

Oregon IPM Program

**Integrated Plant Protection Center
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Highlights: July 2002-December 2003

Integrated Pest Management (IPM) achieves long-term pest, disease and weed suppression by maximizing the use of biological and ecological knowledge in the development of control practices. IPM programs aim to minimize the environmental and human health effects of pest control by emphasizing cultural and biologically-based methods, by providing decision support for pesticide applications, and by developing reduced-risk approaches to pesticide use. IPM programs also tend to be highly cost effective.

Comprehensive IPM programs are difficult to achieve, and successful examples always combine cutting edge research with high impact extension and education programs that encourage adoption through partnership and effective communication with end users.

The Oregon IPM Program is based within the Integrated Plant Protection Center (IPPC) at Oregon State University. The program serves to advance IPM as a strategy for the management of

pests, diseases and weeds in Oregon, through the implementation of research, extension and education programs across the state. The IPM Program focuses upon multi-disciplinary projects that are established through partnerships with other OSU units, and through a network of collaborators in the state, the Pacific Northwest, the USA and beyond. It is supported by funds from the USDA, and by competitive grants.

The IPM Program has been particularly emphasizing the development of multi-investigator, multi-disciplinary programs since July 2002, and this summary presents highlights of that effort. An annual summary will now be issued each January.

For more details about these programs, contact Paul Jepson, State IPM Coordinator, at jepsonp@science.oregonstate.edu, or the contacts listed in the summaries below.

Snap-shot Summary of Highlights

IPM at OSU as a whole

- Federal and regional USDA grants awarded in pest biology and management, and IPM-related projects at OSU, exceed \$8,082,472 since 1996 with \$5,459,101 awarded since 2000, and \$837,079 in 2003.
- Section 18 pesticide registrations in Oregon, supported by the IR-4 program, saved in excess of \$331,000,000 in potential economic losses between 1998 and 2002.

IPM within the areas of emphasis of the IPM Program and the IPPC

- The enhanced multi-investigator research grant program in IPPC (July 2002-December 2003) attracted \$792,539 from federal, regional and local sources combined (\$625,232 of which includes PI's from other OSU units, local USDA laboratories, or other state programs within the region).

Oregon IPM Program Highlights 2003

(Snap-shot Summary Continued)

Biological control and biologically-based pest management

- Funding has been awarded to host a Western Region IPM Center biological control conference in 2005.
- A collaboration with Oregon Tilth has initiated a new conservation biological control program in 2003, involving more than 40 growers to date.
- 23 OSU faculty had approximately 11,000 trainee contacts in the Pesticide Safety Education Program (PSEP) in 2003.
- Over 900 Oregon high school students saw the IPPC Farm Safety Program farm accident injury CD in 2003.

Enhanced diagnostic and forecasting tools

- IPPC weather/degree-day web services assisted nearly 12,000 unique users in 2003.
- IPPC web-based models and decision support tools accumulated nearly 40,000 uses since 1999.
- Participation in the VegNet pest alert network has reduced rejection of harvested broccoli for processing, as a result of cabbage looper contamination, to zero.

Pesticide management, rational use and risk mitigation

- A research, education and extension program in pesticide application technology was launched in 2003, involving pome and stone fruit growers and cereal producers.
- A four-year multi-collaborator best management practice (BMP) project in the Hood River watershed, has reduced the maximum detected levels and the frequency of detections above state standards in streams, for the OP insecticides chlorpyrifos and azinphos-methyl.
- A new project including the Departments of Environmental and Molecular Toxicology, Bioengineering and the IPPC, aims to develop a watershed-based approach to the ecological risk assessment of pesticides.

Information delivery, decision support and outreach

- A new E-mail and web-based IPM news and information service for Oregon distributed 170 messages to over 190 primary recipients between August 2002 and the end of 2003.
- Nearly 62,500 visits were made to the on-line versions of the tri-state IPM handbooks from 51 countries, accessing over 326,000 pages in 2003.
- The USDA-funded regional Pest Management Strategic Plan coordinator will be based in the IPPC for at least the next four years. Recent PMSP's include mint and caneberries, with PMSPs for blueberries, dry bulb onions and alfalfa seed planned for 2004.
- A new grant is providing support for educational programs for Technical Service Providers (TSPs) and other agricultural professionals in pest and nutrient management in the Pacific Northwest.
- IPMnet NEWS now reaches approximately 5,000 recipients a month, in at least 131 countries.
- A collaboration between the IPPC, the Oregon Pest Control Association and the University of Massachusetts IPM Program, is developing IPM Guidelines for structural pests in Oregon.

