Regional IPM Program (Western Region).

**Rate of Return: \$13 for every \$1 awarded.**

IPM Web site (<http://ipm.wsu.edu>). The Mount Vernon Web site (<http://www.mountvernon.wsu.edu/entomology/pests/swd.html>) devoted a special page to emerging efforts toward managing this pest. By fall, researchers and educators across the state had launched a coordinated WSU Extension SWD Web site at <http://extension.wsu.edu/swd>. WSU researchers worked closely with others at Oregon State University (OSU) and USDA-ARS in implementing a \$4.9 million interstate SWD project funded by a USDA-NIFA Specialty Crop Research Initiative (SCRI) grant. Dollars were leveraged from numerous industry commissions to expand this research. In late 2010, "*Drosophila suzukii* (Diptera: Drosophilidae): Invasive Pest of Ripening Soft Fruit Expanding its Geographic Range and Damage Potential," by Walsh and others, was accepted for publication in the inaugural issue of the Entomological Society of America's *Journal of Integrated Pest Management*. (See related SWD article on page 11 of this newsletter.)

**AgWeatherNet Activity.** The popularity and utility of the Washington Agricultural Weather Network (AgWeatherNet) continues to grow, with more than 5,000 members subscribing to the free, weather-based decision-aid service. The network includes 134 weather stations across the state and several linked tools that assist users in making agriculture management decisions based on real-time weather data.

**Orchard Biocontrol.** Researchers at the WSU Tree Fruit Research and Extension Center in Wenatchee completed the second year of their "Enhancing Biocontrol in Western Orchards" project, a collaboration among researchers at WSU; the University of California, Berkeley; OSU; USDA-ARS; and USDA-NIFA to address biocontrol in the apple, pear, and walnut industries in Washington, Oregon, and California. Overall objectives include 1) improving the long-term sustainability of the these industries in the West by enhancing biological control of pest insects and mites and 2) synthesizing information developed in the project to provide outreach tools to bring about change in grower practices.

2010 milestones include completion of laboratory bioassays on eight beneficial arthropods; initiation of large-plot replicated field tests of a variety of pesticide treatments; utilization of HIPV (herbivore-induced plant volatile) attractant in apple, walnut, and pear orchards; and the completion of several large 4-way factorial experiments to optimize attractant blends. These and other results were presented in a 3-hour symposium at the Entomological Society of America's annual meeting in December. The first 2 years' research has resulted in six peer-reviewed publications, more than 2 dozen public presentations, and the creation and maintenance of two dedicated Web sites: <http://enhancedbc.tfrec.wsu.edu> and <http://das.wsu.edu>. More than \$750,000 in additional grant funds have been leveraged to support specific aspects of the ongoing project.

**Handbooks for Hops.** Following the extremely successful release of the first edition of the *Field Guide for Integrated Pest Management in Hops*, a cooperative effort of OSU, the University of Idaho (UI), USDA-ARS, and WSU in late 2009, researchers developed a bilingual (English/Spanish) companion guide in early 2010. The small-format *Field Guide for Integrated Pest Management in Hops: Pocket Version* (Guía de

campo para el manejo integrado de plagas en el lúpulo: *Version de bolsillo*) was printed on water- and tear-resistant paper stock and wire bound for use in the field. It received wide acceptance among hop producers throughout the Pacific Northwest. USEPA's Pesticide Environmental Stewardship Program, which funded the manuals, received an excellent value, as researchers were able to produce both handbooks, plus a second edition of the full-sized handbook, within the original budget for the first handbook.

**Drought Stress in Flavor Crops.** Hops and mint are both perennial crops that depend upon the presence of complex flavor components for marketability. Both are specialty crops produced predominantly in the Pacific Northwest states of Washington, Oregon, and Idaho. Stakeholders in both industries have clearly stated their need for economically sustainable control of specific arthropod pests, weeds, and diseases, as well as their concern about the impact of water shortage on the viability of their crops. With this mandate, researchers sought and received \$1.8 million in funding from USDA-NIFA's SCRI for a Coordinated Agricultural Project that is multi-state (Washington, Oregon, Idaho), multi-institutional (WSU, OSU, UI, USDA-ARS), and transdisciplinary (entomology, plant pathology, weed science, irrigation engineering, food science, economics, sociology, communication/Extension). In September 2009, and continuing throughout 2010, researchers began to investigate the impacts of certain biotic (spider mite, aphid, powdery/downy mildew, weed) and abiotic (water shortage/drought) stresses on these two high value-added specialty crops.

In the course of the first year and a quarter, project researchers refined research protocols in each of the seven disciplines; secured grower-cooperators and established commercial-scale research plots; developed and field-proofed two different deficit irrigation systems to mimic drought stress in the two crops; conducted an initial year of weed, disease, and insect control; quantified subsequent pest pressure across all treatments and irrigation levels; conducted quantity (yield) analyses of the crops across the treatments; initiated quality testing (chemical constituent and sensory analysis) of end products made from the two crops; began an economic study to quantify results of their field work in the market; and initiated interviews with growers and farm workers to evaluate sociological impacts of the biotic and abiotic stresses in the two crops. This project will continue through 2012.



David H. Gent, USDA-Agricultural Research Service

Hop vines.

**Roundup-Ready Alfalfa.** Alfalfa was the first major perennial genetically engineered (GE) crop and was deregulated from 2005 to 2007. Following that period, transgenes were detected in conventional alfalfa, suggesting that industry practices were not sufficiently protective to mitigate gene flow from Roundup-Ready alfalfa (RRA) to conventional alfalfa and alfalfa seed. Certain key markets for U.S.-produced alfalfa hay and seed, including many export markets and the organic market, have little or no tolerance for the presence of transgenes. As Washington State has major alfalfa and alfalfa seed acreage, researchers had been keeping an eye on this issue.

On January 27, USDA-APHIS once again announced the complete deregulation of glyphosate-resistant alfalfa. Grower demand for RRA seed surged immediately, and acreage of RRA hay and seed is predicted to increase rapidly. USDA-NIFA immediately revised their Biotechnology Risk Assessment Research Grants (BRAG) program to include a research objective addressing the not-yet-understood phenomenon of gene flow between RRA and conventional alfalfa forage and seed. WSU and USDA-ARS researchers partnered to submit a proposal to the BRAG program in early March. If funded, this project will investigate the role of feral alfalfa in transgene transmission; examine the impact of leafcutting bees and alkali bees (alfalfa pollinating specialists) as well as honey bees (multi-crop pollinators) on transgene flow; and study transgene flow from RRA alfalfa hay fields to conventional alfalfa seed production fields. Research will take place in Washington, Oregon, California, and Idaho.

#### Urban IPM Activities

**School IPM.** Carrie Foss, WSU's Urban IPM Coordinator, reported that during 2010, the WSU Urban IPM Program continued to expand school IPM implementation in Washington State. Twenty school districts from Washington and Oregon, many of them in the initial stages of school IPM program development, were represented at two school IPM coalition meetings held in Bellevue and Vancouver, Washington. Working with the IPM Institute of North America, researchers conducted IPM STAR recertification evaluations at the Vancouver and South Kitsap School Districts, while follow-up on previous assessments continued with Sedro Woolley, Portland, and Pasco School Districts. The IPM STAR Certification Program recognizes and rewards IPM practitioners who meet a high standard for IPM in schools. WSU also helped the Yakama Nation begin IPM implementation at their tribal school.

WSU hosted the first-ever Seattle Rodent Academy. School district maintenance personnel, Extension educators, pest management professionals, and regulators from the western region were invited to learn, in a hands-on workshop, about IPM for rodents from an international expert.

**Consumer IPM.** The Hortsense (<http://pep.wsu.edu/hortsense>) and Pestsense (<http://pep.wsu.edu/pestsense>) Web sites serve as the core of WSU's Extension consumer IPM education resources. These Web sites provide science-based information that is reviewed and revised annually, making them important and popular as a critical Extension resource for county agents, Master Gardeners, and consumers. The development and maintenance of Hortsense and Pestsense are provided free to Extension by the self-sustaining WSU Urban IPM Program in western Washington. During 2010, Hortsense had 1.4 million hits (a 24 percent increase over 2009) and



66,808 total visitors, while Pestsense had 202,779 hits and 20,979 visitors (a 21 percent increase over 2009). SWD fact sheets were added to Hortsense in 2010.

