

Oregon Department of Agriculture Plant Division Annual Report 2007





April, 2008

Oregon Department of Agriculture

Plant Division

Phone 503-986-4636

Please check your local phone book for TTY/TDD telecommunications service.

Web oregon.gov/ODA/PLANT

In compliance with the Americans with Disabilities Act, this publication will be made available in alternate formats upon request.



Contents

Section one—Administration 1

| | |
|----------------------------|---|
| Administrator's view | 1 |
| Performance measures | 2 |
| Conclusion | 3 |
| Plant Division staff | 4 |

Section two—Nursery & Christmas Tree

Program 5

| | |
|---|----|
| Goals and objectives | 5 |
| Nursery/Christmas Tree Program highlights | 5 |
| Nursery & Christmas Tree Program staff | 6 |
| Nursery Program general information | 6 |
| Nursery research assessment fund | 8 |
| Plant Importation Notification Rule | 8 |
| Phytophthora ramorum | 9 |
| United States Nursery Certification Program (USNCP) | 10 |
| Phytosanitary certificate issuance & tracking system (PCIT) | 10 |
| Christmas tree general information | 11 |
| European pine shoot moth certification | 11 |
| Hawaii agriculture officials visit Oregon | 11 |
| Christmas tree shipping season | 12 |
| Christmas tree research | 12 |
| Christmas tree marketing initiative | 12 |

Section three—Insect Pest Prevention and Management Program 13

| | |
|---|----|
| Highlights—2007 | 13 |
| Comments on retirement | 14 |
| Apple clear wing moth | 15 |
| Apple maggot | 15 |
| Asian defoliating pests | 16 |
| Cereal leaf beetle | 17 |
| Exotic wood boring insects (EWBI) | 18 |
| Grasshopper and Mormon cricket survey summary | 21 |
| Gypsy moth and Asian gypsy moth | 24 |
| Japanese beetle | 24 |
| Khapra beetle | 25 |
| Light brown apple moth | 25 |
| Pilot woody ornamental pest survey at high risk areas in Oregon | 26 |
| Miscellaneous insect identification and new records | 26 |

Section four—Noxious Weed Control

Program 27

| | |
|--|----|
| Introduction | 27 |
| 2007 Weed Program highlights | 28 |
| 2007 Noxious Weed List update | 28 |
| Noxious weed control grants | 29 |
| Summary of early detection and rapid response treatment activities | 30 |
| Purple and Iberian starthistle | 30 |
| Distaff thistle | 30 |
| Paterson's curse | 31 |
| Orange and yellow hawkweeds | 31 |
| Barbed goatgrass | 32 |
| Yellow floating heart | 32 |
| Giant hogweed | 32 |
| Kudzu | 32 |
| Plumeless thistle | 33 |
| Taurian thistle | 33 |
| Goat's rue | 33 |
| Squarrose knapweed | 33 |
| Matgrass | 34 |
| Special projects for 2007 | 34 |
| Biological control | 35 |
| Economic benefits | 36 |

Section five—Native Plant Conservation

Program 37

| | |
|---|----|
| Support to cities and state agencies | 37 |
| Phytomining: Agricultural innovation or an impending weed invasion? | 37 |
| Oregon Air National Guard | 38 |
| ODOT conservation initiative | 38 |
| Adjusting the State Endangered Species List | 39 |
| 2007 cooperative conservation and collaborative outreach | 40 |
| Watershed health projects | 41 |

Section six—Miscellaneous 42

| | |
|---|----|
| Employee training | 42 |
| Oregon Invasive Species Council | 42 |
| Ginseng | 42 |
| ODA Plant Division Web pages | 42 |
| Federal permits and compliance agreements | 42 |
| Publications | 43 |

Section one—Administration

Administrator's view

There is nothing like a close call to focus your attention on the genuinely important things. I had a close call with my health this year, and the response of the Plant Division staff has reinforced my conviction that our crew is first rate.

I've had a better than average immune system my whole life. There were four kids in my family, and to this day my mom isn't sure I ever had chicken pox and mumps, even though I was in close contact with my brothers and sister, who certainly did. I don't remember my early school attendance record, but I do remember being recognized for perfect attendance in fifth grade and I know I didn't miss a day of school due to sickness from then on through college. Mononucleosis kept me out of classes for a week in graduate school, but my otherwise perfect record remained largely intact until I had kids of my own. They had the usual earaches and colds, and my wife and I tag-teamed so that one of us was home when they needed us, but it has been rare that I've had to use sick leave for myself.

Last winter, the tables were turned. My wife and kids nursed me through a case of Cryptococcal (fungal) meningitis. I missed two and a half months of work. It took four different doctors to figure out what was wrong and how to treat it. For a frightening week my health deteriorated rapidly, and my wife took me from one doctor to the next, only to be told repeatedly, "There is nothing medically wrong with him." Fungal meningitis is quite rare. The incubation period is six to nine months and the symptoms are different from other forms of meningitis.

A sobering fact is that this disease is 100 percent fatal if not treated. Luckily, on my second visit to the hospital emergency room, a Dr. Hare agreed with my wife. There was a medical reason I couldn't eat, was incoherent, and had collapsed in her arms. "I'm admitting him now and we'll figure it out later," was the way he put it. Though a spinal tap revealed clear fluid (normally a sign of health), Dr. John Girod, an infectious disease specialist, recognized a very high level of Cryptococcal spores. That diagnosis saved my life.

After a week in the hospital, two weeks of daily outpatient intravenous treatments, and six months of pills, I was cured and nearly back to my old self. To this day I still have some hearing loss in one ear that may be a permanent souvenir. Later, during my online research I read somewhere that "survival with hearing loss is not a bad outcome." So I stopped complaining.

Why am I writing this in the introduction to a Plant Division Annual Report? Simple, The day that I returned to work, I found my desk exactly as I had left it two and a half months earlier. It was as if I'd never been gone; there were no giant piles of papers, no stacks of phone messages, and no unusual backlog of e-mails (I normally deal with about 40 messages a day excluding the inevitable spam). Tristen Berg and the other Plant Division managers, Tim Butler, Gary McAninch, and Kathleen Johnson, had divided my work and carried on the business of the division without me. Included in the workload was planning for a three-day regional meeting of about 100 plant quarantine officials I had agreed to host.

I realize that a clean desk could indicate my position is superfluous, but I assure you that I don't have trouble staying busy, nor do the other managers. With a staff of 60 FTE and a 6.5 million dollar annual budget, the Plant Division is a large organization that requires constant attention to keep everything running smoothly. In my absence, the program managers pitched in, worked together, and kept the ship on course.

The ability and willingness to improvise and team up to get things done pervades the Plant Division. Without it, our successes would be few and far between. I think you'll be impressed, as I am, with all our team members accomplish as summarized in this Plant Division Annual Report. It is a tremendously talented, productive, and sensitive group. This is a genuinely important thing and I feel lucky to have the privilege of working with them.

2008 will have its challenges though I hope serious illness isn't one of them. One important task will be to replace our Insect Pest Prevention Program Supervisor, Kathleen Johnson, who retired at the end of 2007. She has been a key leader in the division and a passionate warrior in the fight to protect Oregon from harmful invasive species for 22 years. That is another genuinely important thing.



*Dan Hilburn
Plant Division administrator*

*Section one—Administration***Performance measures**

In our last six annual reports, we've tracked several performance measures. Once again it is time to review how well we are doing at meeting our goals.

A. Our first benchmark concerns the 10 worst invasive weed and pest species threatening Oregon. These species are present in neighboring states or similar ecoregions and would have extremely serious negative impacts were they to become established in Oregon (see the 2000 Annual Report for background information). Our goal is to keep them out as long as possible. Here is a progress report for 2007:

1. Gypsy moth—Treatments applied two years ago in Eagle Creek, Clackamas County, were successful. We can now declare that population officially eradicated. Twelve gypsy moths were trapped statewide. An eradication project in Shady Cove (Jackson County) is planned for 2008. Future introductions are expected.
2. Japanese beetle—Twenty-three beetles were trapped in Oregon in 2007. Treatments were applied to host material near Portland International Airport and at a trucking facility in Swan Island. Additional delimitation and treatment activities are expected in 2008. Future introductions are expected and public opposition to insecticide-intensive eradication programs is likely to grow.
3. Asian longhorned beetle—No beetles were found in the survey.
4. Imported fire ant—No imported fire ants were found in the survey.
5. Kudzu—Three infestations were found in 2000 and 2001. All were treated. Control at the sites has been excellent; one small patch required re-treatment in 2005, none in 2006 or 2007.
6. Distaff thistle—Several dozen sites in Douglas and Jackson counties are being treated. Each year, fewer plants appear.
7. Purple starthistle—A site in Clackamas County is being intensively controlled. Each year, at this location, fewer plants are found.
8. Hydrilla—This serious aquatic weed is established in Washington and California. It is not known to occur in Oregon, but surveys have been irregular and incomplete. No organized survey was carried out in 2007.

9. Ramorum blight (aka sudden oak death)—Survey results indicate that the eradication program in Curry County has been successful in reducing the rate of spread. Forty infested acres were detected this year, the most since the infestation was discovered in 2001. Infestations at three nurseries were eradicated.
10. Unknown—We must never forget that many exotic species, not yet known in Oregon, have the potential to be harmful to our agricultural industries and natural environment. Concentrating only on the known threats would leave our state vulnerable to invasions by undetected species. Several general surveys, including those for exotic woodborers, improve our chances of finding unexpected invaders.

2007 grade: "A"

Previous years

2006: "A"-

2005: "A"-

2004: "A"-

2003: "A"-

2002: "A"-

2001: "A"-

B. Our second benchmark concerns the percentage of total exported nursery stock rejected at destination. Tracking this rate over time will measure the effectiveness of our nursery inspection and certification programs.

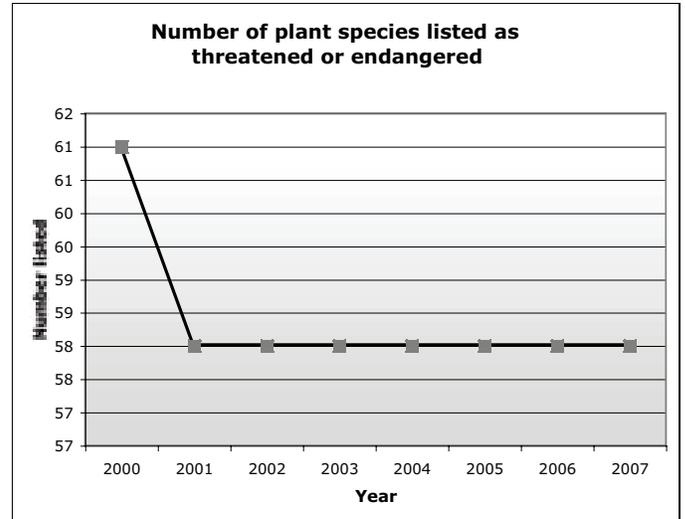
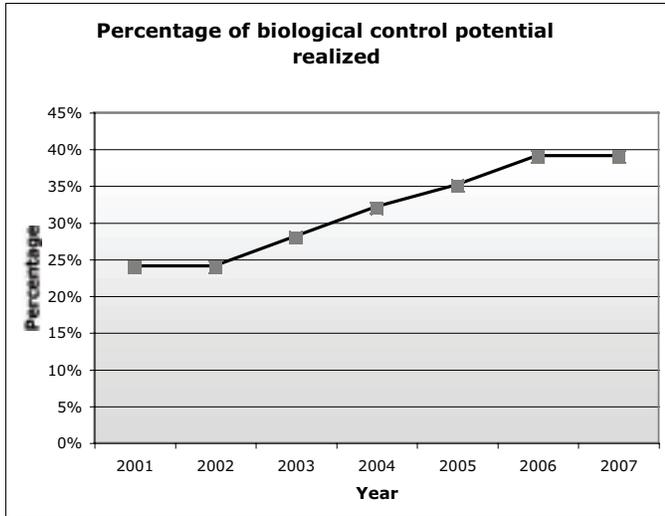
Formula: value exported nursery stock rejected / (gross nursery sales x % exported) x 100 = percent rejected.

For 2006: $\$99,600 / (\$966,000,000 \times 0.73) \times 100 = 0.014\%$.
Grade: "A"

C. Our third benchmark concerns the percentage of biological control potential realized. For each available biological control agent, a county infested with its target weed is a potential habitat. We can measure the success of our biological control program by calculating the percentage of these potential habitats where biological control agents have become well established. The better we do at introducing and redistributing biological control agents, the higher this percentage will be. Over time, our program activities should cause the percentage to rise unless the number of new target weeds and agents grows more quickly than our success at establishment and redistribution. If that happens, the percentage will fall, indicating our program is falling behind.

Formula: number of counties with each agent/weed combination well established / total number of counties with potential habitat x 100 = percentage biological control potential realized.

For 2007: $512 / 1,298 \times 100 = 39\%$ Grade: "A"



D. Our fourth benchmark concerns the number of plant species listed as threatened or endangered in Oregon. This performance measure demonstrates the effectiveness of native plant species conservation programs. It identifies those plants needing protection and those recovered enough to be removed from the list of threatened or endangered species. A declining number of threatened and endangered species indicates an effective program, provided the species are recovering and not going extinct. The elimination of all non-grant funding in 2001 severely limited the effectiveness of this program. Partial replacement funding from lottery proceeds was approved by the legislature in 2005 and the program has rebounded.

For 2007: 60 species listed as threatened or endangered
Grade: "B+"

Conclusion

Overall, ODA Plant Division is doing well. There is room for improvement, but in the current climate of flat budgets and increased risk of invasive species introduction, just maintaining our "A's and B's" report card is going to be a challenge. Thankfully, we have a smart, creative, and dedicated staff. I'm confident we'll rise to the challenge.

*Section one—Administration***Plant Division staff**

Dan Hilburn, Administrator

Office Support

Tristen Berg, Office Manager

Program Assistants

Sue Nash, Nursery/Christmas Tree

Jo Davis, Noxious Weed & IPPM

Insect Pest Prevention & Management (IPPM)

Kathleen Johnson, Supervisor

Entomologists 4

Barry Bai

Jim LaBonte

Helmuth Rogg

Entomologists 2

Diana Kimberling

Kerri Schwarz

Bennett Huffman

Josh Vlach

Richard Worth

Entomologists 1

Todd Adams

Bill Giacomazzi

Pat Mitchell

Curatorial Support Technician

Steve Valley

Emeritus—Volunteers

Alan Mudge

Rick Wescott

Native Plant Conservation

Bob Meinke, Supervisor

Conservation Biologists

Kelly Amsberry

Rebecca Currin

Melissa Carr

Noxious Weed Control Program

Tim Butler, Supervisor

Biological Control Entomologist

Eric Coombs

Projects Coordinator

Tom Forney

Integrated Weed Management Specialists

Bob Barrett

Ken French

Dave Langland

Glenn Miller

Bonnie Rasmussen

Dan Sharratt

Grant Program Analyst

Shannon Brubaker

Weed Management Technician

Beth Myers-Shenai

Nursery & Christmas Tree Program

Gary McAninch, Supervisor

Lead Horticulturist

Jan Hedberg

Horticulturists

Melissa Boschee

Christy Brown

Beverly Clark

Debbie Driesner

John Ekberg

Gary Garth

Dan Hawks

Sherree Lewis

Dennis Magnello

Karl Puls

Lisa Rehms

Eric Reusche

Scott Rose

Susan Schouten

Data Entry Specialist

Kim Lawson

Section two—Nursery & Christmas Tree Program

Goals and objectives

The Nursery & Christmas Tree Program assists the nursery and Christmas tree industries in the production, marketing, and protection of Oregon nursery stock and Christmas trees. We accomplish this by:

- assisting nurseries in providing nursery stock that is free of dangerous pests and diseases.
- providing pest and disease management information to the Christmas tree and nursery industries.
- providing inspection and certification of nursery stock and Christmas trees grown and shipped from Oregon.
- preventing the spread of injurious pests, plant diseases and noxious weeds within the state of Oregon.
- helping to prevent the introduction and spread of pests and diseases that could threaten Oregon's Christmas tree and nursery industries by inspecting incoming shipments of plant material for compliance with Oregon and US quarantines.
- making information available to all licensed Christmas tree growers and nurseries relative to importation requirements of other states and countries.