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IPM Research, Education and Extension at OSU

Research, extension and education activity in IPM at OSU extends to many of the Departments within the College of Agricultural Sciences, most of the off-campus research and extension centers and all the county-based extension offices. An important responsibility of the statewide IPM program is to describe the scope and extent of this activity, and to estimate its

impact within the state and beyond. This document summarizes mainly, the collaborative network associated with the IPPC. This only however, constitutes a part of the total IPM and pest control activity at OSU. Later summaries will be more inclusive of this activity; in advance of these, here are two significant highlights from the broader OSU program.

OSU's record in USDA-funded IPM competitive grants programs

Faculty members at OSU have been awarded \$8,082,472 in USDA-funded research and extension IPM grant programs since 1996, with \$5,459,101, awarded since 2000. The programs include *Crops at Risk (CAR)*, *Risk Avoidance and Mitigation Program (RAMP)*, *Pest Management Alternatives Program (PMAP)*, *Regional IPM Grants (RIPM)*, *Western Region IPM Center*

(*WRIPMC*), *National Research Initiative, Pest Biology and Management (NRI)*, *Initiative for Future Agriculture and Food Systems (IFAFS)*, and IPM-related grants supported by the *Sustainable Agriculture Network (SARE)* and the *National Water Quality Program (NWQP)*. Grants totaling \$837,079 were awarded from among these sources in 2003.

Value of USDA IR-4 program for minor crop pesticide registrations in Oregon, 1998-2002.

The USDA IR-4 Minor Crops Project helps to obtain pesticide registrations throughout the United States. The OSU IR-4 Field Research Center at OSU's North Willamette Research and Extension Center, conducts residue field trials in vegetables, berries, tree fruits, hazelnuts, herbs, and other minor crops, in cooperation with other OSU personnel, field representatives, consultants, and growers to obtain data that support Section 18 registrations (emergency

exemptions), Section 24c registrations (special local needs) and Section 3 registrations (federal registrations) of pesticides deemed critical for maintaining minor crop productivity and profitability. Oregon has a \$1.4 billion per annum share of the \$39.7 billion US minor crop market. The State had 66 Section 18 registrations awarded, through the IR-4 program, avoiding at least \$331 million in economic losses, between 1998 and 2002.

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The number and value of Section 18 registrations in Oregon, between 1998 and 2002
(Data provided by USDA IR-4 program)

<i>Commodity</i>	<i>Number of Section 18's awarded</i>	<i>Economic loss avoidance (if provided)</i>
Apple	4	N/A
Barley	2	7,000,000
Blueberry	4	26,800,000
Caneberries	5	56,400,000
Canola	3	1,000,000
Cranberries	4	2,000,000
Dried peas, chick peas and lentils	6	N/A
Filberts	1	N/A
Grass for seed	3	166,600,000
Hops	14	8,400,000
Mint	7	23,000,000
Raspberry	3	1,700,000
Strawberry	6	30,500,000
Stone fruit	1	N/A
Sugar beet	3	6,500,000
TOTAL	66	331,300,000

Statewide IPM Program areas of emphasis

The Oregon Statewide IPM Program includes the Integrated Plant Protection Center (IPPC), the USDA CSREES IPM, PSEP and Farm Safety programs, the Western Region IPM Center program for Oregon, and IPMnet NEWS, a globally distributed IPM news service. The IPM program and IPPC have embarked upon a programmatic expansion in four areas of emphasis, each of which comprises multi-disciplinary, multi-investigator and often, multi-

state activities, supported by external funding. The enhanced multi-investigator research grant program in IPPC (July 2002-December 2003) attracted \$792,539 from federal, regional and local sources combined (\$625,232 of which includes PI's from other OSU units, local USDA laboratories, or other state programs within the region). The four areas of emphasis are listed below, with highlights from each.

1. Biological Control, Biologically-Based Pest Management

Workshop at OSU leads to conference plan in 2005

A biologically-based pest management workshop, jointly organized by the IPPC, USDA ARS and Oregon Department of Agriculture, held at OSU in December 2002, attracted over 40 researchers with active involvement in biological control. As a follow-up to the workshop, funding was obtained

by the IPPC from the Western Region IPM Center, to hold a Biologically-Based Pest Management Symposium for the western USA in the first half of 2005. **Contact:** Paul Jepson at jepsonp@science.oregonstate.edu.