#### **Professional Pest Manager IPM Training.**

Licensed pesticide applicators are trained in IPM, personal safety when using pesticides, and environmental protection at the WSU urban IPM recertification programs. During 2010, 4,073 pesticide applicators attended pre-license and recertification training in western Washington, with 607 attendees participating in hands-on IPM training for turf and landscape professionals, pest management professionals, and structural pest inspectors. The pest management professional trainings were expanded to include two hands-on trainings, one for bed bug inspections and IPM, and another for beetle identification. In 2010, SWD was a featured topic at all WSU urban IPM recertification courses.

**IPM for Parks and Natural Areas.** The WSU Urban IPM Program continues to collaborate with Salmon-Safe, a nonprofit organization working to restore agricultural and urban streams and the species that inhabit them. WSU's role is to conduct third-party assessments of IPM practices in urban parks, corporate and university campuses, and golf courses. Working with a team that includes a stormwater management specialist and fish biologist, Carrie Foss is responsible for IPM evaluations, pesticide review, reporting, and technical assistance for the urban Salmon-Safe projects in Washington State, including the Port of Seattle Parks, City of Walla Walla Parks, the Olympic Sculpture Park, and the University of Washington's main and Bothell campuses. Salmon-Safe has worked at more than 20 corporate and institutional sites in Washington and Oregon. These systems include golf courses, athletic fields, natural areas, and other recreational sites. Early in 2010, Salmon-Safe conducted a comprehensive assessment of the headquarter campus of the outdoor gear retailer REI, as well as their flagship Seattle store and their West Coast distribution center in Sumner, Washington.

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Rick Melnicove

Outreach is a top priority for the Utah IPM Program. In 2010, they reached tens of thousands of clientele through 23 lectures and workshops, 11 fact sheets, 21 grower field meetings, 6 radio broadcasts, the *Utah Pests News* quarterly newsletter, two articles in the *Utah Berry Growers Association Newsletter*, one article in a trade magazine, one newspaper article, and online materials. The program reorganized its IPM Web site (<http://utahpests.usu.edu/ipm>) and added a new look to improve navigation through the site. Two major accomplishments were the publication of the *Utah-Colorado Commercial Tree Fruit Production Guide*, a collaboration by nine authors, and a new outreach project for fruit growers in northern Utah.

School IPM is a growing part of the Utah IPM Program. Program staff continue to serve on the Utah IPM Coalition, which meets twice a year and serves to train teachers and staff. This year they worked with the Salt Lake City School District on updating and editing the educational materials component of the newly-formed "iPestManager," an online tool to manage pest activity. They also contributed to the district's newsletter, *Pest Press*.

The Program collaborates with the Western Sustainable Agriculture Research and Education (WSARE) program to offer IPM mini-grants to USU Extension faculty. In 2010, four projects were funded that focused on 1) control of beet leafhopper to reduce curly top virus, 2) IPM techniques to reduce squirrel damage in alfalfa, 3) backyard poultry production to reduce weeds and insects, and 4) a comparison of trunk treatments for flatheaded borer management in peach trees.

Applied research projects by the Utah IPM Program in 2010 were focused primarily in fruits and included the use of attract-and-kill stations to manage cherry fruit fly; investigation of European earwig biology and mass trapping; investigation of currant clearwing biology and mating disruption; using molecular techniques to detect fire blight; a disease survey of stone fruit orchards; and evaluation of crop rotation schemes and reduction in nitrogen applications for management of onion thrips and iris yellow spot virus.

#### **Impacts of the Utah IPM Program**

##### **General Impacts**

- Collaborations continue to expand the reach of the Utah IPM Program. New collaborations for 2010 included working with the Natural Resources Conservation Service (NRCS) on reducing use of organophosphates among a select group of fruit growers, and working with Colorado faculty in producing a tree fruit production guide. The Program has ongoing collaborations with the Utah Climate Center, the Utah Department of Agriculture and Food, the USDA RAMP Tart Cherry Integrated Orchard Management Project, the WSARE Onion Pest Management Project, the Utah

Extension Master Gardener Program, the Utah Pesticide Program, the Utah Plant Pest Diagnostic Lab, the USDA-APHIS Cooperative Agricultural Pest Survey Program, and the Western and National Plant Diagnostic Networks.

- The IPM and Sustainable Agriculture Mini-Grant Program has resulted in an increased awareness of regional IPM issues by county Extension faculty, who address pest management problems with results-oriented projects based on stakeholder input. Their audiences are better served because of the grants, and the grants provide tenure-track agents the opportunity to carry out goal-driven, IPM-related research and educational programs.
- The Program's semi-annual survey of IPM Pest Advisory subscribers (commercial and residential) showed positive trends in pesticide reduction and increased use of IPM. For example, 55 percent of respondents have reduced their use of broad-spectrum insecticides, and 47 percent have switched to using only selective/soft/organic materials as a result of receiving the advisories. Most (85 percent) now monitor for pests before spraying, and 35 percent saw reduced costs in pesticide sprays and labor in 2010.

##### **Fruit IPM Impacts**

- In collaboration with the National Agriculture Statistics Service, Program staff surveyed the tree fruit industry to assess their use of IPM practices, and results will guide the Program in outreach and research activities. Findings showed that although 21 percent of growers considered themselves IPM practitioners (14 percent organic), at least 30 percent said they regularly use at least seven of the 22 listed IPM practices, such as trapping and record-keeping, and 78 percent said they monitor regularly for pests. Those who practice IPM reported greater pesticide reduction in the last 5 years than those who practice conventional or organic agriculture. Program staff will continue to analyze the survey data and compare results to tree fruit surveys conducted in 1996 and 2003.
- Results of applied research have led to increases in IPM practices and/or reductions in pesticide use. Examples include:
  - Using killing stations for cherry fruit fly shows promise as a pest management technology to expand organic cherry production.
  - Mass trapping with the use of selective insecticides reduces earwig fruit injury.
  - An ongoing stone fruit diseases survey has not yielded the disease brown rot, which will allow growers to forgo the fungicide sprays they have previously been applying for this pest.
  - Although mating disruption for currant clearwing was ineffective in small fields, the project did lead to a greater understanding of the biology and predators of this pest.
  - The establishment of a grower-operated lab that uses molecular techniques to detect the presence of fire blight bacteria helps growers know whether or not to treat with antibiotics. Those who participated in the fire blight detection service saved, on average, \$50 per acre for each reduced spray.

##### **School IPM Impacts**

- Two 1-day Utah IPM Coalition workshops trained school district staff on pest biology,

## UTAH

#### **Accomplishments of the Utah IPM Program**

Diane Alston, Extension IPM Coordinator, and Marion Murray, IPM Project Leader, reported that the Utah IPM Advisory program continues to grow, with an additional 1,000 subscribers to the email newsletter service in 2010. The program produced 20 tree fruit, three landscape, and five vegetable advisory newsletters. A member satisfaction survey, which had a 20 percent response rate, revealed positive responses (reductions in pesticide use and increases in IPM practices), and 99 percent of subscribers will continue their membership through 2011. The Utah IPM Program continued its collaboration with the Utah Climate Center to maintain pest management tools, including Utah TRAPs (Timing Resource and Alert for Pests, <http://climate.usurf.usu.edu/pest.php>) and weather data, which come from a network of 16 weather stations. TRAPs programmers have updated two models in the system, added graphs showing current weather conditions, and created a frost alert tool with a new map interface. The program purchased three new weather stations and added their data to the site.

management, safety issues, and options for economic sustainability. Several insect fact sheets have been updated or created, and two articles were submitted to *Pest Press*. Through the training and written literature, the Salt Lake City School District was successful in renewing its IPM STAR certification and has leveraged funding for further improvements.