Nursery/Christmas Tree Program highlights

- Inspection and export certification services were provided to Oregon's \$125 million Christmas tree and \$966 million nursery industries.
- Oregon became the first state to participate in the United States Nursery Certification Program. This program uses a "systems approach" to inspect and certify nursery stock exported to Canada. Four Oregon nurseries are currently participating in this pilot program. Additional nurseries may be added in 2008.
- Oregon nursery stock and Christmas trees were exported to 77 foreign countries.
- Horticulturists issued 7,887 state and federal phytosanitary certificates.
- Using the USDA's new electronic certification program, we issued 1,102 federal phytosanitary certificates.
- The Nursery Research Assessment Fund collected and made available approximately \$190,000 for nursery-related research grants.
- Nursery/Christmas Tree Program personnel staffed a booth at the Far-West Show, Oregon's largest nursery trade show.
- Inspections of grape blocks at 15 nurseries were completed to ensure compliance with ODA grape certification requirements.
- European pine shoot moth traps were placed at 346 growing grounds, and 224 Christmas tree and nursery stock growers participated in this year's trapping program.
- Program horticulturists continued to survey for glassy-winged sharpshooter (GWSS), *Hoalodisca coagulata*, in nurseries shipping plant material to California under the California/Oregon Origin Inspection Program. No glassy-winged sharpshooters have been found at nurseries for the past six years.
- In order to meet the requirements of the federal *Phytophthora ramorum* order, 517 host nurseries and 735 non-host nurseries were surveyed for *P. ramorum*. Additional high-risk surveys were conducted at 206 nurseries that grow *Rhododendron* and *Camellia*.

Section two—Nursery & Christmas Tree Programs

- Three Oregon nurseries were confirmed positive for *P. ramorum*.
- Staff received notification of 2,791 shipments of nursery stock imported into the state, and 83 high-risk shipments were inspected for dangerous pests and diseases.
- Melissa Boschee, Christy Brown, and Bev Clark attended the annual meeting of the Western Chapter of the Horticultural Inspection Society in Salt Lake City, Utah.



Melissa Boschee and Bev Clark at 2007 Western Horticultural Inspection Society Meeting in Salt Lake City, Utah.

Nursery & Christmas Tree Program staff

The Nursery & Christmas Tree Program employs 14 horticulturists, one lead horticulturist, one administrative specialist, one data entry specialist, and one program manager. One horticulturist and the data entry specialist are assigned full-time to the *P. ramorum* certification program.



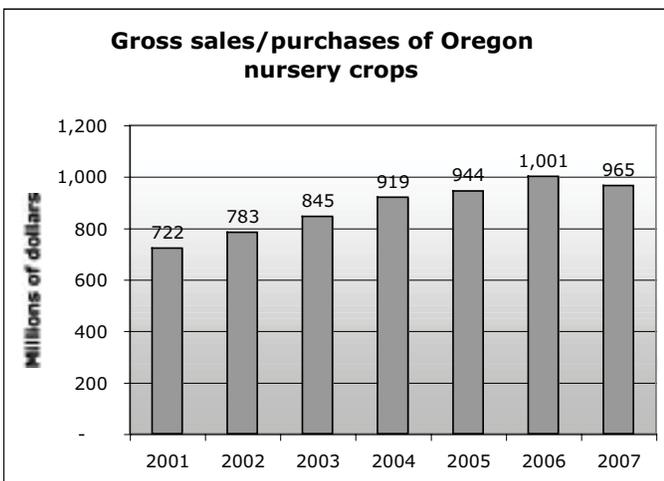
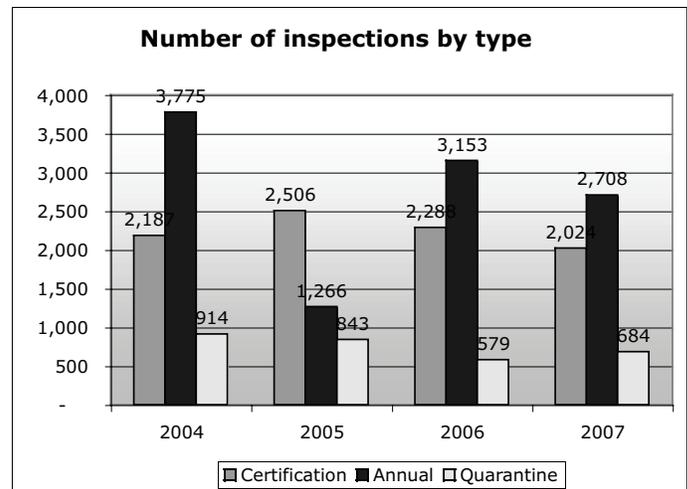
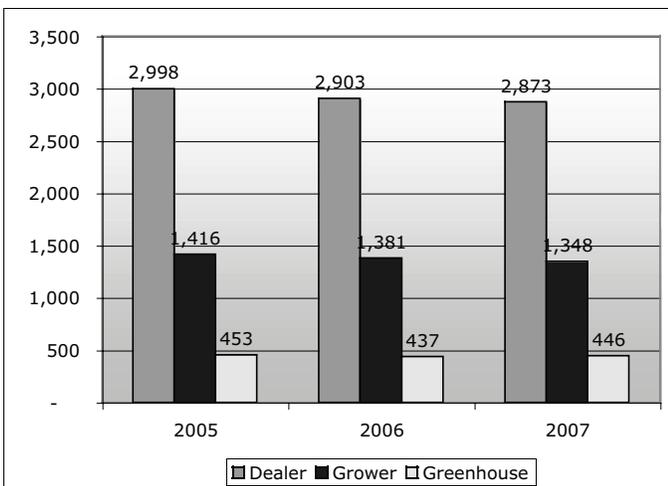
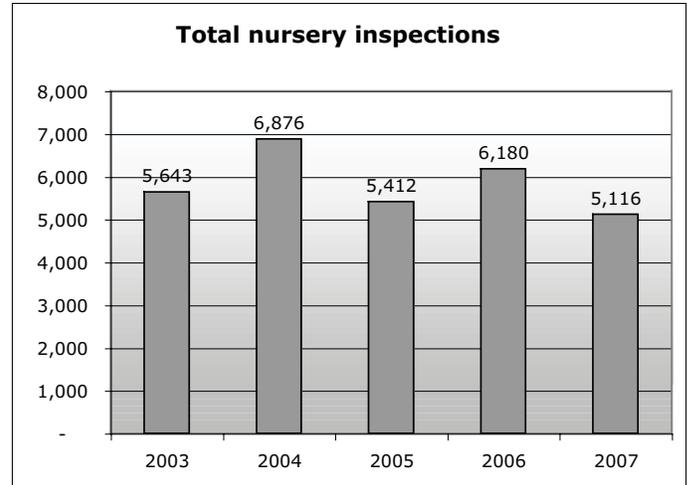
Photo includes: Melissa Boschee, Christy Brown, Bev Clark, Debbie Driesner, John Ekberg, Gary Garth, Dan Hawks, Jan Hedberg, Sherree Lewis, Dennis Magnello, Gary McAninch, Sue Nash, Karl Puls, Lisa Rehms, Eric Reusche, Scott Rose and Susan Schouten.

Nursery Program general information

The nursery industry continues to be the largest segment of Oregon agriculture. ODA's nursery inspection program is funded entirely from nursery license and certification fees. Three different nursery license types are issued depending on the nature of the nursery business. A dealer's license is required for businesses that buy and re-sell nursery stock. Dealer's licenses are purchased by garden centers, retail stores, florists and landscapers. Dealer license fees are based on the purchase price (wholesale cost) of nursery stock. Cut flowers are exempt from the licensing program. Two types of nursery grower licenses are available through the department. One is a license specific for growers of greenhouse grown herbaceous plants, and the other is a license for all other nursery crops as well as collectors of native plants. The license for both of these types of licenses is based on the wholesale value of nursery stock sold.

During the past calendar year, the Oregon Department of Agriculture (ODA) issued 2,873 dealer licenses (\$154,748,736 reported purchases); 446 licenses were issued to greenhouse growers of herbaceous plants (\$98,365,399 reported sales), and 1,348 licenses were issued to nursery stock growers and collectors of native plants (\$712,018,663 reported sales). The total value of nursery stock purchases and sales reported to the ODA in 2007 was \$965,132,798. During the 2007 calendar year, the nursery program conducted 5,116 inspections. Inspections are divided into the following general categories: routine and requested inspections, 2,708; inspections for Oregon quarantine compliance, 684; and certification inspections, 2,024.

The Nursery & Christmas Tree Program field staff issued 4,429 state and federal phytosanitary certificates for consignment of nursery stock to foreign countries. In addition, 1,434 federal phytosanitary certificates were issued for shipments of lumber destined to foreign countries.



Top ten foreign destinations for Oregon nursery stock

| Country | # of Certificates |
|--------------------|-------------------|
| Canada | 3179 |
| Mexico | 388 |
| Japan | 234 |
| United Kingdom | 103 |
| Puerto Rico | 95 |
| Germany | 62 |
| Russian Federation | 55 |
| Netherlands | 46 |
| China | 36 |
| Italy | 20 |

*Section two—Nursery & Christmas Tree Programs***2007 nursery research projects**

| Project # | Title | Investigator | Total |
|------------------|--|---------------------|--------------|
| 2007-31 | <i>Horticultural Research Institute</i> | | \$15,000 |
| 2007-07 | <i>Evaluation of peach tree borer mating disruption in Oregon Nurseries</i> | Rosetta | \$814 |
| 2007-20 | <i>Continued development of a pest prediction calendar for Oregon container nurseries.</i> | Rosetta | \$6,786 |
| 2007-06 | <i>Development of new, superior cultivars of landscape plants</i> | Pellet | \$10,000 |
| 2007-24 | <i>Managing overhead irrigation to minimize Phytophthora diseases</i> | Parke | \$30,000 |
| 2007-10 | <i>Prevention of Crown Gall and leafy gall in herbaceous perennials</i> | Putnam | \$9,283 |
| 2007-13 | <i>Eradication of pathogens from nursery crop cuttings</i> | Linderman | \$21,000 |
| 2007-15 | <i>Epidemiology of Phytophthora ramorum on Viburnum</i> | Grunwald | \$26,000 |
| 2007-14 | <i>Eradication o pathogens from nursery pond water by electrocatalytic oxidation</i> | Linderman | \$21,000 |
| 2007-09 | <i>Developing green roof plants for Oregon's nursery industry</i> | Schroll | \$7,500 |
| 2007-21 | <i>Evaluation of clay amendments for Douglas-fir bark.</i> | Owens | \$18,940 |
| 2007-18 | <i>Efficacy of fungicide drench applications for control of Phytophthora syringae in field-grown and container-grown Malus 'Spring Snow'</i> | Regan | \$13,000 |
| 2007-23 | <i>Effect of container architecture on growth and water use efficiency of course and fine rooted trees.</i> | Owens/Altland | \$19,903 |

Nursery research assessment fund

ODA received 30 nursery research grant pre-proposals for the 2007 grant year. These competitive requests were for approximately \$190,000; collected through nursery research assessment fees. The Nursery Research and Advisory Committee, in cooperation with the Oregon Association of Nurseries Research Committee, selected 12 research projects that met research priorities. The Advisory Committee also voted to provide a \$15,000 grant to the National Horticultural Research Institute. Several research projects not funded, or only partially funded by ODA grant dollars, were recommended to receive funding from independent private sources including the Oregon Association of Nurserymen, J. Frank Schmidt Memorial Trust, Tree Disease Fund and private industry. Nursery research project final reports for 2005 are now on-line at:

<http://oregon.gov/ODA/PLANT/NURSERY>.

Plant Importation Notification Rule

Prior to 2004, *Phytophthora ramorum* was found in Oregon associated with several imported nursery stock shipments. In 2004, the Oregon Department of Agriculture adopted a notification rule (OAR 603-054-0027), allowing department inspectors the opportunity to inspect shipments of high-risk nursery stock shortly after they arrive. This rule requires recipients of imported tree and shrub nursery stock from any out-of-state source to notify ODA of the shipment's arrival. Notification shall include the species of plant(s), certifications, source and the recipient's contact information.

Notification can be made by mail, e-mail, or FAX and must occur no later than two business days after its arrival. ODA contacts nurseries within one business day of receipt of the notification if the imported tree and shrub nursery stock must be held for inspection.

Notification rule summary

- During 2007 ODA received notification of 2,791 shipments of out-of-state nursery stock received by Oregon nurseries. This represents approximately 20 million plants.
- Program staff determined that 83 of the shipments were high-risk and inspections were conducted.
- Twelve official rejections were issued for quarantine violations.
- Seven shipments were either returned to the shipper or destroyed.
- The most commonly received plant genera were *Pseudotsuga*, *Abies*, *Juniperus*, *Picea* and *Thuja*.
- The top three shipping states from which we received notification were California (1,700), Washington (325) and Michigan (174).

During the same time period, we received notification of plant material from nine foreign countries including Canada (135), Holland (27) and South Africa (7).

Phytophthora ramorum

During the 2007 survey season, the *P. ramorum* program has undergone a facelift. While the majority of the program remained the same, there were several changes including staffing, sampling and the general time-line. In 2006 the survey season extended from mid-February through June while the 2007 season began in mid-February and extended until mid-October. With the extension of the time-line, we reduced the number of survey technicians needed from 17 the previous year to six for the 2007 season.

To start the season, the nursery program began by renewing all of the federal compliance agreements in January. This change was brought on by new requirements made by USDA to 1) harmonize the compliance agreement numbers with the numbers used by the Washington State Department of Agriculture and the California Department of Food and Agriculture and 2) add a growing location and county code to help locate and separate different growing locations. Currently 612 growing grounds or 479 nurseries are under compliance. These numbers are down from 2006 due to the changes in the inspection protocol that included the removal of intra-state shippers from the inspection process.

This season we also included only host nurseries that shipped interstate for inspection and sampling. Intrastate shippers of non-host plants were inspected but were not sampled for *P. ramorum*. This change in procedure allowed our program to inspect and sample all interstate host shippers once to meet federal requirements and complete two additional high-risk surveys at nurseries that ship interstate and grow rhododendrons and/or camellias. A high percentage of plants found infected with *P. ramorum* in nurseries are rhododendron or camellia.

The horticultural inspection staff, as part of the nursery's annual survey, completed non-host surveys as well as intrastate host surveys. Staff inspected 838 non-host nurseries between January and December, and 196 intrastate host shippers.

Additional changes in sampling protocol also increased the number of samples collected at each nursery. In 2006, a minimum of 40 leaf samples was collected at each growing location. In 2007 the number of leaf samples was increased to a minimum of 200 leaf samples per growing location.



2007 *P. ramorum* survey crew.

During the 2007 survey season, a total of 29,665 samples were taken from 517 nurseries (654 growing grounds) for the federal order surveys. An additional 3,080 samples were taken during the high-risk surveys; 924 intrastate host shipping inspections were completed, 516 for the federal order and 408 for the additional high-risk surveys. Results showed that 4.99 percent of the federal order survey samples and 25.10 percent of the high-risk survey samples were positive for *Phytophthora*. These *Phytophthora* positive samples included 41.97 percent of sites surveyed for the federal order and 51.84 percent for the high-risk surveys.

Of the 32,745 samples taken during 2007, five samples from three nurseries were found positive for *P. ramorum*. Two were found during the federal order survey and one was found during a high-risk survey. The disease has been eradicated at two of the nurseries. An eradication is in progress at the third nursery. In comparison to previous years there were fewer positive nurseries detected. In 2004, 2005, and 2006 we found 19, 18, and 12 positives respectively.