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New community-IPM project tackles adoption of conservation biological control

The IPPC, Oregon Tilth, and the Oregon Master Gardener Program, with support from the Xerces Society and the Food Alliance, are developing a grower-based program in conservation biological control (CBC). This partnership is based upon the principles of *Community IPM*. The FAO-developed *Community IPM* concept incorporates IPM in a strategy for local, sustainable agricultural development where farmers: act on their own initiative and analysis; identify and resolve relevant problems; conduct their own local IPM programs; elicit support from local institutions; establish or adapt local organizations that include farmers as decision makers; employ problem-solving and decision-making processes that are open and

egalitarian; create opportunities for all farmers in their communities to participate and benefit from the IPM activity; promote a locally sustainable agricultural system. The OSU/Oregon Tilth program includes grower to grower information exchanges, farm walks and demonstrations of techniques, with an emphasis on farm planning to encourage implementation of CBC. To date there have been three farm walks, a street-fair style event 'Bugscaping 2003' and a number of presentations. These have involved more than 40 growers since August 2003. Workshops, grower meetings and farm walks are planned for 2004. **Contact:** Paul Jepson at jepsonp@science.oregonstate.edu.

2. Enhanced Diagnostic and Forecasting Tools

Use of IPPC weather/degree day models

The IPPC, in cooperation with OSU Botany & Plant Pathology, OSU Cooperative Extension Service, Hood River Grower Shippers, Bear Creek Orchards in Medford, Oregon Climate Service, MSU - Bozeman, UI - Moscow, UAF - Alaska, NOAA, NWS, and US Bur. Reclamation, makes daily weather data, degree-days, phenology models and maps available to serve agricultural and pest management needs for Oregon, Washington, Idaho, Montana, Wyoming, Alaska, and SW Canada. These formatted weather data, degree-days, and degree-day products (calculators, models, GIS maps, map/GIS

calculator) are kept current and relevant for pest management decision making purposes for Extension personnel, growers and farm managers, consultants, researchers, and students. Since 1999, 36,960 model runs have been logged on the IPPC *IPM weather data and degree-days* web site (<http://pnwpest.org/wea/>). In 2003 daily, interactive degree day maps were added for 5 NW States and the NW degree day mapmaker was updated (<http://pnwpest.org/cgi-bin/nwmapmaker.pl>). **Contact:** Len Coop at coopl@science.oregonstate.edu.

Comparison of use-level for weather/degree-day web site between 2001 and 2003

Year	# Unique visitors	# Visits	Visits/visitor	Pages visited
2003	11,629	17,932	1.54	72,553
2001	8,137	11,331	1.39	53,107

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Runs of the weather/degree-day models with specific examples for pome fruits

<i>Model</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>
Total runs	711	6,380	8,702	10,980	10,187
Calculator runs (i.e. user inputs thresholds)	-	3,219	3,553	6,043	5,155
POME FRUIT EG's					
Apple scab	-	105	252	141	129
Codling moth	-	1,839	1,471	2,247	2,186
Fireblight	-	380	688	705	1,131
OBLR	-	148	535	661	331
Pear scab	-	-	679	369	344
San Jose Scale	-	195	68	319	143

Pest alert service for processed vegetables contributes to reduced losses during pest outbreak years

VegNet <http://extension.oregonstate.edu/marion/commercialvegies/Vegnet/vegnet.htm> is a pest and disease monitoring and reporting network serving the Willamette Valley processed vegetable industry across nine Willamette Basin counties. Supported by the IPPC and the Processed Vegetable Commission, trap data from a network of monitoring stations are used to provide advice to over 150 recipients via fax and e-mail. In the 1998 cabbage looper outbreak, 331

broccoli totes were rejected by processors, at an estimated cost to growers of \$38,504. By participating in VegNet and investing in more extensive scouting, growers are now able to time control measures for sporadic pests in response to VegNet alerts. In the 2003 cabbage looper outbreak, no broccoli totes were rejected.