#### **Vegetable IPM Impacts**

- Program staff led two IPM workshops in collaboration with NRCS for CSA (community supported agriculture) growers. Prior to the workshop, attendees maintained mostly organic operations, but most (75 percent) were not familiar with, or did not use, IPM practices. By the end of the two-part training, feedback was very positive, and 80 percent of the growers responded that they would incorporate much of what they learned. The Program plans to expand the workshops and educational materials next year.
- Reduction in nitrogen fertilizer to 120 pounds per acre (compared to 300 pounds per acre) reduced onion thrips densities and transmission of iris yellow spot virus in onions. Onions planted following corn had fewer thrips compared to a rotation following wheat. Corn consumed more soil nitrogen than wheat, and thus fewer onion thrips developed on onions in the corn rotation plots.

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## NEW MEXICO

#### **State IPM Activities**

Extension IPM Coordinator Tess Grasswitz reported that, in addition to general training activities such as Master Gardener programs and certification classes for pesticide applicators, IPM activities in New Mexico cover several areas of emphasis, all of which include both research and extension components.

**Alfalfa and Cotton.** The two main pest problems in New Mexico alfalfa are the alfalfa weevil (*Hypera postica*) and a complex of blister beetles. It has been known for some time that at least three strains of *H. postica* occur in the United States, and work at New Mexico State University has revealed the presence of a fourth. Different strains occur in single or mixed populations in different parts of the state, and current work is concerned with determining the seasonal phenology of the different strains/populations to better determine proper timing of management tactics. The presence of the different strains of weevil may be a factor underlying the lack of success of parasitoid releases made against this species in the late 1980s, when none of the released species were recovered. However, two of the released parasitoids (*Microctonus colesi* and *Oomyzus incertus*) have now been found in the southern part of the state, and efforts are being made to reintroduce the latter species to the eastern and north-central regions of the state.

Blister beetles (Meloidae) are another issue of concern to growers of alfalfa hay. Cantharidin, a poisonous chemical compound present in blister beetles, can be lethal to livestock (particularly horses), and there is considerable concern among livestock owners regarding the risk of blister beetle contamination of forage. This issue received

widespread media attention last summer following the deaths of two donkeys and a horse after they were apparently fed contaminated hay. Current work on this problem is aimed at determining the regional prevalence and distribution of different species of blister beetles in New Mexico alfalfa and their respective cantharidin content in order to better understand and manage this risk.

The main work on cotton last year was an extensive survey of the size and extent of pink bollworm (PBW) populations in eastern New Mexico and West Texas, conducted in conjunction with Texas A&M University. This survey was undertaken in response to 2009 captures of PBW in the PBW eradication zone between El Paso and the Pecos River.

**Pecans and Pistachios.** Current IPM efforts in these two crops include 1) determining the extent and impact of biological control in pecan orchards, 2) determining the underlying causes of higher levels of damage by pecan nut casebearer in small versus larger trees, and 3) assessing the phenology and current level of activity of navel orangeworm in the pistachio-growing part of the state and its effect on crop quality.

In addition, last season saw unexpected damage from new pests (and pests that have been absent for some years but returned in 2010), and education and outreach activities were conducted to alert New Mexico growers about these risks. Pistachios were affected by leaf-footed plant bugs (*Leptoglossus clypealis*) and late-season infestations of conchuela stink bugs (*Chlorochroa ligata*), both of which had a significant impact on nut quality. In pecans, hickory shuckworm (*Cydia caryana*) returned after an absence of about 15 years, and reports were received in several production areas of leaf damage from what has tentatively been identified as the pecan serpentine leafminer (*Stigmella judlandifoliella*), a pest new to the state.

**Chile.** There are three main foci of the current IPM efforts in Chile: 1) developing integrated control strategies for managing the southern root knot nematode in the presence of weed hosts, 2) evaluating the impact of economically important flea beetles and understanding their associations with weed hosts, and 3) a new project on the potential of RNA interference (RNAi) gene silencing as a viable option for controlling *Phytophthora capsici*, a serious pathogen affecting Chile and other crops in the state.

Fumigants for control of southern root knot nematode are less effective when yellow and/or purple nutsedges are present in infested fields, because the nematodes can overwinter in the nutsedge tubers and, once there, are protected from fumigants. The goal of the NMSU study is to use nematode-resistant and competitive crops to aid field suppression of the pest complex and hence reduce pesticide inputs and/or increase the efficacy of those inputs. Rotations being tested include warm-season annual crops (such as NemX cotton and pearl millet) that can compete with nutsedges (or for which suitable herbicide options are available), and a competitive, cool-season biofumigant crop ("Boss" oilseed radish). These treatments are being compared with rotations involving a nematode-resistant, non-dormant perennial alfalfa that has been used successfully in the past.

**Small Farm/Urban IPM.** This program addresses pest management issues of concern to small-scale commercial growers (including organic growers), home gardeners, the landscape industry, and schools. A key need in helping to reduce unnecessary pesticide use in all of

these sectors is to increase the awareness and recognition of beneficial insects and cultural controls as key components of IPM programs. Activities conducted in 2010 included a series of five organic IPM farm walks, IPM "Bug Nights" (hands-on evening classes held during the summer months), and various school IPM outreach activities. Applied research projects include squash bug biology and control and organic control of several fruit pests (codling moth, peach twig borer, and peach tree borer). A new outreach and demonstration project trialing native plants for pollinators and other beneficial insects was initiated in 2010 in collaboration with NRCS's New Mexico Plant Materials Center at Los Lunas.

**Weeds.** New Mexico's weed IPM program has two major foci: biological control of invasive weeds and herbicide resistance in weeds of agronomic crops. The biological control program is focused primarily on improving the efficacy of existing biocontrol agents (e.g., saltcedar leaf beetles) rather than the importation of new species.

The herbicide resistance program is focused on the prevention, detection, and integrated management of herbicide-resistant weeds. Resistance has now been confirmed in both Kochia (*Kochia scoparia*) and Palmer amaranth (*Amaranthus palmeri*).

**Invasive Species/Diagnostics.** This is one of the strengths of the IPM program at NMSU. A well-established and extremely productive plant pathology clinic provides plant diagnostic services for all of the state's crops/plants, including landscape plants and forest trees. Services include analysis of plant material for plant pathogens and environmental stresses, insect identification, and weed or plant identification. Management recommendations are also provided that focus on



Photo by Gary Kramer, USDA-Natural Resources Conservation Service

appropriate integrated control measures (when these are available).

The clinic also participates in national, regional, and state disease surveys, such as the Legume *ipmPIPE* (Pest Information Platform for Extension & Education) project, which serves as a warning network tracking the spread of legume diseases in North America. In New Mexico, pests included in this survey are soybean rust, common bean rust, white mold, common bacterial blight, alfalfa mosaic virus, bean common mosaic virus, beet curly top virus, and soybean aphid. The clinic also serves as a support lab for the National Plant Diagnostic Network.

#### **State IPM Impacts General**

- Statewide, several hundred Master Gardeners and other home gardeners were trained in IPM and related topics, including weed, insect, and disease identification and management.
- An additional several hundred pesticide applicators were trained in the same topics, and



a wide variety of pest-related information was delivered to the state's growers at workshops and conferences for specific crops, including fruit, hay, nut crops, chile, landscape, and organic systems.

#### Cotton

- The 2010 survey found no PBW in New Mexico, but it found nearly 1,500 in the Midland area of Texas. Since New Mexico growers of Bt cotton are required to maintain refuges of non-Bt cotton, while those in West Texas are not, this is liable to be a contentious issue with New Mexico growers, particularly those on the state line who have cotton acreage in both states being grown under different rules.

#### Pistachios

- Growers have historically considered pistachios "pest free" in New Mexico, and as a result many do not monitor for pests or take pest risks seriously. However, the demonstration project/survey for navel orangeworm revealed that even in the better-managed orchards, up to 5 percent of the harvested nuts were damaged by this pest (with concomitant increased risk of aflatoxin contamination). Damage by stink bugs and leaf-footed bugs was even higher, underlining the need for growers to adopt regular crop monitoring and pest management.