The nursery staff also completed 78 trace-out inspections. Trace-out inspections are conducted on host nursery stock that has been shipped from an infected nursery to another site. Fifty-five samples were taken from 29 nurseries. No positives were found from the trace-out samples.

For the 2008 survey season we do not anticipate any major changes to the certification program.

Section two—Nursery & Christmas Tree Programs

John Ekberg completing paperwork at a nursery.

United States Nursery Certification Program (USNCP)

International trade in nursery stock is considered a high-risk pathway for the spread of plant pests around the world. Traditionally, phytosanitary certification has been based on visual inspection of plants prior to shipping. Although visual inspection remains the primary tool of regulatory agencies, it does have limitations in eliminating the movement of plant pests. Some serious pests, such as *Anoplophora chinensis* (citrus longhorned beetle) and *Phytophthora ramorum* (sudden oak death), have apparently moved between countries and continents on nursery stock in spite of the current visual inspection certification process.

USNCP was developed as an alternative to the traditional visual inspection certification process. It uses a system-based approach that requires the nursery to develop and implement specific pest management practices to mitigate the risk of pest and disease. USNCP is based on IPPC Standard, *The use of Integrated Measures in a Systems Approach for Pest Risk Management* (ISPM 14) and also meets the guidelines of the

NAPPO Standard, *Integrated Pest Risk Management Measures for the Importation of Plants for Planting into NAPPO Member Countries* (RSPM 24).

USNCP is a cooperative program involving USDA, ODA and the nursery industry. USDA is the lead agency and is responsible for developing program standards. Participating nurseries are responsible for developing a pest risk mitigation plan specific to their operations using standards developed by the USDA. ODA conducts four annual audit inspections to ensure that nurseries adhere to their mitigation plan.

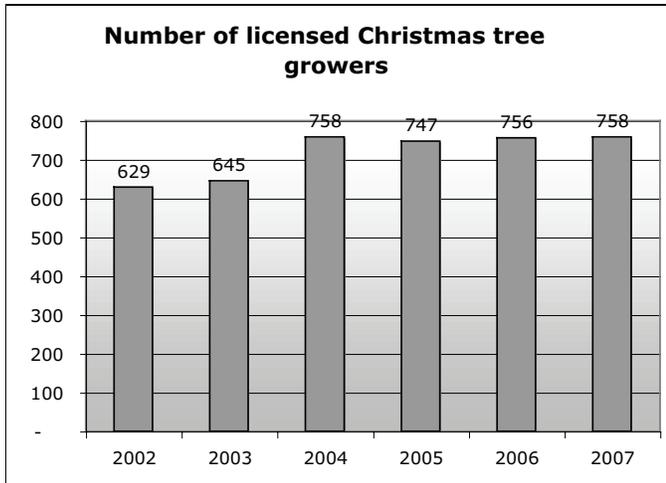
USNCP is currently a pilot program with four Oregon nurseries participating. It is anticipated four additional Oregon nurseries will be added to the program in 2008 and 2009. Under USNCP, federal phytosanitary certificates are issued without conducting a visual inspection of the nursery stock. Currently USNCP certification can only be used for plants exported to Canada. Nursery stock shipped to other countries require a visual inspection before a federal phytosanitary certificate is issued. There were no rejections of nursery stock certified under USNCP during 2007.

Phytosanitary certificate issuance & tracking system (PCIT)

PCIT is a new Web site-based system developed by USDA to track the inspection of agricultural products and certify compliance with plant health standards of importing countries. Under this system, the exporter completes and submits electronic copies of federal phytosanitary certificates to the ODA Nursery and Christmas Tree Program office in Salem. Nursery personnel in Salem review the submitted electronic document, confirm an inspection has taken place, and issue an official certificate. The ODA benefits from PCIT by no longer being responsible for “filling out” phytosanitary certificates for the exporter. Completing a federal phytosanitary certificate is a time consuming process with many opportunities for errors. A large number of lumber exporters and all USNCP nurseries now use PCIT. A total of 1,102 PCIT certificates were issued by the ODA in 2007 which represents 14 percent of all federal phytosanitary certificates issued during the year.

Christmas tree general information

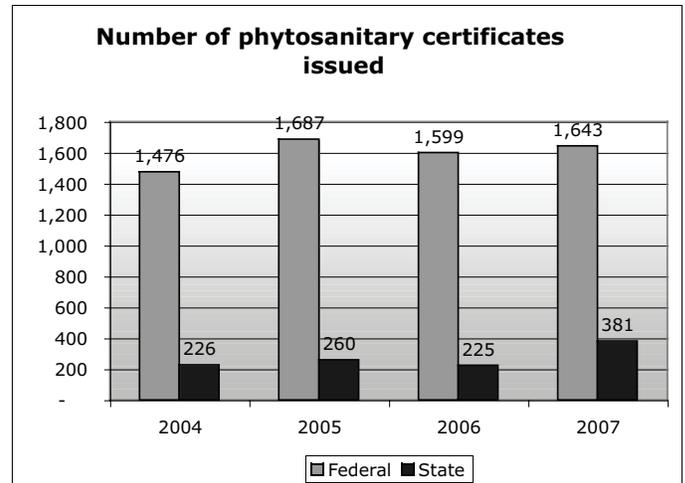
In 2007, the department issued 758 Christmas tree grower licenses. License fees were used to fund 1.5 FTE (field staff) and two 0.16 FTE (program supervisor and program assistant). Staff provide inspection services to assist growers in the production of high quality Christmas trees. Because 90 percent of Oregon's Christmas trees are sold out of state, the main activity of the program is to certify trees destined for foreign and domestic markets.



Christmas tree growers harvest approximately 8 million trees annually from about 49,000 acres. In 2007, approximately 900,000 trees were certified and shipped to foreign countries. The table below shows the top six foreign destinations for Oregon Christmas trees.

Top six foreign destinations for Oregon Christmas trees

| Country | # of Phytosanitary Certificates |
|-------------|---------------------------------|
| Mexico | 1,554 |
| Puerto Rico | 84 |
| Hong Kong | 22 |
| Guam | 13 |
| Canada | 12 |
| Japan | 9 |



European pine shoot moth certification

The Christmas tree program also provides a European pine shoot moth (EPSM) Certification Program to growers who grow and ship pine Christmas trees to California, Montana, and Hawaii. This program also addresses Mexico's EPSM phytosanitary certification requirements. Twenty-nine Christmas tree growing sites were trapped for EPSM during the year. Based on positive trapping results, three of these sites were disqualified from shipping to California or Montana during the 2007 harvest/shipping season.

Hawaii agriculture officials visit Oregon

Two officials from the Hawaii Department of Agriculture visited Oregon in November to meet with the Oregon Department of Agriculture and visit growers that regularly ship to Hawaii. They were particularly interested in observing Christmas tree handling practices prior to shipping. They spent two days in Oregon visiting four growers where they observed their harvesting, shaking and handling processes prior to shipment. The Hawaii officials indicated that the Hawaii Department of Agriculture will require all trees shipped to Hawaii be shaken beginning in 2008 to remove unwanted pests.

*Section two—Nursery & Christmas Tree Programs***Christmas tree shipping season**

A total of 1,643 federal phytosanitary certificates were issued for shipments to Mexico in 2007. Mexican authorities at selected border inspection stations, including Nuevo Laredo, conducted enhanced inspections of Christmas trees for pests and diseases. Several truckloads of Christmas trees were rejected at the border due to the presence of Douglas-fir twig weevil, *Cylindrocopturus furnissi*, and Douglas-fir needle midge, *Contarinia spp.* In addition to the border inspections, a Mexican government agency placed approximately 200,000 trees on hold at distribution centers in Mexico City until additional inspections could take place. This was highly disruptive for both shippers and the buyers of the trees. In the end, inspections revealed that 220 of the held trees were infested with either Douglas-fir needle midge or Swiss needle cast disease. Those trees were destroyed and the remaining trees released for sale.

A total of 381 Oregon phytosanitary certificates were issued for shipments of Christmas trees to Hawaii in 2007. Hawaii inspectors reported finding yellowjacket adults in four containers, as well as a tree frog and a shrew in two additional containers. No shipments were refused entry due to pest or disease finds.

Christmas tree research

No new research projects were approved for funding in 2007.

Christmas tree marketing initiative

In 2007, the ODA's Christmas Tree Advisory Committee proposed using excess Christmas tree license funds to support an industry marketing effort with the overall goal of selling more Oregon-grown Christmas trees. The industry developed a six-month public-relations plan focused on the California market to position Oregon grown Christmas trees as of the highest quality and value. To accomplish this, they hired a public relations firm to determine the reason behind the stagnant or declining use of real Christmas tree sales, understand why people purchase Christmas trees, define the target audience, create messaging that highlights the benefits of real trees, and to promote the quality and value of Northwest Christmas trees. The project was completed on December 31, 2007. Final report of activities related to the grant are to be delivered by February 28, 2008. A total of \$30,000 was allocated to this program by the ODA.



Christmas trees ready for shipping.

Section three—Insect Pest Prevention and Management Program

Introduction

The objective of the Insect Pest Prevention and Management Program (IPPM) is to protect Oregon's agriculture, horticulture, environment, and quality of life from damaging insect pests and to maintain or enhance the value of Oregon's agricultural and horticultural products. The first line of defense is regulatory, consisting of state and federal quarantines designed to exclude exotic pests from entering into Oregon and enforce control area orders to help slow their spread within Oregon. The IPPM Detection and Survey Program provides a second line of defense to protect our natural resources and markets. When an exotic pest population is detected in Oregon, eradication and control programs are promptly implemented if feasible.

Our professional personnel also perform identification services, pest risk assessments, and inspections for several state and federal permit programs. Pest surveys of our agricultural and horticultural crops often meet the entry requirements of national and international customers. Sharing information about the potential threats of invasive species to Oregon with industry groups and the public has become increasingly important in fulfilling our objective. The increasing public awareness and knowledge about exotic species in Oregon can assist our program in quickly locating emerging invasive pest populations. The survey data are documented in our IPPM databases, maps, and in the National Agricultural Pest Information System (NAPIS) database.

Highlights—2007

- Aerial applications of the biological insecticide *Bacillus thuringiensis kurstaki* (Btk) were applied to a 640-acre Asian gypsy moth (AGM, *Lymantria dispar*) eradication area in St. Helens and to a 533-acre European gypsy moth (GM, *Lymantria dispar*) eradication area in Bend. Follow-up detection surveys did not record any surviving moths.
- A total of twelve GM were caught in 2007 at one old and five new sites. Six GM were caught in one trap in Shady Cove near a site where two moths each were caught in 2005 and 2006, respectively. A live egg mass, dead adult female, larval skins, and pupal cases were found nearby on a recreational vehicle recently returned

from Pennsylvania. A 336-acre eradication program is being proposed for treatment in 2008.

- Foliar and soil treatments for Japanese beetle (JB, *Popillia japonica*) were applied within a 271-acre eradication area at Portland International Airport (PDX) and at an eradication area on Swan Island. Only a soil treatment was applied to a third eradication area in Troutdale.
- In 2007, a total of twenty-five JB were trapped statewide within delimitation areas: 12 in the PDX area, 10 at Swan Island, and three single catches in Troutdale and in an area northwest of Portland (all Multnomah County). None were caught in the Silverton delimitation area in 2007.
- In 2007, the apple maggot (AM, *Rhagoletis pomonella*) eradication program at a Pendleton apartment complex that began in 2006 continued with larvae infested soil removal, netting over soil under infested trees, insecticide treatments, and delimitation trapping. Only seven AM were trapped in 2007, compared to 135 in 2006.
- In 2007, Eastern Oregon saw an eight-fold increase in grasshopper-infested acreage. Almost 800,000 acres in 13 eastern Oregon counties had infestations of grasshoppers at economically injurious levels (more than eight grasshoppers per square yard), predominately the clearwinged grasshopper (*Camnula pellucida*). Baker, Union, and Wallowa counties accounted for almost 2/3 of the total acreage. Mormon cricket (*Anabrus simplex*) populations were recorded in over 11,500 acres in Malheur and Gilliam counties. ODA assisted USDA APHIS in the protection of 36 acres of rangeland on the Klamath Marsh National Wildlife Refuge against nymphal clearwinged grasshopper infestations, with an application of the juvenile growth inhibitor, Dimilin.
- In 2007, surveys did not detect apple leaf miner (*Stigmella melella*), pine moth (*Dendrolimus pini*), khapra beetle (*Trogoderma granarium*), light brown apple moth (*Epiphyas postvittana*), nun moth (*Lymantria monacha*), rosy gypsy moth (*Lymantria mathura*), or Siberian moth (*Dendrolimus superans sibericus*). A pilot survey of 45 major nurseries and plant retailers and five special sites (e.g., the Oregon Zoo) that import ornamental plants has not detected any new pests, although final samples and species identifications are not completed. Apple maggot and cereal leaf beetle (CLB, *Oulema melanopus*) surveys detected no expansion of their ranges in Oregon.

Section three—Insect Pest Prevention and Management

- Surveys for exotic wood boring insects did not detect apple clearwing moth (*Synanthedon myopaeformis*), Asian longhorned beetle (*Anoplophora glabripennis*), Emerald ash borer (*Agilus planipennis*), European wood wasp (*Sirex noctilio*), Mediterranean pine engraver (*Orthotomicus erosus*), or red haired bark beetle (*Hylurgus ligniperda*). With two exceptions, no other new exotic woodborers were found. A Eurasian conifer bark and cambial borer (*Cydia coniferana*), previously found in Washington, was detected in northwest Oregon and in Klamath County for the first time. A Mediterranean longhorned beetle (*Nathrius brevipennis*), known from California for decades, was found in Portland. No exotic target pest species were found at or near the railroad tie treatment plant in The Dalles, where eradication treatments were conducted in 2005 and 2006.
- Due to the high parasitism rates by CLB larval parasitoids, the acres treated with pesticides in Oregon decreased from a peak of 64,200 acres in 2004 to 19,141 acres in 2007.
- IPPM's digital imaging system and expertise were used to develop screening aids for additional wood boring beetles, including western metallic wood boring beetles (Buprestidae) and bark/ambrosia beetles (Scolytinae) of the eastern United States. The identification aids developed by the IPPM team have been integral to national surveys for exotic wood boring insects.

Comments on retirement

I have especially treasured this year, my last before retirement, working with IPPM entomologists, insect survey technicians, and many others to plan and implement six different eradication or control projects and over 30 specific survey programs, including two new surveys and several with the potential to detect additional invasive invertebrate pests. IPPM entomologists increased their experience planning and successfully implementing aerial treatments to eradicate Asian gypsy moth in St. Helens, gypsy moth in Bend, and on-the-ground soil and foliar treatments to eradicate Japanese beetle at PDX, Swan Island, and Troutdale. I feel confident they are well prepared to conduct future programs.

The considerable achievements reported here have been made possible by the combined efforts of our experienced, professional, and dedicated IPPM team. Collaboration and continued development of excellence in technical and field expertise have been essential to our successful implementation of these programs designed to protect and enhance Oregon's

natural resources, economy, and quality of life. Thanks to each one of you for all your excellent work.

A special thank you to long-time USDA Forest Service cooperator, Dave Bridgewater, who retired in January 2008. Dave's expertise, vision, dedication, good humor, collaboration, and proactive approach have made our efforts to achieve our shared goals of protecting agriculture, forests, and urban environments from invasive species more effective. Thank you also to our volunteers, others on the ODA team, the public and cooperators in Oregon, nationally and internationally. Everyone's best contributions will be needed again to successfully face the changes and challenges of 2008.

Invasive plant pests continue to threaten Oregon's agriculture, forests, environment, and quality of life for its citizens. Marshalling the resources needed to address invasive plant pests effectively will be a challenge for ODA, industry, and citizens alike. Looking to the future, I expect change to continue its rapid pace and hope that IPPM will use change as an opportunity to achieve its purpose ever more effectively.