Contact: Dan McGrath at Daniel.mcgrath@oregonstate.edu

3. Pesticide Management, Rational Use and Risk Mitigation

Application technology project launched

The IPM Program has launched a research, extension and education program in application technology in 2003. This program involves numerous collaborators including extension faculty in Hood River, Wasco, Sherman and Gilliam counties, OSU Department of Environmental and Molecular Toxicology, Confederated Tribes of the Warm Springs Reservation, Hood River Watershed Group, Hood River Growers and Packers Association, and the Mid-Columbia Agricultural

Research and Extension Center. Two educational workshops, on drift management for cherry growers and wheat growers, have taken place, and field demonstrations will be provided in 2004.

Contact: Paul Jepson at jepsonp@science.oregonstate.edu). Research in drift reduction in orchard systems, funded by the Oregon CWA 319 program will begin in 2004.

Contact: Clark Seavert and clark.seavert@oregonstate.edu).

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Hood River Watershed: Water Quality & Pesticides

In 1999, the Oregon Department of Environmental Quality (DEQ) found levels of the organophosphate (OP) insecticides chlorpyrifos and azinphos-methyl in the Hood River watershed that exceeded water quality standards. In 2000, OSU and the DEQ—in cooperation with the Oregon Department of Agriculture, Hood River Soil and Water Conservation District, Hood River Watershed Group, Hood River Growers and Shippers IFP, and the Confederated Tribes of Warm Springs—initiated a project to monitor chlorpyrifos and

azinphos-methyl in Hood River tributaries. Concurrently, OSU Extension and Experiment Station personnel worked with growers to develop best management practices (BMP's) for OP applications in their orchards. These practices were designed to reduce chemical loading in Hood River streams. Monitoring in 2000-2003 has shown that maximum detected levels and the frequency of detections above state standards, have declined in successive years. **Contact:** Jeff Jenkins at jenkinsj@ace.orst.edu.

Modeling explores pesticide fate in surface and ground waters

An EPA-funded research project involving the Department of Environmental and Molecular Toxicology, Department of Bioengineering and IPPC, aims to develop a watershed-based approach to the ecological risk assessment of pesticide use in western Oregon. This project is developing methods to evaluate the impact of pesticides on stream health, as measured by the aquatic insect community, for key land use practices within western Oregon watersheds. These include upland forestry, lowland urban and agricultural land uses. The approach is to model pesticide inputs and fate within a GIS-based

modeling framework that includes hydrologic regimes, multiple land uses and climate data. Modeling of species sensitivity distributions will then be used to identify the potential for harm to aquatic invertebrate communities. A consultative workshop, outlining initial findings and seeking technical advice and support included representatives from USGS (Portland), EPA (Corvallis), NOAA Fisheries (Washington Habitat Branch), Oregon NRCS, USGS-BRD Columbia River Research Lab., and the Oregon Department of Agriculture (ODA) Pesticide Division. **Contact:** Jeff Jenkins at jenkinsj@ace.orst.edu.

PSEP and Farm Safety programs had their most successful year

The Pesticide Safety Education Program (PSEP) involved 23 OSU faculty throughout the state in 2003, who provided 357 person-days of education and outreach. There was a 6% increase in attendance of recertification classes (9,302 trainees), with a total of 10,903 trainees in the program as a whole, 550 of whom received their training in Spanish. The PSEP program, based in IPPC, developed 15 new teaching aids, and video for 4h of core training that was shown in 20 counties. **Contact:** Myron Shenk at shenkm@science.oregonstate.edu.

The Farm Safety program reached vocational agricultural teachers in high schools through distribution of a farm accident injury CD. This CD was used by 21 teachers to provide instruction to 604 students. The CD was also used in tractor machinery safety training classes for 320 students, 225 of which obtained a certificate of training, and it was used by the Oregon Occupational Safety and Health Division, in state-wide farm safety training. **Contact:** Myron Shenk at shenkm@science.oregonstate.edu.

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4. Information Delivery, Decision Support and Outreach

News and information service completes first year

The OSU-IPM e-mail list and Oregon IPM Information Source web site (<http://oregonipm.ippc.orst.edu>), provide time-sensitive news and information to approximately 190 OSU, USDA ARS, USDA APHIS, USDA NRCS and ODA personnel associated with IPM in Oregon. One hundred and seventy e-mail messages and approximately 80 web postings were sent or posted between August 9th, 2002 and December 31st, 2003. New e-mail lists include growers associated with the IPPC, and IPM-stakeholders

including non-profit groups and commodity organizations. **Contact:** Paul Jepson at jepsonp@science.oregonstate.edu.