#### Urban/Small Farm IPM

- A tabletop display aimed at increasing audience recognition of beneficial insects was exhibited at events throughout the state, with a total estimated attendance of approximately 16,250 people. Most of the visitors to the display were unfamiliar with the majority of the insects exhibited.
- On-farm events continue to be a popular and effective means of education and outreach. IPM "Bug Nights" had a substantial impact on participants' ability to identify key pest and beneficial insects as evaluated by pre- and post-event tests using live insects and pest damage. Pre-test scores typically averaged around 25 percent, increasing to about 77 percent after the events. Attendees at our organic IPM farm walks also benefitted from the experience: 100 percent reported an increase in their understanding of organic approaches to pest management (24 percent by "a little," 76 percent by "a lot").

#### School IPM

- With assistance from the Western School IPM Working Group, four New Mexico public school districts and two independent schools have been assisted in implementing IPM on their campuses. One of these schools is now aiming to achieve IPM STAR certification in the next few years.

#### Diagnostics

- In 2010, the plant diagnostic clinic processed 1,414 routine plant disease or disorder samples, 1,064 insect samples, and 150 plant/weed samples. A new pathogen, *Phytophthora nicotianae*, was also found in the state on onion and tomato. This is the first report of this pathogen on bulb onions in the United States. A new host (peach) for New Mexico was also discovered for the bacterial pathogen, *Xylella fastidiosa*. In addition, *Labyrinthula terrestris*, the causal agent of rapid blight of turfgrasses, was found in New Mexico for the first time last year.

Contact Tess Grasswitz at [tgrasswi@nmsu.edu](mailto:tgrasswi@nmsu.edu).

## NEVADA

The University of Nevada Cooperative Extension's IPM team consists of Jay Davison, Statewide Extension IPM Coordinator and Area Forage and Alternative Crops Specialist, and Lisa Blecker, IPM Educator. Focus areas they have traditionally participated in include IPM in agronomic crops and IPM in recreational lands. They also collaborate with IPM personnel in Arizona, California, and New Mexico as part of the Arid Southwest IPM Network.

The landscape and demographics of Nevada present unique pest management challenges. Nevada is comprised of roughly 70 million acres, 61 million (87 percent) of which are federally owned. This includes Bureau of Land Management, U.S. Forest Service, and National Park Service land. Additionally, there are more than 1 million acres of tribal land (in addition to federally-owned land operated by the tribes). Coordinating pest management efforts with numerous agencies and tribal entities requires time and patience. It also offers an advantage, since agencies have resources that program staff do not have at the University of Nevada.

The majority of Nevada's population (92 percent) is concentrated in two urban areas—Reno/Sparks and Las Vegas. These urban areas encompass four counties (out of 17) and only 14 percent of the total land area of Nevada. Thus, rural counties cover 86 percent of Nevada's land area. This places a heavy weed management burden on a relatively small percentage (8 percent) of the state's population and the federal agencies that manage those lands.

Overall, Nevada is the driest state in the United States, which limits crop diversity. Hay is grown on more than 90 percent of Nevada's production land, since the state's climate is very conducive to production of high quality alfalfa and specialty hays. Common rotational crops are small grains, corn, potatoes, and onions. A growing trend, due in part to Nevada's limited private land resources, is the sale of many larger farms and ranches, which are often broken into smaller farms. These smaller-acreage farms represent unique challenges, and often the producers have different priorities and needs from those of a traditional Nevada producer growing hay on 2,100 acres.

In the coming program year, there is a plan to expand the IPM program into urban areas. Program staff have proposed to pilot urban IPM education in the Reno/Sparks metropolitan area, which has a population of about 420,000, or 15.6 percent of the state's population. This is a new area of emphasis for Nevada Cooperative Extension and is of extreme importance due to the high population concentration in Nevada urban areas.

#### Program Highlights

From July 2009 to July 2010, the IPM team taught IPM principles at 37 workshops throughout the state and presented results of research projects at two field days and six field tours and demonstration plots. These activities were attended by more than 2,385 agricultural producers, public land managers, Extension personnel, and other pest managers. Topics discussed included weed identification, scouting, integrating chemicals with other control tactics, Early Detection and Rapid Response, and weed prevention.

**Early Detection and Rapid Response (EDRR) Program.** A major focus for the program is the



*Musk thistle (Carduus nutans), a noxious weed in Nevada, invades roadsides, pastures, and waste areas.*

Steve Dewey, Utah State University, Bugwood.org

continued development of the Nevada Early Detection and Rapid Response (EDRR) Program for identifying and eradicating new invasive weeds. During the winter of 2008–2009, they developed and conducted county-based, in-person weed surveys in Nevada and phone and email surveys in bordering counties in Arizona, California, Idaho, Oregon, and Utah to determine the current distribution and abundance of invasive weeds in the state of Nevada and on its borders. Using the data collected during these meetings, program staff developed weed distribution and abundance maps and a preliminary "Weeds to Watch" list of potential new invaders in each county, forming the basis for the EDRR program. Program staff met with weed managers in each county to finalize each "Weeds to Watch" list. A full-color poster highlighting the priority species has been developed for each county. Developing an individual "Weeds to Watch" list for each county allows the program team to tailor their education efforts in each county. Rather than focus on a statewide weed list, they focus on prevention, as well as identification and eradication, of the specific weeds on each county's list, since these are more likely to become a problem. During the 2011 growing season, a workshop will be held in all 17 Nevada counties to distribute the posters and teach the principles of weed prevention and EDRR.

**Needs Assessment.** In 2008, program staff completed a comprehensive statewide survey of all Nevada agricultural producers and public land pest managers to determine the current level of IPM implementation and future educational and research needs. The results of this survey were analyzed, and a comprehensive report was written, published, and distributed to stakeholders across the state. The report is entitled *Nevada's 2008 Weed Management Extension Program Needs Assessment: A Survey of Agricultural Producers and Public Land Managers*.

**Nevada Noxious Weed Field Guide.** Program staff wrote, published, and printed the pocket weed identification and management booklet entitled *Nevada Noxious Weed Field Guide*. This publication is an excellent weed identification resource displaying identifying photographs and describing unique characteristics of each weed to aid in its identification. Additionally, the pocket guide details IPM tactics for all of Nevada's 47 noxious weeds, including biological, chemical, and mechanical controls. Since the guide was published, the program has distributed 7,500 copies to public land managers, producers, and other private citizens throughout the West. The guides were so popular that the program was able to secure funding from the Bureau of Land Management to print an additional 15,000 copies. These copies are currently being distributed. Program staff plan to build on the success of this

book by continuing to incorporate its IPM tactics into their educational programming. This is an award-winning publication: it won the APEX Award for Publication Excellence for the graphic design work, and it was also awarded the American Society of Agronomy's Extension Educational Materials Award.

**Revegetating Abandoned Farm Lands.** Jay Davison is leading a research project to evaluate cultural practices necessary to establish several native plant species on abandoned farmlands and disturbed rangelands. The information generated by these projects is a critical step in preventing the invasion of these lands by noxious weeds. The project results were presented at two field days (attended by 76 stakeholders) and three field tours (29 stakeholders). Oral presentations were given at two international symposia (115 attendees) and at the Nevada Weed Management Association Meeting (56 stakeholders). And results were shared in a poster presentation (63 stakeholders) and at a two-day forage workshop (22 attendees).

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## IDAHO

Extension IPM Coordinator Ed Bechinski reported that E-IPM funding awarded to the University of Idaho supports three primary activities: 1) statewide IPM programming coordination; 2) IPM outreach projects in urban landscapes, cereals (barley and wheat), and sugarbeets; and 3) weed and insect diagnostic laboratories. Projects primarily operate through faculty "Topic Teams," which are statewide work groups of county Extension educators and state Extension specialists who are broadly charged with Extension program planning, action, and assessment. None of the Teams is specifically dedicated to pest management programming. They instead are organized by subject-matter (e.g., specific crops) or issues (e.g., water quality). Several Teams with notable Extension IPM programs—particularly in potatoes, small acreage crops, and biological control of invasive weeds—are funded entirely by sources other than the E-IPM award, so they are not described here.