Dr. Kathleen J. R. Johnson
Supervisor, IPPM Programs at her retirement party



Back row (left to right): Bennett Huffmann, Josh Vlach, Helmuth Rogg, Rick Westcott, Pat Mitchel.
Front row: Bill Giacomazzi, Kerri Schwarz, Richard Worth, Barry Bai, Jo Davis, Steve Valley, Jim LaBonte, Kathleen Johnson, Todd Adams, and Diana Kimberling.

Apple clear wing moth

The apple clear wing moth (ACW), *Synanthedon myopaeformis*, is native to Europe, western Asia, and North Africa. ACW was first documented from North America in 2005 from British Columbia, where it is now established. Host trees are damaged by the larvae boring beneath the bark and into the cambium near the base of the trunk. Potential hosts include a number of horticultural and agricultural trees such as apple, pear, plum, peach, apricot, quince, hawthorn, and mountain ash. By mid-May, 299 large Delta traps were placed in 13 counties, with lure changes approximately every four weeks, and picked up by the end of September. Traps placed in NW Oregon counties yielded many specimens of a native moth, the red-belted clear wing, *Synanthedon culiciformis*, which feeds on alder and birch. This moth so closely resembles ACW that the only way to reliably distinguish between these two species is by examining the genitalia. No ACW were detected in 2007.



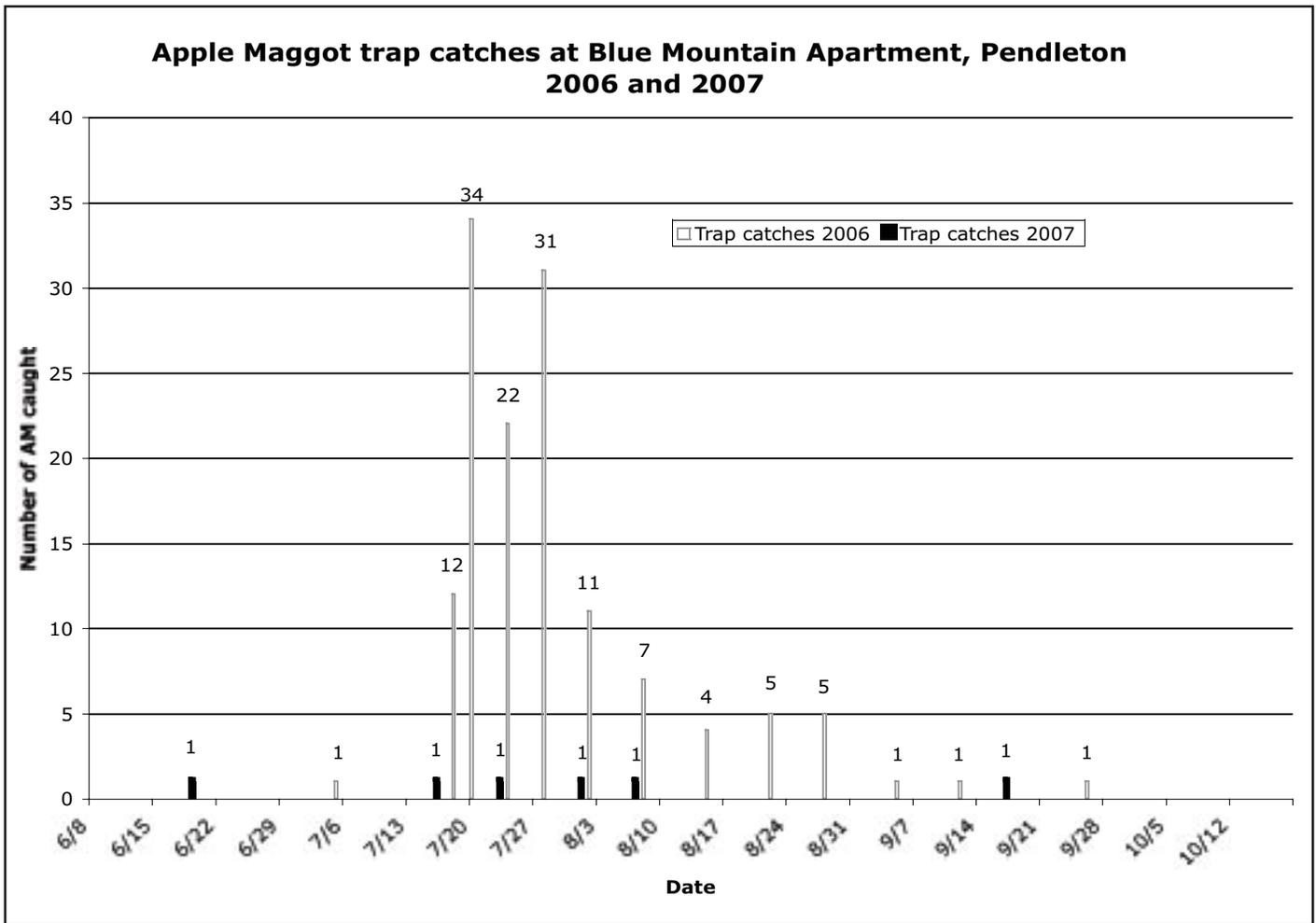
Apple clear wing moth.

Apple maggot

Apple maggot (AM), *Rhagoletis pomonella*, a fruit fly native to the eastern US, was first reported from Oregon in 1979. Since then, it has been found in all western Oregon counties, in Hood River and Wasco counties, and in the Pendleton area of Umatilla County. Apple maggot is a serious threat to apple production in areas of Oregon where it is not yet permanently established.

In 2006, IPPM began an AM eradication program at the Blue Mountain apartment complex in Pendleton that continued in 2007. In early April, IPPM staff and several volunteer OSU Master Gardeners removed soil from around the hawthorn trees most heavily infested with AM and buried the soil under several feet of dirt to kill any overwintering AM pupae. To prevent AM adults from emerging from the soil, insect-proof netting was placed on the ground along the drip line of several hawthorns with heavy AM infestations. After the first AM catch on June 19, a licensed applicator company applied five neonicotinoid (a.i., acetamiprid) and three imidacloprid treatments on the ground and foliage of the all hawthorns at the apartment complex. Fifty-six traps were placed from mid-June through mid-September in host trees at the infestation site and within a 0.5-mile radius area. Six AM flies were caught at the apartment complex between June 19 and September 17 in 2007, compared to 135 AM in 2006. Also one AM fly was trapped within the 0.5-mile buffer around the Blue Mountain apartment complex.

Section three—Insect Pest Prevention and Management



Apple maggot trap catches at Blue Mountain apartment complex, 2006 and 2007.

AM trapping was conducted to provide certification for fresh market apple sales to Washington and Arizona under the terms of those states' permits and to detect AM in apple growing areas where it is not yet known to occur. No AM were detected in the 39 traps placed in a ¼-mile area around known commercial apple orchards in the Hood River Valley. For the seventh consecutive year, no AM survey was conducted in Wasco County, where commercial apples are placed into cold storage. No AM were detected in the 10 traps placed in Milton-Freewater (Umatilla County) and in the vicinity of orchards where trapping has typically been conducted since 1980.

Asian defoliating pests

Exotic defoliating insects from Asia are one of the greatest threats to Oregon urban, rural, and wild forestlands, as well as the watersheds within those habitats. As in past years, a survey targeting several pest species of Asian origin was conducted. Traps were placed in host trees within five miles of ports and waterways at high risk for imported Asian gypsy moth, including the ports of Coos Bay and Portland and along the Columbia River waterway from Astoria to Portland. These areas are also at high risk of introduction for the following exotic defoliators:

Nun moth

Nun moth (NM), *Lymantria monacha*, is native to Europe and Asia. NM poses one of the most serious threats to western and northern US forests of spruce, pine, and Douglas fir. A total of 769 delta traps with PheroTech NM lures were placed by mid-July and removed in September. No NM were detected.

Rosy gypsy moth

The natural range of rosy gypsy moth (RGM), *Lymantria mathura*, extends from Japan to China and west to India and Pakistan. If established, RGM would threaten Oregon and Pacific Northwest forest ecosystems, forest industry sustainability, and the plant nursery trade. Additionally, there is evidence suggesting RGM could enhance the severity of gypsy moth outbreaks. A total of 256 clam shell traps with RGM lure were placed by mid-July and removed in September. No RGM were detected.

Siberian moth

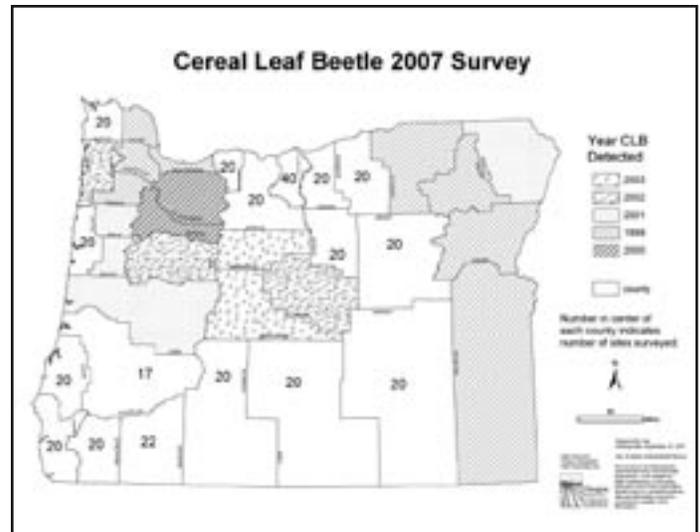
Siberian moth (SM), *Dendrolimus superans sibericus*, is the most destructive defoliator of conifer forests in northern Asia. A total of 755 milk carton traps with SM lure were placed by mid-June and removed in September. No SM were detected.

Cereal leaf beetle

Cereal leaf beetle (CLB), *Oulema melanopus*, was first identified in Michigan in 1962 as an introduced pest from Europe. It is an important pest of cereal crops in eastern and western states. First detected in Oregon in 1999, by 2006 CLB was found in 19 counties: Baker, Benton, Clackamas, Columbia, Crook, Deschutes, Jefferson, Lane, Linn, Malheur, Marion, Multnomah, Polk, Tillamook, Umatilla, Union, Wallowa, Washington, and Yamhill. Statewide surveys in 2007 did not detect CLB in additional counties.

In 2007, ODA, USDA, and OSU continued the CLB biocontrol program to monitor, release, and redistribute two parasitoid wasp species, *Anaphes flavipes*, an egg parasitoid, and *Tetrastichus julis*, a larval parasitoid, within CLB-infested counties in Oregon.

Releases of *A. flavipes* have been made from 2000-2007 at several sites in northwestern Oregon and one site in Union County. Despite some initially promising parasitism rates (5 percent to 30 percent), as of 2007 there is no evidence that *A. flavipes* is established.



Our source for *A. flavipes* since 2005 has been the Colorado Department of Agriculture's biocontrol facility in Palisade, Colorado. Unfortunately, the CLB colony collapsed during the winter of 2006-07, and our program sent 15,827 adult CLB to Colorado to help re-establish their laboratory colony.

One goal for the *T. julis* program in 2007 was to ascertain the parasitism rate CLB in central and northeastern Oregon and to collect and redistribute *T. julis*, which establishes well in release areas. CLB larvae were collected from fields and dissected for parasitism assessment. As in 2006, widespread recovery of *T. julis* was confirmed this year in both eastern and western counties, including locations where it had not been released. The peak parasitism rates per positive county were: Baker (85 percent), Crook (24 percent), Jefferson (5 percent), Linn (100 percent), Marion (100 percent), Multnomah (100 percent), Umatilla (80 percent), and Washington (68 percent). A few sites were also sampled in Deschutes and Wallowa counties, but were negative for *T. julis*.

Other activities of this program included the collection and redistribution of *T. julis* within Oregon. As in 2006, the source of *T. julis* released in Oregon was solely from material collected within Oregon. The OSU insectary fields in Benton and Union counties were discontinued in 2007 because they have high *T. julis* and low CLB populations. It has become difficult to find collectable numbers of CLB in Union County. The OSU insectary field site at the Central Oregon Agricultural Research Center in Madras, Jefferson County, was the only site that received *T. julis*. Additional adult CLBs were released there to increase CLB numbers. Larvae parasitized with *T. julis* were released in growers' fields throughout Oregon. The estimated number of *T. julis* released in each county in 2007 was: Crook, 2,581; Deschutes, 600;

Section three—Insect Pest Prevention and Management

Jefferson, 10,461; Marion, 525; Wallowa, 2,040. In 2007, *T. julis* was released in Wallowa County for the first time.

A 2007 Oregon pesticide usage survey by USDA APHIS showed a continuous decrease in acreages treated with pesticides against CLB from a peak of 64,200 acres in 2004 to 19,141 acres in 2007.

Dr. Barry Bai, IPPM's biocontrol entomologist traveled to China in May of 2007 to continue a foreign exploration project seeking natural enemies of CLB started in 2005. With the aid of Chinese entomologists, the rice leaf beetle, *Oulema oryzae*, and its egg parasitoid, *Anaphes nipponicus*, were collected from Fuzhou area, Fujian Province. After the departure of Dr. Bai, Chinese entomologists made about 14 additional collections in seven provinces, providing enough material for four shipments of the parasitoid to Washington State University's quarantine facility. About 40 adult parasitoids emerged from these materials. The wasps readily attacked CLB eggs and successfully completed one generation on CLB eggs. The potential of *A. nipponicus* as a biocontrol agent of CLB requires further testing, and additional parasitoid surveys in China are planned.

Exotic wood boring insects (EWBI)

The introduction of exotic wood boring insects continues to be a major threat to Oregon's agriculture, forests, and ecosystems. Exotic wood boring insects are a very diverse group requiring a wide array of survey methods. IPPM's 2007 surveys for EWBI reflect the individual characteristics of each target or group of targets, as indicated below.

Asian longhorned beetle

As in past years, IPPM surveys continued for Asian longhorned beetle (ALB), *Anoplophora glabripennis*. The larvae of this wood boring beetle native to China and Korea attack and kill hardwood trees. Currently, there are no effective traps for ALB. Instead, visual surveys for ALB and typical ALB damage were conducted on 13,299 host trees at 6,485 sites in 25 Oregon counties where other statewide pest detection traps (e.g., gypsy moth traps) were present. The five sites at which survey technicians reported ALB-like damage in 2007 were evaluated by ODA entomologists. No ALB infestations have been found to date in Oregon.

Emerald ash borer

Native to Asia, emerald ash borer (EAB), *Agrilus planipennis*, attacks true ashes (*Fraxinus* spp.), killing all trees that it attacks. This serious pest is established in Illinois, Indiana, Michigan, Ohio, and Ontario, Canada. It has also been found in Maryland and West Virginia.

As effective traps were not available for the 2007 survey season, 1,331 ash trees were visually surveyed for EAB damage in 19 counties at 667 sites where other statewide pest detection traps (e.g., gypsy moth traps) were present. As in prior years, no evidence of EAB was found.

Also during 2007, a pilot trap tree survey was conducted in the Portland metropolitan area. Forty *Fraxinus pennsylvanica* (minimum 2.5 inch dbh) trees donated by J. Frank Schmidt and Son of Boring, Oregon, were planted by mid-May at 13 sites, with up to four trees per site. The ash trees were girdled in order to make them attractive to EAB. Each tree was then wrapped just above the girdle with a band of purple cellophane coated with Tanglefoot® (a sticky material used to entangle crawling insects), which was checked every two weeks beginning in June and ending in mid-October. No EAB were collected on sticky bands. The only related species captured via sticky bands was a single specimen of a native species, *Agrilus politus*. At the end of the survey, each tree was dissected to check for EAB larvae in January 2008 and none were found.

Pine attacking pests

Two exotic bark beetles established in the US were targets of the pine attacking pest survey: *Orthotomicus erosus*, the Mediterranean pine engraver (MPE), established in California, and *Hylurgus ligniperda*, the red-haired bark beetle (RHBB), established in California and New York. The geographic focus for the survey was east of the crest of the Cascade Mountains, although some high-risk sites in western Oregon were also surveyed.



Mediterranean pine engraver.