A new Oregon IPM Newsletter, supported by more frequent supplements has also been issued in .pdf form, with contributions from OSU, state and federal agencies and non-profit organizations. (issue 1 in January, issue 2 due in early 2004.

Contact: Paul Jepson at jepsonp@science.oregonstate.edu.

High use of on-line IPM handbooks soon after introduction

Following the lead set by the editors of the annually published, tri-state Plant Disease Control Handbook in 1998 (<http://plant-disease.ippc.orst.edu/index.cfm>), IPPC has developed on-line versions of the insect (<http://pnwpest.org/pnw/insects>) and weed management (<http://weeds.ippc.orst.edu/pnw/weeds>) handbooks, attracting nearly 15,000 unique users to the two on-line handbooks in their first year (<http://pnwpest.org/usage/>). Use of the on-line disease handbook exceeded use of the other two, with

visitors also returning to use this handbook with greater frequency. All the handbooks now have an international audience, despite their focus on the Pacific Northwest. Detailed analysis of search paths and visit patterns suggests that the handbooks are used to provide information for commercial, homeowner and structural IPM problems. The Handbook authors include many faculty from OSU, Washington State University and University of Idaho. **Contact:** Len Coop at coopl@science.oregonstate.edu.

**Comparison of use-level for on-line, IPM Handbooks
(totals exclude visits by all robots, spiders etc.)**

Handbook	Year first on-line	# Unique visitors	# Visits visiting	Visits per visitor	Countries visiting	Pages
Plant Disease	1998	23,359	32,581	6.45	51	210,434
Insect	2002	10,077	12,285	1.20	46	51,403
Weed	2001	14,344	17,573	1.22	48	64,396

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Regional PMSP coordinator based at OSU

A regional Pest Management Strategic Planning (PMSP) coordinator will be based at OSU for at least the next four years, funded by a new Western Region IPM Center grant. To date, six multi-state Pest Management Strategic Plans (PMSP's) have been completed for crops grown in Oregon and other Pacific Northwest states (mint, caneberries (raspberries, blackberries, and hybrid berries), chickpeas, dried peas and lentils (as a group), potato, cranberries and small grains), as part of a

regional collaborative program. Completed PMSP's for Pacific Northwest crops, as well as other crops in the USA, can be viewed at <http://www.pmcenters.org>. Three further PMSP's (blueberries, dry bulb onions and alfalfa seed) involving Oregon and other Pacific Northwest states, are planned for 2004. **Contact:** Joe DeFrancesco at defrancj@science.oregonstate.edu.

Nutrient and Pest Management Education Project

A new USDA National Integrated Water Quality Program Extension Education grant has been awarded to educate Technical Service Providers (TSPs) and other agricultural professionals in the Pacific Northwest. TSPs are private-sector agricultural professionals that can provide conservation assistance to producers and landowners through programs such as the Environmental Quality Incentives Program (EQIP) administered by Natural Resources Conservation

Service (NRCS). The tri-state project team will also produce workshops on emerging issues and educational resources. This cooperative project includes faculty from OSU (Crops and Soil Sciences, IPPC & Environmental and Molecular Toxicology), WSU and U. of Idaho Extension, and professionals from the NRCS and other agencies. **Contact:** Mary Staben, mary.staben@oregonstate.edu.

Records set by IPMnet NEWS

IPMnet NEWS is a joint activity between IPPC and the Consortium for International Crop Protection (CICP), sponsored by the USDA CSREES. It is dedicated to the free global dissemination of IPM information. IPMnet NEWS celebrated its 10th anniversary with the October issue (Number 118) and now reaches 3,150 individuals in 131 countries. Portions of the NEWS are seen by many others each month through being forwarded or

excerpted by AgNet (distributed to 55 countries) and the South Pacific IPM Group. The main mode of distribution is via e-mail text file, but all issues can also be found at <http://www.ipmnet.org/news.html>. IPMnet NEWS is the only known free, global, monthly electronic news distribution vehicle available to any party who requests it. **Contact:** Allan Deutsch at deutscha@science.oregonstate.edu.

Structural pest IPM initiative

A collaboration between the IPPC, the OSU Southern Oregon Experiment Station, the Oregon Pest Control Association and the University of Massachusetts IPM Program, is developing IPM Guidelines for structural pests in Oregon. The

project began with a three-day seminar set on board a cruise ship in the Pacific in November, 2003, and is being followed up by series of workshops. **Contact:** Rick Hilton at richard.hilton@oregonstate.edu.