Ed Bechinski provides leadership for statewide outreach in pest management by participating in planning, assessment, and reporting meetings of UI Extension faculty work groups for potatoes, cereals, sugarbeets, and commercial and consumer horticulture.

### Urban Landscape IPM

The E-IPM program addresses top-ranking insect pest concerns of Idaho homeowners by conducting outreach that combines new print and online IPM resource materials for homeowners with local delivery of on-site IPM workshops—particularly training for Master Gardeners. A major effort for 2011 has been to extend titles in the "Homeowner IPM Guides" publication series that was begun in 2010 when the program published seven fact sheets and bulletins about stinging insects, spiders, and their relatives. Two new titles are currently in preparation: *Homeowner IPM Guide to Insects in Backyard Vegetable Gardens* (which will replace and significantly extend out-of-print UI Bulletin 740) and *Guide to Beneficial Natural Enemies* (which will replace and significantly extend out-of-print regional bulletin PNW 343).

Their vision is to develop, by year three of the E-IPM award, a comprehensive Web site that homeowners can consult about the diagnosis and management of yard and garden diseases, insects, and weeds. They are leveraging the E-IPM award with support from the Western IPM Center to conduct shelf surveys of homeowner pesticides at retail outlets and then to generate an online database of recommended products for backyard gardens. They patterned their work after similar efforts by the University of California Statewide IPM Program.

Printed and online resources were supplemented by onsite IPM workshops for Master Gardeners, landscape professionals, and homeowners. Over the past 2 years, E-IPM funding has supported local delivery by Bechinski of nearly 60 hours of IPM educational workshops to beginning and advanced Master Gardener volunteers in Idaho and adjoining Washington. The subject-matter focus has been pest identification, biology, and management options, with an emphasis on "least-toxic" biorational pesticides and biological control. They are leveraging E-IPM funding with an internal University of Idaho grant awarded to the Commercial and Consumer Horticulture Team to convene a series of four regional workshops during the summer of 2011 for UI county Extension educators and Master Gardeners.

Biological control workshops delivered by Bechinski reached 55 homeowners during spring of 2011. An additional 8 hours of biocontrol workshops for homeowners during summer 2011 will combine classroom instruction with field visits. Bechinski delivered IPM workshops for nursery professionals that reached 170 owner-operators at two regional venues during 2011.

**Outcomes.** IPM workshops during the 2 years of E-IPM funding have trained 425 Master Gardener volunteers, who in turn have extended IPM recommendations to thousands of local residents. Short-term logic model outcomes were formally measured at select workshops by using standard 10-question pre-test/post-test methods to assess gains in audience knowledge. The mean gain in knowledge among Master Gardeners was 62 percent. Sales of Extension bulletins in the "IPM Guide" series are proxies for gains in IPM knowledge among homeowners. Clients purchased 1,863 copies of four printed manuals (Bulletins 852, 853, 854, and 871), which placed them among the best-selling UI Extension publications during 2010. Short-term logic model outcomes (i.e., the likelihood of clientele adoption of IPM practices) were measured at select workshops by asking audiences to respond to the post-workshop evaluation item: "Please list one idea you plan to put into practice." Replies commonly centered on conservation biological control, such as, "Closely check bugs before killing to keep good bugs" and "Always consider whatever is safe for beneficials—try to maintain whatever predators (good) already exist."

### Cereal IPM

Work plans for 2010–2011 include two major activities: 1) seminars at local and regional Extension workshops for commercial barley and wheat growers and their pest management advisors, and 2) statewide IPM adoption surveys. The latter remain in progress.

Bechinski delivered 12 IPM seminars in Idaho and adjoining Washington to cereal producers and industry field staff during 2010 and 2011. Subject matter included field scouting methods, degree-

day models, economic injury levels, cultural and biological control, and judicious pesticide use. He continued work with county Extension educators about a new exotic (European) cutworm, *Noctua pronuba*. He published an online Extension bulletin and created IPM resource materials (PowerPoint show and handouts) used at five Extension workshops by UI Extension colleagues to educate commercial grain growers and their advisors about *Noctua* identification, damage, and management options.

Range expansion of another exotic pest, *Sitodiplosis mosellana* (wheat midge), in Kootenai County, near the Idaho/Washington border, during fall 2010 has prompted multi-county detection survey plans with a researcher at Washington State University for the 2011 growing season. In-service training delivered by Bechinski during March 2011 trained 10 UI county Extension educators and state Extension specialists about wheat midge detection, pest status, and management. Prior to the 2010 detection, wheat midge in Idaho had been confined for 20 years to a single county at the Idaho/Canada border.



Photo by Jeff Vaniga, USDA-Natural Resources Conservation Service

**Outcomes.** More than 600 commercial grain growers and agricultural professionals learned about IPM practices for cereal insect pests by attending workshops delivered by Bechinski during 2010 and 2011. Another 355 cereal producers and their advisors learned about the identification, biology, and management of *Noctua* by attending Extension workshops delivered by four UI county Extension educators and specialists who used IPM resource materials developed by Bechinski. An interview about IPM for cereal pests on the Northwest Ag Information Radio Network reached thousands of commercial growers in Idaho, Oregon, and Washington.

### Sugarbeet IPM

Work is under way to document intermediate-term logic model outcomes of Extension IPM programming in sugarbeets by designing a survey questionnaire to quantitatively measure grower adoption of IPM methods for sugarbeet diseases, insects, nematodes, and weeds. Similar surveys conducted 20 years ago will provide baselines for comparison. Rather than conduct surveys with a printed questionnaire booklet mailed statewide to growers, program staff instead plan to conduct live, on-site surveys at grower meetings during late winter of 2012 by using audience participation remote clicker technology (i.e., the TurningPoint audience response system) in order to maximize response rates.

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## Thomas Holtzer

*Professor and Head, Department of Bioagricultural Sciences and Pest Management, Colorado State University, and Co-Director, Western Integrated Pest Management Center*

### *Involvement with the Western IPM Center*

Tom Holtzer, who heads the Department of Bioagricultural Sciences and Pest Management at Colorado State University, Fort Collins, is the Co-Director of the Western IPM Center. Because of his long-standing commitments and connections in the research and extension community and university system, and his depth of administrative experience, Tom brings a rich and unique perspective and expertise to the Center as he contributes to discussions and provides input about the Center's direction to Director Rick Melnicoe, Associate Director Linda Herbst, and the Center's Advisory and Steering Committees. And Tom's perspective from Colorado adds valuable geographic diversity to the Center's leadership team. He also provides a connection with the State Agricultural Experiment Station system and is a conduit to State IPM Coordinators and the IPM research community in the West through his leadership on multistate projects and committees.

Tom said his involvement with the Center "grows out of a long-term interest in IPM—ever since graduate school. That was before the term 'IPM' even appeared." When USDA began discussing the concept of the regional IPM centers, Tom was involved as Administrative Advisor of the Western Education/Extension and Research Activity 069 (WERA-069), a multistate group focused on IPM and sponsored by the Western Association of Agricultural Experiment Station Directors. "I quickly got involved in trying to flesh out how the regional IPM centers might work, and Rick and I decided to collaborate on the Western IPM Center," said Tom. He became Co-Director in 2003.

Asked about his perspective on the role of the Center in furthering IPM in the region, Tom answered, "The Center's importance is captured in that last word: regionalization—of decision-making about which issues are important, how to address them, and how to incorporate them into Center grants that provide people in the region the opportunity to work across state lines." He added, "I am proud of the involvement of the broad group of stakeholders in the Advisory and Steering Committees that had never before been brought together at the regional level to provide that kind of diverse input into IPM."