For the MPE survey, 59 Lindgren funnel traps were placed and 60 traps for RHBB. Traps for these species were placed in late March and early April and maintained until the beginning of October. Where feasible, traps were “piggy-backed” to economize on labor and time. The following lures were used: for MPE, UHR alpha-pinene, methyl butenol, and ipsdienol; for RHBB, UHR alpha-pinene, and UHR ethanol. Many samples for MPE and RHBB remain to be processed. To date, 13,644 specimens of 133 species have been identified from trap samples; however, no MPE or RHBB have been recorded. For the second year in a row, an exotic cerambycid, *Nathrius brevipennis*, was trapped in Portland in an RHBB trap. This southern European species, which attacks many species of broadleaf trees and shrubs, has been established in California for many years, but has never been found in Oregon or the Pacific Northwest until 2006. It is not known to be a pest.

Two species of conifer-attacking moths, for which pines are prime hosts, were included as part of this survey: a species feeding under the bark, *Cydia coniferana*, and a defoliator, *Dendrolimus pini*.



Cydia coniferana.

Cydia coniferana (CCON) is native to Europe and Asia. Hosts include pine, spruce, and fir trees. CCON feeds in the bark and cambium layers. Although not considered a major pest in Europe, it is associated with fungal pathogens in host trees in western Asia. CCON was first found in the western US as a non-target catch in a survey conducted in western Washington in 2000. This was only the second North American record. The first record of CCON in New England in the 1950s, was not considered an established population. Since then, western Washington has had the only known established US population. Sixty-two traps were set by mid-June until mid-September in 21 counties statewide with lure changes about every four weeks. CCON was detected in Oregon in four counties: Clackamas, Multnomah, and Washington in NW

Oregon, and Klamath in south central Oregon. It was not detected in the central Oregon counties surveyed.

Dendrolimus pini (DPIN) is a destructive defoliating moth of conifer forests in northern Asia and feeds on various species of pine, spruce, larch, fir, Douglas fir, and juniper. Risk ratings for *D. pini* establishment and economic and environmental impact potential in the US are high. In 2007, 62 milk carton traps were placed in host trees in seven counties in the major regions of Oregon. Traps with DPIN lure were placed by mid-June and removed in September. No *D. pini* were trapped.

European wood wasp survey

The European wood wasp, *Sirex noctilio* (SN) attacks various conifers with pine being the prime host. Introduced from Europe, likely through solid wood packing material, SN has devastated Monterey pine plantations in Australia, New Zealand, South Africa, Brazil, and Chile. Recently, established populations were detected in the northeastern US and adjacent Canada. This pest poses a major threat to Oregon’s coniferous forests and wood product industry. In 2006, a limited survey for SN was conducted at selected high-risk sites in western Oregon.

In 2007, 119 Lindgren funnel traps baited with lures containing a mixture of beta-pinene and alpha-pinene were placed in May and June and removed by mid-October. Most traps were located at or near high-risk sites in central and eastern Oregon, and twenty high-risk sites in western Oregon. Some traps were “piggy-backed” at sites with MPE and RHBB traps.

Samples yielded seven wood wasp species representing 323 specimens. No SN were detected.

Exotic ambrosia beetle delimitation survey in The Dalles

Ambrosia beetles either native to the eastern US (i.e., *Euplatypus compositus*, *Oxoplatypus quadridentatus*, *Monarthrum fasciatum*, and *M. mali*) or exotic, but established in the southeast US (i.e., the granulate ambrosia beetle (GAB), *Xylosandrus crassiusculus*), were found at The Dalles in Lindgren funnel traps in 2004 as part of ongoing surveillance for exotic wood boring insects. The sources were raw railroad ties (primarily oak and hickory) imported from the southeastern USA. Delimitation surveys and an eradication project took were conducted in 2005. Approximately 200 traps were placed for delimitation/detection, and a pesticide was applied in April 2006 against any ambrosia beetle that may have become established. No target insects were found in 2006.

Section three—Insect Pest Prevention and Management

Although no target insects were found in 2006, concerns about the efficacy of lures used that year prompted the same level of delimitation effort in 2007. In March and April, 207 traps were placed and remained active through mid-October. All samples were processed and all wood boring insects identified. A total of 53,916 wood boring insects were trapped. No specimens of the aforementioned species or any other regional exotics of concern were found.

Early Detection and Rapid Response Program

IPPM has been part of the Early Detection and Rapid Response Program (EDRR) since its inception in 2001. IPPM's participation has consisted primarily of three components: development of protocols, surveys conducted in Oregon, and provision of taxonomic support to other states. The 2007 Oregon EDRR survey focused on sites at high risk of importation of exotic wood borers via solid-wood packing material (SWPM), a known pathway for introduction of exotic wood boring insects. Nine sites in central and northeastern Oregon were selected for survey based upon their documented importation of large volumes of SWPM. Six sites were in Bend and Redmond and three were in Ontario. Three funnel traps were placed at or in the immediate surroundings of these sites: the traps were baited with either an Ultra-high release (UHR) ethanol, a combination of UHR alpha-pinene and ethanol lures together, or a three-component lure targeting exotic species of *Ips* (cis-verbenol, ipsdienol, and methyl butenol). A total of 27 traps were placed. Samples were taken every two weeks and processed by our IPPM staff. All specimens from the following families and subfamilies of beetles (Coleoptera) were identified to species level: Buprestidae, Cerambycidae, and Scolytinae (Curculionidae). All specimens of wasps (Hymenoptera) in the families Siricidae and Anaxyelidae were identified to species level. All samples have been processed, with a total of 5,470 woodboring insects identified, including 86 species (Cerambycidae—32 species, Buprestidae—23 species, Scolytinae—24 species, Siricidae—six species, Anaxyelidae—one). The 2007 survey resulted in no new exotic wood borer detections or new positive sites. The first documented Oregon specimen of a longhorned beetle (*Pogonocherus mixtus*) predominantly found in the East, but also known from British Columbia and Washington, was found in a funnel trap at a landfill in Bend.



Pogonocherus mixtus.

EDRR—taxonomic support to other states

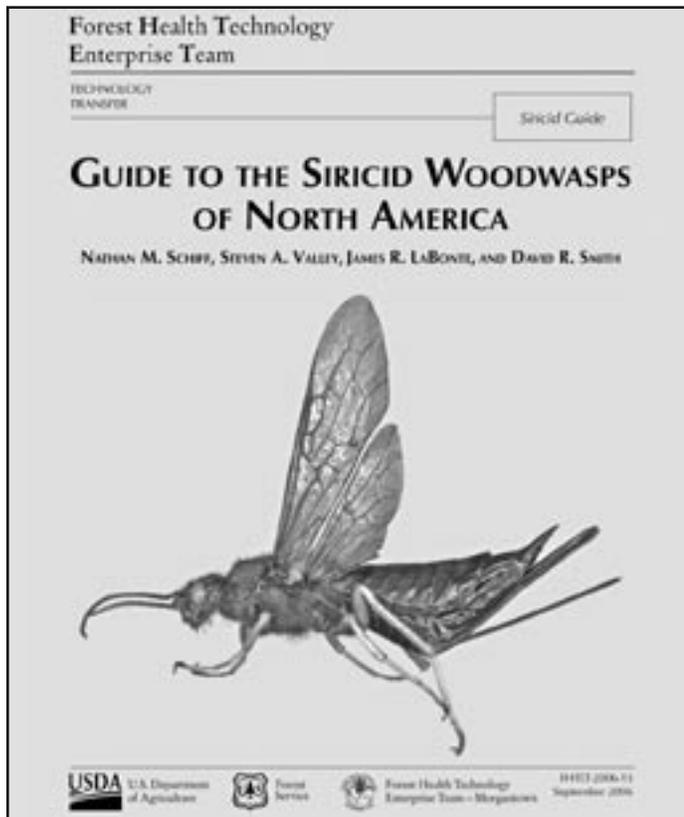
IPPM employs several methods to provide taxonomic support to other western states with limited resources. Identification of target taxa from samples acquired during EDRR surveys in other states is one method. In 2007, ODA IPPM staff identified EDRR samples from California, Colorado, Utah, and Washington. Samples remain to be processed from California while those for the other states have been completed. A number of new state records were detected during 2007: California (Scolytinae) *Hypothenemus seriatus* and *Euwallacea fornicatus*; Colorado (Cerambycidae) *Pyrotrichus vitticollis*; Utah (Scolytinae) *Hylastes opacus* and (Buprestidae) *Chrysobothris arizonica*; and Washington (Scolytinae) *Scolytus schevyrewi* and *Hylastes opacus*. Utah collections also contained two specimens of an undescribed *Buprestis* species (Buprestidae).

Limited taxonomic resources exist for identifying wood borers, especially very small wood boring beetles. As in prior years, EDRR taxonomists developed new screening aids to address this challenge, enabling nontaxonomists to recognize and screen out the most abundant non-target species. Because of regional faunal differences, screening aids were developed for each major region, including the East, the Pacific Northwest, and the West. The IPPM staff developed a digital

imaging system that was fundamental to the success of the screening process. A workshop on scolytine identification, integrated the screening aids and was held at Cornell University. Participants at this workshop were from various agencies and institutions, including state extension, USDA APHIS and Forest Service, and universities.

North American Siricidae Field Guide

The discovery of the wood boring wasp *Sirex noctilio* established in New York and Ontario (Canada) in 2005 demonstrated the extremely limited taxonomic resources available for siricid identification in North America. IPPM staff began collaboration in 2006 with USDA Forest Service entomologists on the development of a “hard copy” guide for the North American Siricidae. Using our advanced digital imaging system, IPPM staff provided high quality images for this project. The guide was published in late 2006 and available for distribution in early 2007. Copies (free!) are available through the US Forest Service Forest Health Technology Enterprise Team.



Cover of Guide to North American Siricidae.

Buprestid and Cerambycid screening aids

As part of a cooperative project with a USDA Forest Service researcher at Oregon State University to develop better survey and identification tools for exotic wood borers, IPPM staff helped design an image based screening aid for common western metallic wood boring beetles (Buprestidae).

Target species selected were based on IPPM trapping data over the last ten years. Several exotic species of concern were also included in the aid. Images acquired via IPPM’s extended depth of field imaging system were then compiled into a PowerPoint presentation developed by IPPM taxonomists. IPPM’s retired taxonomist, Rick Westcott, an internationally recognized expert on Buprestidae, gave feedback on the design of the screening aid. US Forest Service personnel to detect errors or improve design then tested the screening aid. The screening aid was then forwarded to the US Forest Service Forest Health Technology Enterprise Team where it is being adapted for placement on their Web site. A similar screening aid for western longhorned beetles (Cerambycidae) is undergoing development for 2008.

Grasshopper and Mormon cricket survey summary

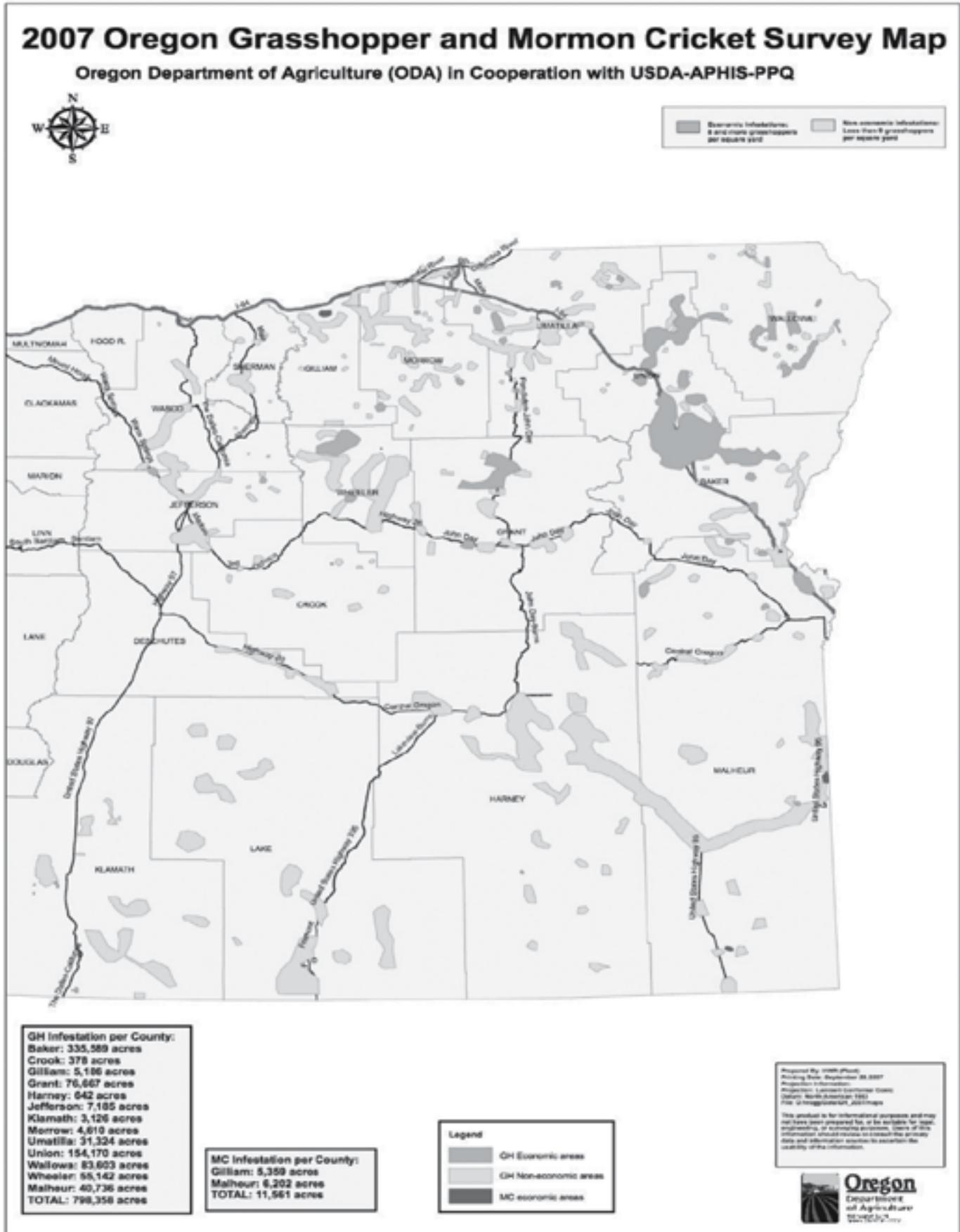
The 2007 Oregon grasshopper survey season, conducted by ODA in cooperation with USDA APHIS PPQ, started on May 15 and ended on September 6. Adult survey data recorded economic levels of grasshoppers at least eight per square yard on 798,358 acres in 13 counties of eastern Oregon. A total of 1,585 sites were visited; of these, 706 were nymphal and 870 were adult survey sites. (See Table 1).

Table 1: Oregon grasshopper survey statistics 2005-2007

| Year | 2005 | 2006 | 2007 |
|---|--------|--------|---------|
| Infested acreage | 64,751 | 97,399 | 798,358 |
| Infested counties | 9 | 14 | 13 |
| Number of sites | 859 | 1,368 | 1,585 |
| Number of sites with economic levels of grasshoppers | 115 | 100 | 298 |
| Average number grasshoppers per square yard at sites with economic infestations | 15 | 16 | 18 |

The counties with the highest grasshopper infestations were Baker, Gilliam, Grant, Jefferson, Malheur, Morrow, Umatilla, Union, Wallowa, and Wheeler. Mormon cricket infestations were also found in Gilliam and Malheur counties.

Section three—Insect Pest Prevention and Management



Section three—Insect Pest Prevention and Management



Heavy infestation of feeding grasshoppers in Baker County.