Rick and Linda emphasized Tom's pivotal role in helping to establish the Center on a solid and successful foundation of stakeholder input and support in the region. "He stepped up to the plate at a critical time," said Rick. At the inception of the Center, Tom was involved in convening a stakeholder visioning meeting. His established connections with State IPM Coordinators and other stakeholders throughout the West as Administrative Advisor for WERA-069, and his commitment to bring their perspectives into the early planning stages of the Center, ensured that the goals, purposes, and overall plan of the Center served the needs and concerns of the diversity of IPM stakeholders in the region. Linda said, "Without Tom's insight into the benefits of working collaboratively from the beginning on this IPM Center concept, we wouldn't have evolved the way we have. He has been a critical part of making the Center what it is." And Tom's ongoing connections through WERA-069 have maintained, throughout the



Thomas Holtzer

Center's evolution, a vital continuity between the Center and IPM stakeholders. Tom has also been very supportive of collaborations among the different IPM stakeholders in the region, and especially between the State IPM Coordinators and the Center's other state contacts.

Regarding Tom's location in Colorado, Linda said, "Tom sees agriculture from a totally different perspective than we do in California. We are overwhelmed with minor crops here and in the Pacific Northwest. Tom brings a balance, representing the intermountain and arid state perspectives." Rick added, "Rangeland is an example. It has been given little attention in terms of funding, and when we are discussing priorities for our requests for proposals, Tom has helped show that rangeland deserves its fair share."

Summing up, Linda said, "Tom is a visionary. IPM has evolved over the years, and

Tom is very visionary about the kinds of changes that have occurred. He has brought that perspective to our Advisory and Steering Committee discussions and to the administrative leadership of the Center." Rick added, "He also reels us all in (all of the regional Centers) on administrative concerns and issues, like indirect cost. He lets us know what the administrators' points of view are on issues that we don't always have insight into."

### *Career—Breaking Down Barriers*

Tom was attracted to integrated approaches and systems-level thinking early in his career and has continued his interest in big-picture, long-term perspectives. Tom said, "It goes back to very early on as a graduate student, and even before that. I was trying to figure out ways to approach problem solving by integrating different points of view and approaches—from molecular to ecological, and from different disciplinary approaches. I like the saying, 'The world has problems; universities have departments.' The message is that breaking down barriers to broader ways of thinking leads to great approaches to solving problems." He added, "IPM is the marriage of basic science and applied science and outreach, and it draws from many disciplines."

**Administration.** Tom sees his most important professional accomplishments as being in administration, and he feels fortunate that through his administrative efforts he has been able to break down barriers that get in the way of solving important problems. For example, in 1995, after serving as the head of the Department of Entomology at Colorado State University for 8 years, Tom found himself in the position of providing administrative leadership for the merger of his department and the Department of Plant Pathology and Weed Science. Tom was committed to developing a highly functioning new department that would not only provide a stable administrative home for the component disciplines, but also create a dynamic administrative unit with a strong, unified vision and mission and positive working relationships among all faculty—regardless of their disciplinary backgrounds. Tom said, "The merger of departments, while it posed difficulties, was an opportunity to bring people together. I was fortunate to have that chance to invest my administrative efforts in helping the new administrative structure

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***"Breaking down  
barriers to broader  
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to solving problems."***

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bear fruit.” He added that, across the research community, IPM has evolved from an early emphasis on insect pests to the point where plant pathology and weed science are equal partners. In his role as department head, Tom sees his main job as “helping faculty be productive by creating an environment that encourages both individual productivity and collaborative efforts in research, teaching, and outreach.”

**Teaching.** Tom said his agricultural ethics course has become increasingly interesting and challenging, because in a dramatic way it focuses on the integration of spheres that are not thought by many to be connected to each other. He said, “What I have come to really enjoy is the opportunity to get students from all over campus to ask ethical questions about agricultural issues and practices and then to analyze various arguments as they develop their answers. Students are learning critical thinking skills and how to put together rational arguments from their own point of view. I tell students, ‘I don’t have an interest in changing your mind about an issue. I want you to critically analyze an issue from an ethics perspective and be able to talk or write about it clearly and effectively.’”

A chief goal for Tom is for graduate students in his department to have not only a research area of great strength, but also to sincerely appreciate people who come from other disciplinary backgrounds. He said, “To be good and constructive in a cross-disciplinary framework you have to have a deep strength that you bring to the table, but you also have to be able to respect and value people from other disciplines and strength areas. It’s hard to do and may conflict with some basic aspects of human nature. It can fly in the face, to a degree, of some productivity measures (like publishing a lot of papers), but if you really want to make progress in solving practical problems as well as in fundamental research, collaboration is a must. One person cannot master everything that is needed, so you need teams to solve most of the truly important problems.”

**Research.** Tom’s own research has focused primarily on ecology and management of insect and spider mite pests. Hallmark’s of his team-oriented research have included innovatively using multiple scales of experimentation (e.g., microscopic, greenhouse, and field) and employing multiple techniques and technologies (e.g., observation, automated data collection, remote sensing, GIS, and computer modeling) to gain a deeper understanding of complex biological systems and to gain insights into their management. He has done less research as his administrative efforts have increased, but he said, “What has continued to really interest me is teams of people working together, and doing what I can to help that happen.” For many years, he and his collaborators have tried to work out the relationships between spider mites and plants, and what triggers outbreaks and prolongs them. His most recent research focuses on the Russian wheat aphid and how weather and climate affect the population dynamics of the pest and its parasites and predators.

**Challenges and Opportunities Going Forward.** Tom said that a continuing challenge in the 21st century is that there is still a certain reluctance within universities to having departments and disciplines become too closely associated. “I have tried to be a voice that says there are benefits to including other disciplines in what you can offer to students and in how you can formulate research proposals and the like. In our department I have tried to highlight the benefits of interdisciplinary associations and to focus on cross-cutting areas of emphasis—like ecology, molecular biology, and IPM—where we can take transdisciplinary approaches to get people working together. For example, we have in our department plant pathologists with genomics expertise who are working with field-oriented weed scientists on the molecular genetics mechanisms of herbicide resistance in weeds. That kind of interdisciplinary work is best fostered in a place where these people are brought together.”

Looking to the future, Tom has a deep interest in finding ways for university administration to help create the strong, vital institutions necessary to solve the problems he thinks will face us. He pointed out that all land-grant universities are hurting in terms of funding right now, and he wants to find ways for them to grow back strong and to expand when there is an opportunity to do so. Tom asked, “How do we position agriculture and IPM for the future? How do we use the strengths of molecular biology and ecology to solve problems that are becoming more acute as needs for food, fiber, and energy increase and as

threats from invasive species grow?” He added, “I am concerned about making sure agriculture and food production receive the attention they deserve from the public so that we have the resources needed to solve the looming problems. What are the initiatives we can start now that will help in the struggle for food, and that will do it in environmentally sound ways? We are seeing a disturbing juxtaposition: funding is shrinking, and the problems are increasing—it’s a real challenge for all of us.” In each of his roles, as he continues to do his part to help address these challenges, Tom said the most rewarding thing about his work is “a profound sense of satisfaction that I have the opportunity to indeed facilitate other people being successful.”

## Personal

Tom was born in Harrisburg, Pennsylvania, and grew up in the western part of the state. He earned his B.A. in biology from Thiel College, in Greenville, Pennsylvania, and his M.S. and Ph.D. in entomology with an ecology minor from North Carolina State University. Tom and his wife, Irene, have been married since college, and family is important to them. They have two grown children, one of whom is married and has three kids. Tom said, “We know a lot of people think we are crazy, but despite the challenges, we feel very fortunate to live on 10 acres in the foothills, 2,000 feet above Fort Collins, where we can heat our house with wood we split ourselves, grow a few flowers in our fenced-in “deer-free zone,” and train dogs for agility trials. Having our grandkids close enough that we can really be involved in their lives is especially wonderful.”

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## Now Online: Journal of Integrated Pest Management

The Entomological Society of America released the first issue of the *Journal of Integrated Pest Management* (JIPM) in October. JIPM is a free, online-only, open-access, peer-reviewed extension journal that covers the field of integrated pest management. The intended readership is any professional engaged in any aspect of IPM, including crop producers, individuals working in crop protection, retailers, manufacturers and suppliers of pest management products, educators, pest control operators, and others.