In 2007, there was a large buildup of grasshoppers in northeastern Oregon. At the beginning of June, high numbers (more than 75 grasshoppers per square yard) were reported in the Haines area. Surveys recorded economic densities, predominately of *C. pellucida*, from Elgin (Union County) and Enterprise (Wallowa County) to Baker City (Baker County). Almost 600,000 acres of mostly private rangeland were infested with up to 74 grasshoppers per square yard. Adult grasshopper survey in other areas of eastern Oregon showed economic densities in Gilliam, Grant, Jefferson, Klamath, Malheur, Morrow, Umatilla, and Wheeler counties. Most infestations were on private rangeland with levels ranging between eight and 50 grasshoppers per square yard. The dominant species in these counties included: *Melanoplus femurrubrum*, *M. sanguinipes*, *M. packardii*, *Oedaleonotus enigma* and *Aulocara elliotti*. The map that follows shows the extent of grasshopper and Mormon cricket infestations in 2007. As in recent years, grasshopper infestations in the Klamath Marsh National Wildlife Refuge, Klamath County, were relatively small. Only a few egg beds in the historically heavily infested areas had economic densities of *Camnula pellucida*, the clearwinged grasshopper. At the end of May, intensive nymphal surveys were conducted on both the Refuge and adjacent private rangeland. Following a public information meeting, 17 acres of *C. pellucida* egg beds were treated with the juvenile growth inhibitor pesticide Dimilin. A 50 percent RAATs (Reduced area-agent treatment) application by ATV protected 34 acres. Post-treatment counts showed an average of 94 percent mortality. No economic densities in the Klamath marsh and adjacent private rangeland were evident during the adult survey at the end of August.



Ground application of Dimilin using an ATV to clearwinged grasshopper egg beds at Klamath Marsh National Wildlife Refuge.

Section three—Insect Pest Prevention and Management

Following the 2006 grasshopper treatment program on more than 20,000 acres of private rangeland in the Fort Klamath area, Klamath County, no grasshopper densities at or above economic levels were recorded this year on treated areas. However, economic densities of *C. pellucida* were recorded on about 1,724 acres of non-treated areas. IPPM provided technical assistance to a private rancher in Haines (Baker County) regarding an outbreak of *Melanoplus bivittatus* and *C. pellucida* on about 176 acres of rangeland in June.

Mormon crickets, *Anabrus simplex*, were recorded in areas south of Arlington (5,359 acres), Gilliam County, for the third year in row, and also near Jordan Valley (3,935 acres), and Jackson Summit (2,267 acres) in Malheur County. Landowners in Jordan Valley conducted a treatment against Mormon cricket using Carbaryl bait. A large infestation of Mormon crickets on BLM land in nearby Owyhee County, Idaho, was successfully treated with Dimilin by APHIS personnel.

Gypsy moth and Asian gypsy moth

ODA maintains a high-level detection program for the European gypsy moth (GM), *Lymantria dispar*, and its Asian strain (Asian gypsy moth, AGM). In 2007, 16,566 GM traps (this includes traps for AGM) were placed statewide. Twelve gypsy moths were caught at one old and five new sites. All moths were submitted to the USDA Otis Pest Survey, Detection and Exclusion Laboratory, for genetic analysis and were determined to be either typical North American strain (nine moths) or with alleles present in the US in low percentages (three moths).

Single gypsy moths were detected at four new sites: Sunriver (Deschutes County), Wasco (Sherman County), Murphy (Josephine County), and near Clatskanie (Columbia County). Two gypsy moths were also caught in traps at a new site in southeast Eugene (Lane County). In addition, six adult gypsy moths were caught in one trap in Shady Cove (Jackson County) near a site where two moths each were caught in 2005 and 2006, respectively, indicating a breeding population. Gypsy moth pest alerts were distributed and information was gathered from nearby residents. IPPM staff found a live egg mass, a dead female gypsy moth, about eight pupal cases, four dead pupae, and a dozen larval skins on a travel trailer. The infested trailer was parked near the trap that caught six GM. The trailer returned from a trip to Pennsylvania and West Virginia in June 2007. Aerial applications of Btk by helicopter are proposed for about 336 acres in Shady Cove in spring 2008. Delimitation trapping will be conducted in 2008 around all 2006 and 2007 positive sites.



Gypsy moth eradication team of May 3, 2007, in Bend.

In spring 2007, an AGM eradication program covered 640-acres area in St. Helens and a GM treatment covered 533-acres in Bend. A helicopter made three applications of Btk at each site. Delimitation trapping at both sites did not catch any moths in the summer of 2007. Before populations can be declared eradicated, two additional years of negative AGM trapping and one additional year of negative GM trapping are required.

Japanese beetle

Detection and eradication of Japanese beetle (JB, *Popillia japonica*) introductions and prevention of new arrivals on aircraft and nursery stock from infested states remain a high priority for ODA. IPPM personnel have trapped 266 JB and conducted three successful JB eradication programs, all in residential areas, since 1988.

In 2007, 2,643 JB delimitation traps were placed, all in Silverton and in the Portland metro area, where JB were previously caught. Additional delimitation trapping was conducted at high risk sites, i.e., those receiving ground or air cargo from high risk areas. A few traps were placed outside of the Willamette Valley at airports receiving planes from JB infested areas. Twenty-six Japanese beetles were trapped, mostly in delimitation traps: 13 in the PDX area, 10 at Swan Island (Portland), and three single catches in Troutdale and northwest Portland (all Multnomah County). None were caught in the Silverton delimitation area.

Eradication efforts continued at the Portland International Airport (PDX) Airtrans Center because of positive trap catches in previous years. Treatment plans and outreach materials were developed in collaboration with the Oregon

Health Services, Oregon State University, National Pesticide Information Center, and technical experts at the USDA Japanese Beetle Laboratory.

Beginning in July, three sites were treated in the Portland metro area where JB were trapped in 2006: a 271-acre eradication area around Airtrans Way and Cornfoot Road where seven JB were trapped, the FedEx trucking facility on Swan Island where 28 JB were trapped, and a truck stop near the Troutdale airport where a single JB was trapped. The eradication area at PDX included three adjacent sites—Airtrans Center (associated with several air cargo carriers), the Air National Guard Base, and Broadmoor Golf Course. The PDX sites received one Merit® soil application for larvae and two Tempo® SC Ultra foliar applications for adults, while the Swan Island site received Tempo, Merit, and Arena applications. The Troutdale site received a single Arena application in late September because the single JB adult was not found until late in the season.



Foliar application of Tempo® for Japanese beetle adults at Airtrans Center at Portland International Airport.

Due to the risk of adult Japanese beetles hitchhiking on aircraft, USDA APHIS PPQ monitors JB populations at eastern US airports each year. As soon as population levels pose a risk of live beetles entering aircraft, the airport or carrier is regulated. In 2007, nine airports or air carriers in seven states were regulated by PPQ for JB. IPPM conducted 74 cargo airplane inspections and found 29 JB (1 alive, 25 dead, and three moribund). Continued cooperation, monitoring, information sharing, and commitment among state and federal regulators, industry representatives, and private consultants are critical to reducing the risk of introduction and establishment of JB in Oregon.

Khapra beetle

Khapra beetle (KhB), *Trogoderma granarium*, is one of the most important pests of stored products in the world. KhB is on the 2007 Oregon Invasive Species Council list of the “100 most dangerous invaders.” Previous surveys of 70 high-risk sites in western Oregon in 2003 and 2004, detected no KhB. A new survey in fall 2007 of 11 sites (eight in Portland, one in Salem, and three in Eugene) was conducted. Ninety-five KhB traps were placed at sites that included small ethnic food importers, carpet and rug importers, and businesses that imported goods from a number of high-risk areas in the world, e.g., parts of Africa, Asia, India and the Middle East. No KhB have been detected to date.

Light brown apple moth

Light brown apple moth (LBAM), *Epiphyas postvittana*, is a destructive apple pest but it also is considered a pest of nursery stocks, cut flowers, vineyards and many other hosts. It is native to Australia and is also found in Tasmania, New Zealand, and Hawaii. LBAM was reported for the first time in North America in February 2007 by a retired entomology professor who found suspect moths in a backyard light trap in Berkeley, California. The exotic moth has now been confirmed in 10 counties within the greater San Francisco Bay Area and in Los Angeles County, California.

Limited statewide surveys for LBAM in Oregon were conducted in 2003 and 2004 and were negative. In response to the California infestation and subsequent quarantine, 459 delta-style traps baited with LBAM pheromone lures were placed statewide in 2007. No LBAM were detected.

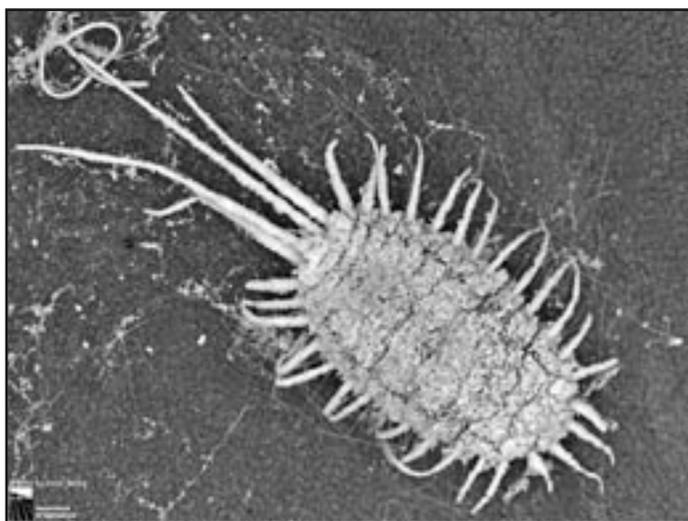


Light brown apple moth

*Section three—Insect Pest Prevention and Management***Pilot woody ornamental pest survey at high risk areas in Oregon**

Exotic woody ornamental pests (e.g., mites, scales, whiteflies, and viburnum leaf beetle, *Pyrrhalta viburni*) are a major threat to Oregon's plant nursery industry and the health of ornamental plantings and forests throughout the state. The risk of importation of such pests through nursery stock, germplasm samples, and plant collections is very high. These pests are small and cryptic, rendering them very difficult to detect through inspection and there are no effective trapping methods. Establishment of such pests would have profound regulatory consequences for Oregon's agricultural exports.

Forty-five major nurseries and plant retailers in Oregon were identified as high risk for exotic woody ornamental pest introductions, based on import records, host diversity, and volumes of plant materials received and sold. In addition, five other special high-risk sites known to import small volumes of foreign plant material over long periods were identified: the Chinese Gardens, Hoyt Arboretum, the Oregon Zoo (all in Portland), the Germplasm Repository in Corvallis, and the Oregon Garden in Silverton.



Longtailed mealybug adult.

A survey for woody ornamental pests was conducted May through December. Since no effective traps or lures for the target pests are known, the survey was performed visually. Twenty-two high risk nurseries and retailers were surveyed at least once. All of the special sites were surveyed. A total of 126 samples were collected, 35 from nurseries or retailers and 91 from the special high-risk sites. Of these, 88 had mites and Homoptera present. A target mite, the black currant gall mite, *Cecidophyopsis ribis*, was tentatively identified from initial samples of black currant. Several suspect scales and whiteflies were also collected. Although no other specific targets have

been confirmed, several noteworthy species were found. These included iris whitefly (*Aleyrodes spiraeoides*), which is clearly more widespread in Oregon than previously recognized; the crape myrtle aphid (*Tinocallis kawaluokalani*), possibly a new interception for Oregon; the citrus mealybug (*Planococcus citri*), again, a possible new interception for Oregon; and a bamboo spider mite (*Stigmaeopsis* sp.), which is causing significant damage in ornamental bamboo plantings at several locales. A psyllid native to Japan, *Cacopsylla fatsiae*, was found on outside plantings of its only known host, *Fatsia japonica*, at the Oregon Zoo. This is the first record of the psyllid species from Oregon. The Oregon Zoo survey confirmed that the infestations of Argentine ant (*Linepithema humile*) in an aviary and ghost ant (*Tapinoma melanocephalum*) in and around the primate house detected in 2006 are still present.

Miscellaneous insect identification and new records

In 2007, IPPM taxonomists identified over 1,642 insects and other invertebrates from samples or contacts via telephone, e-mail, or walk-ins. In general, these did not originate from specific IPPM programs but instead were from ODA horticultural and commodity inspection programs, other government agencies, university and museum collections, commercial sources, the general public, and professional colleagues. IPPM's retired taxonomist is also a collaborating scientist for the Systematic Entomology Lab, USDA. In a voluntary capacity, he made 1,785 identifications of samples of flatheaded wood boring beetles (Buprestidae), most of which were intercepted at US ports of entry.

IPPM taxonomists confirmed the first record of *Pityophthorus juglandis*, a twig beetle native to the western US, from Oregon. This species attacks walnut trees and may be responsible for some of the twig and branch dieback in walnuts observed in recent years.

IPPM taxonomists identified the first record of the banded elm bark beetle, *Scolytus schevyrewi*, from Washington state (Dallesport), while providing taxonomic support for the Washington State Department of Agriculture's CAPS (Cooperative Agricultural Pest Survey) exotic wood boring insect survey.

Section four—Noxious Weed Control Program

Introduction

Our mission is to protect Oregon's natural resources from the invasion and proliferation of exotic and invasive noxious weeds. The Noxious Weed Control Program:

- provides leadership and coordinate noxious weed management.
- serves as a technical resource for noxious weed issues.
- provides public outreach, education, and awareness.
- conducts weed risk assessments.
- detects new invaders and implements rapid response control projects.
- coordinates and implements biological control of weeds.
- administers the State Weed Board grant program.



*From left to right rear: Dan Sharratt, Tom Forney,
Glenn Miller, Ken French, Eric Coombs
Middle: Tim Butler, Bonnie Rasmussen, Shannon Brubaker,
Bob Barrett, Jo Davis, Dave Langland
Front: Beth Myers-Shenai*

The following is an overview of the Noxious Weed Control Program and a brief summary of major activities for 2007.

The Noxious Weed Control Program has 12 technical employees located in Salem, Canyonville, Klamath Falls, Redmond, Burns, and Union. The program also employs seasonal staff during the field season to work with noxious weed control projects statewide.

The Noxious Weed Control Program provides statewide leadership for coordination and management of state listed noxious weeds. The program focuses on early detection and rapid response projects for new invasive noxious weeds, implements biological control, implements statewide inventory and survey, provides the public and cooperators technical assistance and noxious weed education, maintains noxious weed data, and provides assistance to land managers and cooperators with integrated weed management projects. The program also supports the Oregon State Weed Board (OSWB) with administration of the OSWB Grant Program, develops statewide management objectives, maintains the State Noxious Weed List, and develops weed risk assessments.

The OSWB is a seven-member board appointed by the director of ODA. The primary mission of the OSWB is to guide statewide noxious weed control priorities and to award noxious weed control funds. Priorities are developed in part through the state Noxious Weed Control Policy and Classification System by listing and prioritizing noxious weeds.

Noxious weeds do not respect ownership or watershed boundaries and effective management requires support and participation from all affected parties. Cooperative management of noxious weeds allows for prioritizing activities and the best use of limited resources to meet the challenging needs of noxious weed management. Partnerships allow management across jurisdictional and ownership boundaries.

For these reasons we seek to increase communication, improve coordination, gain cooperation, and help implement projects among cooperators. The program encourages and supports partnerships between private landowners, state agencies, federal agencies, tribal governments, counties, weed management areas, watershed groups, conservation organizations, and other weed control entities in the state.

Section four—Noxious Weed Control

2007 Weed Program highlights

- During 2007 the program carried out 128 weed control projects. There were 624 noxious weed treatments made by staff using integrated control methods. Pretreatment and post-treatment monitoring was completed at 165 sites.
- Biological agents were released at more than 214 sites throughout the state during 2007. Over 127 biocontrol sites were monitored to determine establishment and impact. Forty-one releases of biocontrol agents were provided to cooperators.
- OSWB grants: The OSWB received 173 grant proposals and awarded 68 grants totaling \$1,045,123.
- Goat's rue (*Galega officinalis*) was traced by USDA-APHIS personnel to an organic herbal farm in Josephine County. USDA and ODA met with the grower and ordered the removal of the planting. Weed program staff followed-up and confirmed the removal operation.
- Taurian thistle (*Onopordum tauricum*) was detected for the first time in Oregon in Klamath County. The weed program will present a risk assessment to the OSWB for possible listing.
- Tansy ragwort (*Senecio jacobaea*) has resurged in parts of western Oregon. Significant infestations reoccurred in Southeast Salem in 2007. The outbreak generated calls of concern and complaints from the public. Monitoring by ODA showed that biocontrol agents were present and widespread and should control most infestations. ODA worked with Oregon State Corrections on a multi-acre infestation at the state prison farm near Salem. The weed program advised a management plan to control the ragwort infestation.
- Giant hogweed (*Heracleum mantegazzianum*) was previously monitored at known sites and received chemical or manual treatment. An additional 15 sites received a final survey and were considered free from giant hogweed after five consecutive years with no plants. A new riparian infestation was found in the Vermont Creek drainage in the City of Portland.
- Kudzu (*Pueraria lobata*) was identified for the first time in Oregon in 2000. Followup monitoring for regrowth was completed in 2007, and no regrowth was found for the second season at any of the prior Oregon kudzu sites.
- Orange hawkweed (*Hieracium aurantiacum*) and meadow hawkweed (*Hieracium pratense*) at the Lolo Pass hawkweed site, are showing significant results after five

years of treatment. The Union and Wallowa County sites also received treatment. Hawkweed was also a point of interest in Central Oregon and Harney County. Escaped ornamental plantings were found in 2005 and 2006. All known infestations were treated in 2007.

- Weed publication: a loose-leaf publication titled *Western US Invasive Plant Weed ID Guide* was developed and published by ODA in 2007. The project was sponsored by USDA-APHIS. The guide features 51 cards that provide descriptions and photos to aid in field identification.

2007 Noxious Weed List update

Noxious weeds are defined by the OSWB as exotic, non-indigenous plant species that are injurious to public health, agriculture, recreation, wildlife, public or private property. As of February 2007 there are 107 state-listed noxious weeds in Oregon.

An important function of the Noxious Weed Control Program is to detect and identify new invasive weed species before they become firmly established in Oregon. Plant risk assessments are tools that assist the weed program and OSWB in listing new noxious weeds by gathering background information. Priority activities include networking with weed professionals, identifying the highest risk species and conducting yearly surveys to detect new populations. Not all recently recognized invasive species are new to North America. Certain ornamental species that have been planted for years are now a cause for concern because of their invasive nature.

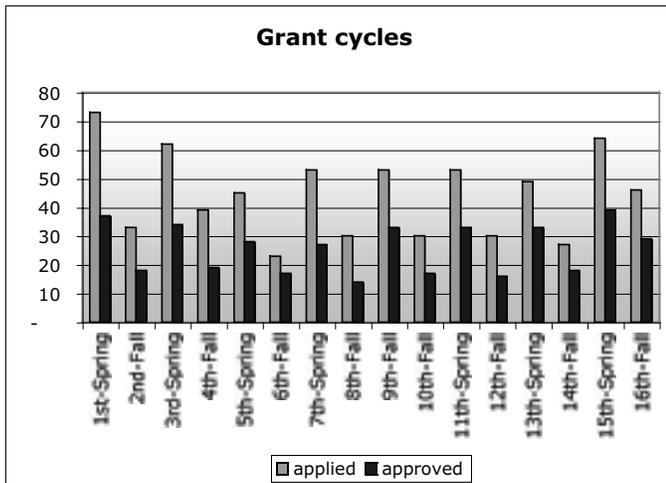
Species that have come to the forefront include English ivy, jubata grass, and butterfly bush. Discussions between ODA, OSWB, and the nursery industry are essential to find a mutually viable solution.

The following are changes made to the State Noxious Weed List in February 2007:

- Garlic mustard (*Alliaria petiolata*) was added to the "T" list
- Parrot's feather (*Myriophyllum aquaticum*) was added to the "B" list
- Perennial peavine (*Lathyrus latifolius*) was added to the "B" list

Noxious weed control grants

During the 2005-2007 biennium, OSWB received approximately \$1.3 million of Measure 66 Lottery funds for noxious weed control grants. Priority projects were those that restore, enhance, or protect fish and wildlife habitat and watershed function. ODA continues to allocate substantial amounts of time to review, administer, and monitor the OSWB noxious weed grants. The final cycle for the 2005-2007 biennium was completed in 2007 and the first cycle for the 2007-2009 biennium was awarded. In 2007, OSWB awarded 68 grants totaling \$1,045,123.



OSWB grants applied for and number approved.

During the 2007 legislative session, an additional \$1 million was allocated to the OSWB grant program, which brought the total to \$2.5 million for the 2007-2009 biennium. With the increased funding it is estimated that an additional 40 projects may receive funding in the 2007-2009 biennium. The legislature also dedicated a position to coordinate the grant program. Shannon Brubaker was hired to fill this position. Her main objective is to ensure compliance.

Projects in Clatsop, Clackamas, Columbia, Coos, Curry, Douglas, Harney, Jackson, Jefferson, Malheur, Wallowa, and Yamhill counties were monitored during the 2007 field season. Meetings with grantees and field tours were conducted. General findings indicate that grantees complied with the purpose of these funds and have been doing a thorough job at controlling noxious weeds at the majority of sites visited. In some cases minor issues were noted and ODA staff subsequently worked with the grantees to modify best management practices to help strengthen future projects. It is clear that additional funds are necessary to continue to gain momentum on the fight against noxious weeds.



Shannon Brubaker taking data at a Japanese knotweed site in Wallowa County.



Shannon Brubaker, Ken French, and cooperater review maps and photos of distaff thistle sites in Douglas County.

Section four—Noxious Weed Control

Summary of early detection and rapid response treatment activities

Early detection and rapid response (EDRR) are primary activities of the ODA program. ODA approaches EDRR by working with cooperators and developing partnerships to identify species of concern, distribute information, and implement projects. A principal activity is using a risk assessment process with the OSWB to list species on the State Noxious Weed List as “A,” “B,” or “T.” Priority listed species are incorporated into presentation and outreach activities to cooperators and the general public. Surveys for early detection are conducted; pest alerts and other information are produced and distributed to increase awareness in an effort to find existing or new infestations. Rapid response projects are implemented to eradicate or contain new invaders.

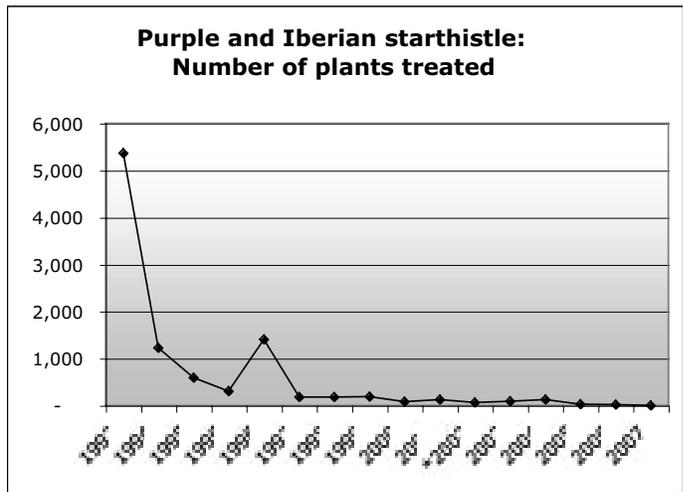
An economic analysis reveals a 33:1 benefit to cost ratio for EDRR projects. Annual treatments for the control of “A” (highest priority) and “T” (target) designated weeds have reduced the net acreage of many large weed populations. For example, annual intensive control efforts for distaff thistle (*Carthamus lanatus*), and purple starthistle (*Centaurea calcitrapa*) have achieved 99 percent control on most sites.

ODA continues to meet program goals to limit or reduce acreages of all “A” rated weeds and implement projects for “A” and “T” listed species. Statewide management plans for “T” weeds are updated each January to identify priorities for the field staff as new problems arise. Weed awareness and weed site reductions continue to be achieved through public education, eradication and containment projects, and biological control. The following are a few highlights of “A” and “T” weed projects for 2007.

Purple and Iberian starthistle

Purple and Iberian starthistle (*Centaurea calcitrapa* and *C. iberica*) are two species of limited distribution at one location in Clackamas County. Five historic sites have occurred in Oregon. The Clackamas County infestation is currently the only active location. 2007 marks the 14th year of containment since starthistle was first reported in 1993. Both species have the potential to invade 1.5 million acres in Oregon with a potential economic impact of \$12 million per year. Dormant seeds in the seed bank have been the annual source of plants. The historic infestation was estimated at two net acre over 80 gross acres. Three plants were found and treated in 2007. The last two years of treatment have shown significant drops

in plant numbers, indicating that the seed bank may be nearing depletion. Treatment: three plants over 80 acres.



Distaff thistle

In 1987 woolly distaff thistle (*Carthamus lanatus*) was discovered in Oregon. The potential danger to Oregon’s native plant communities, forage production, and watershed health was made evident by California and Australia’s experiences where huge acreages were dominated by the thistle. Control was first initiated in Oregon in 1987. Four new sites were found in 2004, two in 2005, and one in 2006. Now 37 land ownerships are known to be infested in 21 locations in Oregon. These include nineteen areas in Douglas County, one in Josephine County, and one in Curry County. Contract crews started work in June 2007 and continued until July.

EDRR activities involve the control, survey and monitoring of all known infestations. All distaff sites are intensively treated, with eradication as the goal. Each site is treated two to three times each season. Crews use herbicides, backpack sprayers and manual control. Hard seed germination in the fall is the source for the next season’s infestation. Plant counts show reductions of well over 90 percent from historic levels. It is important to continue to protect riparian areas and watershed health from further invasion by this non-native thistle. Treatment: 5.3 net acres over 3,655 gross acres.

Paterson's curse

Paterson's curse (*Echium plantagineum*) was first detected in August of 2003 in Linn County. In 2004 a second infestation was confirmed on a hillside pasture in Douglas County. Originally from western Europe and the Mediterranean region, it is widespread in temperate zones and extends into the tropics. In Australia, it has become a serious weed of grazed pastures, grain production fields and natural areas. Paterson's curse is a prolific seeder and can germinate under a broad range of environmental conditions.



Treating Paterson's curse in Douglas County.

In May 2004 a large infestation of Paterson's curse, consisting of 100 net acres/300 gross acres was identified southeast of Dillard in Douglas County. Meetings were held with landowners and neighbors. Eighty net acres of the project area were aerially sprayed in 2004, with 20 net acres of additional ground treatment. All 2005 and 2006 treatments were done by ground application, with most areas requiring four to five treatments for complete control and to prevent seed set. In 2007, ODA staff treated the heaviest 100 acres. Roseburg Forest Products supplied the herbicide for treating their lands. The sites were worked intensely with contract crews twice during the summer to treat any missed plants and eliminate seed production. The Cow Creek Band of Umpqua Indians contributed funds for some of the contract labor, while Douglas County SWCD provided a lead worker and helped with contract administration.

Delimitation surveys were completed for the project area in central Linn County in 2003 and additional surveys were conducted at the new site in Douglas County during 2004 to determine the distribution and spread of the infestation. The Linn County infestation is limited to four locations along field borders in the Lebanon area. These sites were regularly

monitored and treated in 2007. One of the Lebanon sites will be part of an ODOT construction project slated for 2008. ODA worked with ODOT to mitigate the impact of the operation. Treatment: .85 net acres treated over 33.5 gross acres

Orange and yellow hawkweeds

Orange and yellow hawkweeds (*Hieracium aurantiacum*, and *H. pratense*) are very invasive plants. Once established, hawkweeds can quickly develop into a patch that continues to expand until they cover the site with a solid mat of rosettes. Hawkweeds displace native vegetation, posing a serious threat to native plant communities. They can dominate pastures, lawn and roadsides crowding out desirable species. Hawkweeds are invading native meadows on the Mt. Hood National Forest (NF). Additional populations occur in Wallow, Union, Deschutes and Harney counties. The following are highlights of treatments at each of the project sites:

Western Oregon: Mt. Hood National Forest infestation covers over 1,000 gross acres of Lolo Pass on the Zig Zag and Hood River ranger districts. The majority of the infestation is found on Bonneville Power Administration (BPA) managed rights-of-way and additional outlier sites are found in the Mt. Hood Wilderness, county road shoulders and on private timberlands. This is a cooperative project that includes the USFS, BPA, BLM, Clackamas County, and private landowners. Treatments at the site have achieved a 90 percent reduction since the start of the project in 2003, when the estimated acreage was 150 net acres over 1,500 gross acres. In 2007, less than six net acres were treated. Monitored: 100 net acres over 1,500 gross acres, Survey: 100 gross acres. Treatment: six net acre over 1,500 gross acres.

Central Oregon: In 2004 an ODA horticulturist found orange hawkweed growing in flower beds in Sisters, Oregon. These plantings throughout Sisters were planted and maintained by local garden club members. In 2005, ODA met with the local garden club who agreed to replace all orange hawkweed plants. They informed ODA that a local nursery was selling orange hawkweed. ODA confirmed this and confiscated 157 containers of the plant labeled as "orange aster." All landowners with hawkweed infestations were contacted in 2007 and each agreed to control their orange hawkweed. A late season followup revealed good but not complete compliance. In 2008, ODA will help treat the two largest sites. The remaining appear to be achieving good control. Treatment: 0.44 net acres over 4.75 gross acres.

Section four—Noxious Weed Control

Eastern Oregon: A concerted effort among cooperators in northeast Oregon was made in 2007 to find and treat meadow hawkweed. Two OSWB grants were funded for work in outlying locations in Wallowa and Union counties. The Wallowa-Whitman NF crews and contractors treated all hawkweeds that they could find. ODA treated the bulk of the infestations on private land within the Bear Creek area and supplied herbicide through Wallowa County Weed Control for the landowners equipped to do their own treatments. ODA also assisted Tri-County CWMA and Union County with surveys and treatments in Union County.

Treatments were focused on containing more widespread infestations and controlling outlying populations. ODA worked closely with Wallowa Resources, Wallowa-Whitman NF, and Tri-County CWMA to ensure that resources were being used efficiently. All parties involved treated the outlying population on the upper Imnaha River, which posed a serious threat to the river system. Treatment: 70 net acres over 375 gross acres.

Barbed goatgrass

Barbed goatgrass (*Aegilops triuncialis*) an “A” rated weed was detected along Hwy 199 south of Cave Junction in 2003. The site was treated, but it was late and the plants were mature. Treatments in 2005 resulted in fewer plants than 2004. Bridge construction started in 2005 with major soil disturbance. In 2006, the number of plants was greatly reduced, with the only active infestation found outside the construction zone. The infestation was treated in spring 2007 and remaining plants were hand pulled and bagged. ODA staff monitored the site in late 2007 and found only dead plants from earlier treatments. No seeds were produced at the site in 2007. Treatment: 0.1 net acres treated using chemical and manual control.

Yellow floating heart

Yellow floating heart (*Nymphoides peltata*) is an ornamental aquatic plant. The first infestation was reported in 2004 in Washington County. Treatments began in 2005 and the OSWB listed the plant as an “A” rated weed. In 2007 the Washington County infestation site was treated with herbicide and covered with landscape fabric to reduce future regrowth. A second site was detected in 2005 in Lane County. The first herbicide treatment in 2006 resulted in an 85 percent reduction of the population. The remaining plants were treated in 2007. Treatment: 0.35 net acres over 3.5 gross acres.

Giant hogweed

Giant hogweed (*Heracleum mantegazzianum*) is both a state and federally listed noxious weed. Hogweed is a human health concern; the sap is highly toxic and causes contact dermatitis.

Giant hogweed was first detected in Oregon in 2001. An early detection and control project was implemented in northwestern Oregon in an effort to reduce public health risks and prevent spread.

Hogweed surveys are conducted in the field by staff and through mail and phone queries to property owners with known infestations. Fanno Creek, the first riparian infestation in the state, was surveyed and plants were treated for the fourth consecutive year. The Fanno Creek hogweed population has been reduced by 80 percent since 2005.