JIPM is multi-disciplinary in scope, publishing articles in all pest management disciplines, including entomology, nematology, plant pathology, weed science, and other subject areas. Articles in JIPM are written to help IPM professionals work on pest management issues and are divided into three categories:

- profiles of insects, including scientific name, description of stages, biology, life history, host plants, potential for economic damage, sampling or scouting procedures, and management and control options
- emerging IPM issues, including information on the issue’s relevance, why the issue developed, balanced perspectives on the issue, and possible solutions
- recommendations on pest control and pest management topics that are based on IPM principles and supported by published research and validation data when available

The first issue of JIPM can be accessed at <http://esa.publisher.ingentaconnect.com/content/esa/jipm>. For more information about JIPM, go to <http://www.entsoc.org/pubs/periodicals/jipm>.

# A Fresh SPIN on IPM: Sharing Ideas Through Online Networking

By Josh Vincent, Northwest Center for Alternatives to Pesticides

Undeniably, the explosion of social media in recent years has served to reshape the way people interact online. Facebook and Twitter have become ubiquitous, asserting themselves as powerful tools for the rapid and broad dispersal of information. Internet users have begun to turn to social media for their news, and news stories are now crafted so that they are more easily shared among social networks. More and more, people are drawn to social media for information, even if they are not interested in online networking. This is why, when the Northwest Center for Alternatives to Pesticides (NCAP) saw the need for a fast and interactive means of sharing information about IPM techniques, we decided to build a social network for that express purpose.

It began back in 2007. NCAP received funding from the Western IPM Center to survey and report on effective IPM strategies for parks maintenance. As part of the Pesticide-free Places Campaign, NCAP's then staff person Megan Kemple worked with partners to conduct surveys and on-site interviews with parks employees throughout the Northwest, compiling the results about what did and didn't work. The summary of the interviews and surveys was presented in detail in a series of reports focusing on non-herbicidal management strategies for each of the following areas: turf, tree wells, fence lines, hardscapes, shrub beds, and landscaped areas. The reports were then distributed to more than 140 city park employees and were made available through NCAP's Web site (<http://www.pesticide.org>). In addition, more than 50 copies of each report were mailed to regional city park managers.

The reports were well received, but as they generated much interest and many follow-up questions, they also highlighted the need for an immediate way for parks staff from different areas to connect with each other for further discussion. Park employees began requesting that the project be expanded to further address their needs, so the next step was to provide a platform for information sharing that would better promote peer-to-peer communication, and ultimately the adoption of new IPM practices. Under the leadership of Shelly Connor, NCAP and partners convened a working group of IPM leaders and parks staff from across the Northwest. The goal was to outline a strategy for creating this new platform. In discussing the different ways that parks and other agency staff communicate, it was decided that the most effective way to address IPM needs would be to provide a sustained way for parks staff to ask specific questions of their peers. Enter social media.

With additional support from the Western IPM Center, the Sustainable Places Information Network (SPIN) was launched in May



Bed bug.

Courtesy Centers for Disease Control

of 2010. Now a year old, it has connected more than 100 land-care and maintenance professionals across six states. It hosts 11 videos, almost 60 blog articles, webinars, and discussion forums on a broad range of indoor and outdoor IPM topics. In addition to these resources, SPIN allows users to post their own content in the form of comments, videos, blog posts, and most importantly, questions.

Additionally, SPIN has now expanded to include forums for indoor IPM as well. By working with staff from schools and housing providers, SPIN now hosts resources on everything from model school IPM policies

to protocols for safe and effective bed bug treatments in multi-family housing units. SPIN's most recent video project involved documenting a standard bed bug inspection with the Housing Authority of Portland (HAP). The video can be seen here: <http://www.sustainableplaces.org/pest-prevention/how-to-inspect-for-bed-bugs>. Follow-up videos have been scheduled with HAP to show how they are managing bed bugs with heat treatments, cold treatments, diatomaceous earth, and cedar-based products.

A wider adoption of IPM approaches is critical to preserving environmental and human health in the urban setting, not simply through reducing health risks associated with infestations, but also through reducing the health risks associated with exposure to chemical pesticides. By linking land-care, maintenance, and pest management professionals in a forum dedicated to IPM, SPIN hopes to fuel a freer and faster exchange of ideas that will promote best practices throughout the western region and beyond.

Join SPIN at <http://www.sustainableplaces.org/register>, and see some of SPIN's latest IPM videos at <http://www.sustainableplaces.org/multimedia-library/videos>.

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## PMSP Update

### Ongoing:

- **Blueberry (Oregon, Washington):** In final editing
- **Cucurbit Crops (Hawaii, Guam)**
- **Desert Turf (Arizona, Nevada, and Southeastern California)**
- **Grass Seed (Idaho, Oregon, and Washington)**
- **Low Desert Cotton (Arizona and Southeastern California)**
- **Orchid (Hawaii):** Currently being reviewed
- **Seed Potato (Alaska, California, Colorado, Idaho, Montana, Oregon, Washington):** Currently being reviewed
- **Turf (Hawaii):** Currently being reviewed

### Completed:

- **Pear (California)**



Courtesy of NCAP

Founding SPIN members tour a pesticide-free park that NCAP helped to establish in Eugene, Oregon.

Courtesy of USDA-Natural Resources Conservation Service



# Spotted Wing Drosophila, a Recent Invader of the Western Region

Frank G. Zalom, Professor and Extension Entomologist, University of California, Davis

More than 3,000 species of vinegar flies, classified in the family Drosophilidae, have been identified worldwide. The adults of most of these species lay their eggs in decomposing plant material and are considered pests only when their eggs or larvae (maggots) are found in processed products. When “drosophila” are mentioned, many people think of a single species, *Drosophila melanogaster*, the white rat of insect genetic studies for the last century. Indeed, the genome of *D. melanogaster* has been sequenced, and this species has become a model for genetic manipulation.

In fall of 1998, an exotic species to North America, *Drosophila suzukii*, was first found in Santa Cruz County. Its behavior was unusual in that it laid its eggs and its larvae developed in sound fruit prior to harvest. It is one of only two *Drosophila* species known with this behavior. The prominent, serrated ovipositor of the female allows it to penetrate a fruit's surface and insert its eggs. It inserts approximately one to three eggs per oviposition site and more than 350, on average, during a single female's lifetime. *D. suzukii* males can be identified by the presence of a dark spot at the posterior edge of both wings—hence its common name, spotted wing drosophila. The female lacks wing spots and except for its large ovipositor, resembles other common *Drosophila* species. Adults are similar in size to other *Drosophila*, being approximately 2 to 3.5 millimeters in length, and the white larvae present in infested fruit grow to about 3.5 millimeters in length. *D. suzukii* is most active at mild temperatures of about 20° C (68° F). Activity is reduced above 30° C (86° F), which may explain the reduced densities observed in California's Central Valley and elsewhere during the hot summer months. It is reported to successfully overwinter on the island of Hokkaido, in Japan, where winters average -12 to -4° C (10 to 25° F); however, these temperature parameters must yet be confirmed for the U.S. population.

*D. suzukii* came to prominence in the spring of 2009, when it caught California cherry growers by surprise, resulting in extensive damage in the Santa Clara Valley and from Yolo to Stanislaus Counties. Trapping by the California Department of Food and Agriculture at that time revealed that the fly

could be found in all coastal California counties. Further trapping in the fall of 2009 confirmed *D. suzukii* presence in western Oregon, the Columbia River Gorge, western Washington north into British Columbia, and Florida, with damage being reported to a number of fruit crops in the West. In 2010 it was discovered for the first time in the Carolinas, Louisiana, Michigan, Wisconsin, and Utah, and it has also been found in Italy, France, and Spain. It has been present in Hawaii since at least the 1980s without being reported as causing economic damage.

While the origin of the *D. suzukii* invasion of the western United States is not known, its endemic range is Japan, Korea, and eastern China, where it is known as a pest of cherries, berry crops, and other soft fruit. Prior to its detection in the United States, virtually all of the literature on *D. suzukii* was in Japanese, a factor impacting its initial U.S. identification and research. Fortunately, implementation of provisional monitoring and control strategies by fruit and berry growers after they experienced devastating losses in 2008–2009 has resulted in greatly reduced economic damage; however, longer term, more sustainable strategies must be developed. Monitoring to date has been done with liquid traps baited with apple cider vinegar or brewer's yeast, sugar, and water, and larval infestations in fruit have been detected with a sugar or salt flotation method. Traps for *D. suzukii* seem to perform best when deployed in the cooler, shadier areas of the field or orchard. Unfortunately, these traps are not specific, attracting and capturing other species of *Drosophila* and a number of different types of flies as well, so proper identification is important. Management at this time is based largely on broad-spectrum chemicals, including organophosphates, pyrethroids, and spinosyns. Organic growers must rely on approved products containing pyrethrum or spinosad. But residual impact of these compounds is limited to 1 to 3 days, so repeated applications are necessary.

A group of scientists at the University of California (Davis, Berkeley, and Cooperative Extension), Oregon State University, and Washington State University, together with colleagues in Canada and state regulatory agencies, developed a comprehensive plan for studying the biology and management of *D. suzukii* on western U.S. crops and received



A male spotted wing drosophila.

a competitive grant from the USDA-NIFA Specialty Crop Research Initiative grant program in fall of 2010. Objectives of this project include evaluating genetic, biological, and ecological parameters of *D. suzukii*; developing management strategies (including biological controls and cultural practices) to minimize infestation and reduce risk; measuring awareness, impact, and success; and synthesizing existing and new information to provide real-time support. The Web site for this project is <http://swd.hort.oregonstate.edu>.

Additional information on *D. suzukii* can be found from these resources:

Caprile, J., M.L. Flint, M.P. Bolda, J.A. Grant, R. Van Steenwyk, and D. Haviland. 2011. Provisionary Guidelines: Management of Spotted Wing Drosophila in Home Garden Situations. UC Statewide IPM Program. (available online at <http://www.ipm.ucdavis.edu/exotic/drosophila.html>)

Vlach, J. 2010. Identifying *Drosophila suzukii*. Oregon Department of Agriculture. (available online at <http://www.oregon.gov/oda/plant/ippm>)

Walsh, D.B., M.P. Bolda, R.E. Goodhue, A.J. Dreves, J. Lee, D.J. Bruck, V.M. Walton, S.D. O'Neal, and F.G. Zalom. 2011. *Drosophila suzukii* (Diptera: Drosophilidae): Invasive Pest of Ripening Soft Fruit Expanding its Geographic Range and Damage Potential. *Journal of Integrated Pest Management*. 2:1–7. (available online at <http://esa.publisher.ingentaconnect.com/content/esa/jipm/pre-prints>)

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Cherry fruit infested with spotted wing drosophila larvae.

Martin Hauser, courtesy University of California Statewide IPM Program

Larry Strand, courtesy University of California Statewide IPM Program

# Update on Alaska Potato IPM Scouting Manual: A Pocket Guide in English and Russian

By Ronda Hirnyck, University of Idaho

In 2010, University of Idaho Extension was awarded funding through the Regional IPM (RIPM) Competitive Grants Program—Western Region, for a project to address field scouting and pest identification needs in Alaska potato fields. The project leverages funds from a WIPMC-funded project, a *Field Guide to Potato Pests in English and Spanish*, published by UI Extension in 2008. That guide was created to help Spanish-speaking field workers identify key potato pests, utilize timely IPM techniques, and possibly help reduce unnecessary pesticide applications. An additional objective was to develop a “template” for future field pest guides that could be used in other commodities to complement an IPM program.

Since there are no Alaskan IPM manuals specifically directed for field scouting, nor are there any such manuals in Russian (the language of Alaska’s primary farm labor force), Co-Project Directors Ronda Hirnyck, University of Idaho, and Tom Jahns and Janice Chumley, University of Alaska Cooperative Extension, decided to use the existing Idaho field guide template to develop something similar for Alaska potatoes. The “Alaskanized” version of the Idaho *Field Guide to Potato Pests* is currently under development and should be ready for distribution in the spring of 2012. The Alaska field guide outlines a scouting plan for potatoes according to crop stage, and it targets economically damaging pests at each of the stages. Included will be photos identifying each pest and the damage it causes, photos of beneficial insects commonly found in Alaska potato fields, blank pages for inventory notes, and a scouting map. The Idaho field guide template will be altered to highlight Alaska potato pests previously identified by the regional *Pest Management Strategic Plan for Pacific Northwest Potato Production*, with additional input from Alaska potato producers and Extension and state agricultural personnel.

In February, Hirnyck and Chumley presented a draft version of the “Alaskanized” scouting manual to producers and industry personnel at the Alaska Produce Growers Conference, sponsored by the University of Alaska Fairbanks Cooperative Extension Service. The project was very well received by attendees. Project Directors met with a group of producers after the conference to incorporate last-minute ideas, new pests, and any other input for the field guide. Once the draft scouting manual has been translated into Russian, the Project Directors will work with a local native-speaker of Russian, who will proofread the scouting guide to ensure ease of understanding and accuracy. The Project Directors will introduce the field guide to potato producers at the 2012 Alaska Produce Growers Conference and conduct train-the-trainer workshops for these producers.

Contact Ronda Hirnyck at [rhirnyck@uidaho.edu](mailto:rhirnyck@uidaho.edu).



Working on a watering system in a potato field in Palmer, Alaska.

## Mark Your Calendar

2011

- 2011 American Phytopathological Society (APS)-International Plant Protection Congress (IPPC) Joint Meeting, August 6–10, Honolulu, Hawaii.  
<http://www.apsnet.org/meetings/annual/Pages/default.aspx>
- Resistance 2011 International Conference, September 5–7, Rothamsted Research, West Common, Harpenden, Hertfordshire, United Kingdom.  
<http://www.rothamsted.bbsrc.ac.uk/resistance2011.html>
- XIII International Symposium on Biological Control of Weeds (ISBCW 2011), September 11–16, Waikoloa, Hawaii.  
[http://uhhconferencecenter.com/xiii\\_isbcw.html](http://uhhconferencecenter.com/xiii_isbcw.html)
- IR-4 Food Use Workshop, September 13–14, Raleigh, North Carolina.
- 2011 National Plant Diagnostic Network meeting, November 6–9 (field trip November 10), San Francisco, California.
- Entomological Society of America 59th Annual Meeting, November 13–16, Reno-Sparks Convention Center, Reno, Nevada.  
<http://www.entsoc.org/am/fm/index.htm>

2012

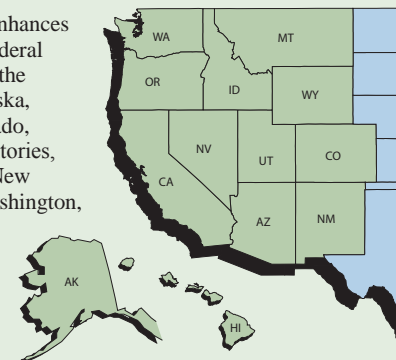
- 7th International IPM Symposium, March 27–29, Memphis, Tennessee.
- Western Society of Weed Science Annual Meeting, March 12–15, Peppermill Resort, Reno, Nevada.  
<http://www.wsweedscience.org/default.asp>
- Entomological Society of America 60th Annual Meeting, November 11–14, Knoxville, Tennessee.  
<http://www.entsoc.org/am/fm/index.htm>

2013

- Western Society of Weed Science Annual Meeting, March 11–14, Catamaran Resort Hotel, San Diego, California.  
<http://www.wsweedscience.org/default.asp>
- Entomological Society of America 61st Annual Meeting, November 17–20, Austin, Texas.  
<http://www.entsoc.org/am/fm/index.htm>

## Center Scope

The Western IPM Center enhances communication between federal and state IPM programs in the western United States: Alaska, Arizona, California, Colorado, Hawaii and the Pacific territories, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. It serves as an IPM information network, designed to quickly respond to information needs of the public and private sectors.



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