Seven new sites were reported to ODA through outreach efforts to the public, including a new riparian infestation in the Vermont Creek drainage in Portland. Presentations were given to over 800 people and the weed was featured in a TV news story and in local newspapers. Technical bulletins were distributed in high-risk areas to inform the public. Forty-nine previously known sites were monitored and treated chemically or manually. ODA is providing treatment at nine of those sites. An additional 15 sites received a final survey and were considered eradicated after five consecutive years with no plants. Total acreage of hogweed in the state is determined to be 0.13 net acres over 40 gross acres. Treatment: 0.13 net acres, surveyed: 5,000 gross acres, monitored: 40 gross acres.

Kudzu

In July 2000 kudzu (*Pueraria lobata*) was detected on a road bank in Clackamas County. This was the first infestation detected west of Texas. Kudzu is an aggressive climbing vine that smothers other landscaping plants. It is native to China and Japan and is a major problem in the southeastern US where an estimated seven million acres are infested. In 2000 a second site in Oregon was detected in Multnomah County. In 2001 a third site was detected in Multnomah County. All sites were initially treated with a selective herbicide, which is very effective for kudzu control. Survey and detection efforts were conducted throughout Western Oregon during 2007 and no new sites were detected. All three known sites were monitored throughout the 2007 season, and no new plants or regrowth were observed.

Plumeless thistle

Historically, Grant was the only Oregon county infested with plumeless thistle (*Carduus acanthoides*). In 2007 a second population was confirmed in Klamath County south of Klamath Falls. Infestation was found by the county weed supervisor.

The Grant County infestation resurged in 2003. Following this episode, ODA became more directly involved in treating the site. Grant County Weed Control and ODA regained the upper hand in 2004. Fifty acres were treated on six ownerships. Grant County made the spring treatment and ODA assisted the county in followup treatments. The 2004 treatment was very effective, with rosette numbers markedly reduced. Landowner interest and cooperation is good and many of the new sites are reported by local ranchers.

In 2007, Grant County Weed Control surveyed and treated the area without the assistance of ODA. Plumeless thistle populations appear to be declining. Thistle treatments were combined with Mediterranean sage treatments at three of the ownerships with good results. Treatment: Grant County, 50 net acres over 1,200 gross acres; Klamath County one net acre over five gross acres.



Taurian thistle

Taurian thistle (*Onopordum tauricum*) was discovered in Oregon for the first time in 2007 by a county weed supervisor. ODA helped Klamath County to determine the extent of the infestation and treat this newly discovered noxious weed. No other sites, outside the original, were found. It appears the thistle has been present for two to three years. There are two historical sites in Modoc County, California and additional scattered sites in the Sierra Mountains. The only other known infestations are in Pueblo County, Colorado. Treatment: 250 plants over four gross acres.

Goat's rue

Goat's rue (*Galega officinalis*) dried leaves were found by USDA-AHPIS-PPQ inspectors in a commercial outlet and were traced to an organic herbal operation in Josephine County. Goat's rue is a federal listed noxious weed and is an "A" rated listed weed in Oregon. USDA-APHIS personnel contacted ODA about the goat's rue planting. USDA and ODA met with the grower and requested the removal of the planting. ODA personnel followed up on the removal operation.

Squarrose knapweed

Squarrose knapweed (*Centaurea virgata*) a state listed "A" weed. To date, three sites have active infestations, two in eastern Oregon and one in central Oregon. The largest site is near Long Creek in Grant County. It occurs in good quality bunchgrass range covering three private ranches. This site has been under intensive treatment since the late 1980s to contain the spread and reduce the infestation. There have been no plants found since 2003. Grant County Weed Supervisor Tom Rush, supervised the summer survey and treatment. ODA will continue to monitor this squarrose knapweed infestation in the future.

The eastern Oregon squarrose knapweed project in Malheur County includes comprehensive surveys and treatments at both of the infestations. The Malheur County location continues to be clean. A number of people monitor this site annually.

A second active site is in Jefferson County. In 2003, Floyd Paye of Jefferson County Weed Control Program noticed plants in the area that looked different from the diffuse knapweed, *Centaurea diffusa*. ODA confirmed that the plants were not diffuse knapweed and that they were most likely squarrose knapweed. That was later confirmed by OSU herbarium

Section four—Noxious Weed Control

staff. The area was surveyed to delimit the infestation. The original infestation grew only slightly. In 2004 Jefferson County used OSWB grant funding to control and complete an extensive survey of area. A survey of the railroad tracks was completed during flowering. Burlington Northern provided the equipment and manpower to complete the survey of the rails from South Junction to the north and to Terrebonne in the south. No plants were found along the railroad tracks. Ten plants were eradicated in 2004 by Jefferson County and ODA. In 2005 ODA assumed control of squarrose knapweed. The landowner has provided access to the site through his farm and has given permission to treat the plants on his property. No plants were found in 2007.

Matgrass

Matgrass (*Nardus stricta*) is a bunch type, low growing perennial grass that is not palatable to livestock for grazing. Matgrass seedlings are very hard to see among other pasture grasses. Their crowns will range from the size of a dime to the size of a quarter. Seeds are thrown several inches from the mature seed head. This creates a colony that is roughly circular in shape, and from one to three feet in diameter, in just one or two years.

Matgrass was first noticed in a peat pasture about 35 years ago by a landowner near Fort Klamath. The infestation is located approximately one mile west of Fort Klamath, Oregon, and is the only known matgrass infestation in the state. The farming practices of dragging the pastures to break up clumps of cattle manure in the early spring and irrigation flooding have spread the matgrass over approximately 180 acres of pasture.

Control efforts of the infestation begun about 33 years ago by the landowner. About 20 years ago, Klamath County Noxious Weed Control personnel began to help the landowner treat the site. During the last 14 years, ODA joined the effort to contain the infestation. Eradication is unlikely unless the grasses in the entire pasture area are eliminated to destroy the seed bank. At this time, the landowner is unlikely to take the pasture out of grass production. Several colonies were found in a neighboring field for the first time in 2007. The infestation level in the pasture has declined since the owner discontinued dragging the field and has delayed flood irrigation until after treatment. Treatment: 1.95 net acres over 200 gross acres.

Special projects for 2007

The Noxious Weed Control Program works on a variety of special projects and with a host of public and private cooperators to implement noxious weed control projects throughout the state. The following are a few of the projects completed in 2007:

WeedMapper project

WeedMapper (www.weedmapper.org) is a Web site that provides distribution maps and information on identification and impacts of state listed weeds. It also provides a report form to allow cooperators and land managers to notify ODA of any new weed sightings. Weeds are mapped at the state and county levels. This is a joint project between ODA and OSU with support from BLM, and USFS.

Weed maps are compiled from data provided by ODA, USFS, BLM, county weed programs, SWCDs, cities, non-profit groups, and online submissions. Data contributed to WeedMapper continued to increase in 2007, 68 agencies and property managers contributed. Extensive effort was put into organizing and consolidating data this year to make the transition from raw data to published maps smoother and quicker.

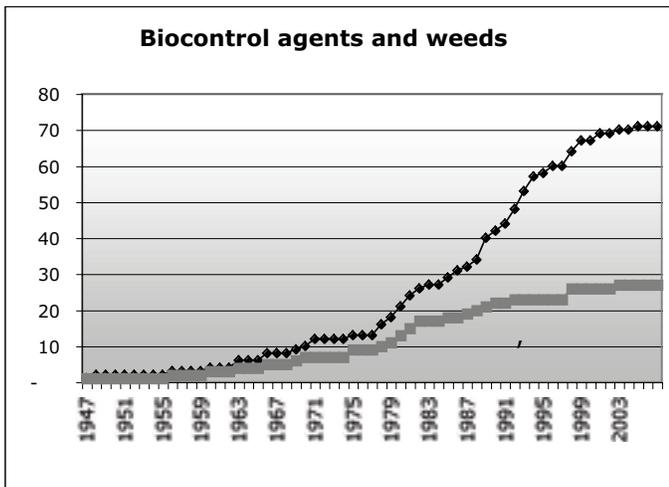
WeedMapper is a valuable tool in EDRR efforts. Shared data turned up a new record of garlic mustard (a "T" listed weed) in Jackson County and a citizen used the weed siting form to report a new location of giant hogweed. The Web site also prompts users to call the Invasive Species Hotline to report high-priority weeds.

Reports from users continue to be overwhelmingly positive. The Web site is being used by a wide range of land managers from federal, state and local agencies to assess conditions and prioritize projects. The site is also used by property owners who are looking for information about weed identification and distribution and students researching weed information for projects and reports.

Progress was also made on securing a data-collection device that will allow users to collect and share field survey data easily. The TDS Recon, a sturdy PDA, was tested in 2007 and will be used by ODA in 2008. If field tests of the PDA and WeedMapper Data Collection software goes well the program will be made available to other agencies to collect WeedMapper data.

Biological control

Since 1947, 71 species of classical biological control agents have been introduced against 27 species of noxious weeds in Oregon. Several of these biocontrol agents have become reassociated with six additional species of weeds for which they were not originally introduced. ODA manages 112 biocontrol projects, the most of any state in the US. The ODA biocontrol database contains more than 11,700 records of biocontrol agent releases. Several biocontrol projects have been successful in controlling targeted weeds, including tansy ragwort, St. Johnswort, musk thistle, Mediterranean sage, purple loosestrife, yellow starthistle, diffuse knapweed, and Dalmatian toadflax. ODA strives to adhere to the International Code of Best Practices for classical biological control of weeds in order to better implement a safer and more effective program.



Cumulative number of weeds targeted (gray) and cumulative number of classical biological control agents (black) released in Oregon by year.

Biological agents were released at more than 264 sites in Oregon during 2007, treating over 3,000 acres. Over 144 biocontrol sites were monitored to determine establishment and impact of biocontrol agents. In April 2007, Staff Entomologist Eric Coombs attended the XII International Symposium Biological Control of Weeds in La Grande Motte, France. He presented two papers and co-authored two others.

The USDA APHIS-PPQ biocontrol program, under the direction of Gary Brown, remains an important partner in implementing biocontrol in Oregon. ODA and APHIS provide surplus biocontrol agents to many local agencies and other states. The ODA program continues its work on cooperative research projects with Drs. Peter McEvoy and Jeff Miller and their staff at OSU. The ODA Biocontrol Program

also serves as the state level biological control of weeds data center for the US.

Major projects

Dalmatian toadflax: The toadflax stem weevil *Mecinus janthinus* has been recovered in many locations in central and eastern Oregon and provides excellent control. A cooperative project with county weed programs, ODA, and BLM released weevils along 30 miles of the John Day River and other areas in the river basin.

Field bindweed: The field bindweed gall mite *Aceria malherbae* was found established in Oregon for the first time. A healthy population of mites was recovered in the Tygh Valley area in Wasco County, where the mite reduced the biomass of field bindweed by more than 80 percent. Redistribution efforts were made at the local site in order to provide a larger nursery habitat that could be used for redistribution to other parts of the state in 2008.

Garlic mustard: In 2006 ODA began pre-release monitoring studies in conjunction with Dr. Bernd Blossey, Cornell University, NY. Host specificity testing is currently underway and releases could be made in the next year or two.

Gorse: In 2007 petitions were submitted to import and test the gorse shoot moth *Agonopterix ulicitella* and the gorse thrips *Sericothrips staphylinus* at the OSU Quarantine Facility. Field sampling near Hilo, HI was conducted in 2007. Collection sites for both agents were established for host specificity tests planned in 2008. The project is being coordinated by Dr. Fritzi Grevstad, funded by USFS. ODA is a major partner.

Knotweeds: Prerelease studies on Japanese knotweed and its allies were conducted at several sites in Oregon in cooperation with ODA. The quarantine facility at OSU, Forestry Sciences, is being used to conduct host specificity studies for several prospective biocontrol agents (*Ostrinia*, *Galerucida*). The project is being coordinated by Dr. Fritzi Grevstad (University of Washington) and primarily funded by USFS. ODA is raising host test plants.

Meadow knapweed: Redistribution of the knapweed seedhead weevil *Larinus obtusus* is nearly completed in western Oregon. Studies to determine efficacy will be conducted in the coming years, and releases will be made as needed.

Mediterranean sage: An ongoing cooperative study with Dr. Jeff Miller, OSU, Department of Range Science, is studying the regional long-term impacts of the root/crown weevil *Phrydiuchus tau* on Mediterranean sage. Most ODA release sites from 1970-1983 have shown significant control

Section four—Noxious Weed Control

and an \$800,000 per year benefit, especially at sites now dominated by perennial grasses and shrubs. Results from long-term regional studies were submitted for publication in 2007. ODA will study a major outbreak of Mediterranean sage as part of a team with cooperators. The outbreak in the Summer Lake area resulted from a fire several years ago.

Purple loosestrife: The *Galerucella* leaf beetles have reduced numerous infestations throughout Oregon by more than 90 percent. A cooperative project with APHIS; Dr. Ralph Garono, Earth Designs Inc.; and Dr. Peter McEvoy, OSU will monitor and redistribute the agents throughout the lower tidal zones of the Columbia River area.

The Army Corps of Engineers provided funding for a mass-rearing project, which supplied releases of the root weevil *Hylobius transversovittatus* for sites along the Columbia River. Many stands are of loosestrife are in decline following severe defoliation by the leaf beetles.

Rush skeletonweed: The root-boring moth *Bradynoba gilveolella* was released in the Port of Portland area within the BPA power line right-of-way. Additional population sources from Europe are being sought that are more adapted to southwest Oregon conditions.

Russian thistle: Russian thistle seeds were collected at several sites in Oregon. USDA-ARS will test the vulnerability of Oregon Russian thistles to various pathogens from Europe, which may be potential biocontrol agents.

Salt cedar: The leaf beetle *Diorhabda elongata* has been difficult to establish in Oregon. In 2007, Gary Brown, USDA-APHIS, gave ODA approximately 50,000 adult beetles from Lovelock, Nevada. The beetles were released at several sites in Malheur County. By August, the beetles had defoliated a strip 30 meters long at the Haystack Butte site, the first site to show a promise of possible establishment.

Scotch broom: The Scotch broom gall mite, *Aceria genistae*, was discovered in 2005 near Portland, Oregon. This was the first finding of this adventive natural enemy of Scotch broom in the US. ODA is cooperating with Jennifer Andreas, WSU, to conduct host specificity studies to determine if the mite is safe enough for redistribution into new areas. Also, the Scotch broom seed beetle *Bruchidius villosus* has been widely redistributed for the first time, and should continue for the next several years.

Tansy ragwort: In 2005 numerous sites in the Willamette Valley experienced a resurgence of tansy ragwort. Biocontrol agents were found at all of the recalcitrant infestations. No livestock deaths associated with the 2005-2007 outbreaks have been reported to ODA. A cooperative study with the University of Idaho is being conducted to test the Swiss

biotype of the flea beetle at various elevations in Oregon and Idaho. An open release was made in eastern Oregon at the Buckhorn infestation.

Teasel: Preliminary investigations are being conducted on two species of teasel to survey for natural enemies. The investigations are conducted in cooperation with USDA-ARS EBCL.

Economic benefits

Classical biological control of weeds has a good safety record, but a somewhat scanty track record of documented economic benefits. Most of funding for biocontrol projects is used during the foreign exploration host specificity testing in the introductory phase, and little is appropriated for long-term efficacy studies. On successful long-term projects, benefits can occur as steady stream returns, i.e., \$5 million per year for the ragwort project in Oregon, where annual agency expenditures on this weed is now less than \$20,000 per year.

Where feasible, it is economically advantageous to implement biocontrol in order to reduce annual losses. By actively redistributing ragwort biocontrol agents, ODA accomplished a successful regional project five to 10 years sooner than by the natural spread of the insects, averting \$25-\$50 million in losses to agriculture.

A partially successful biocontrol project can provide a positive benefit-cost ratio, even though the degree of weed control may be less than desired. If biocontrol agents reduced the top 12 weeds by 30 percent, annual losses could decrease by \$20 million. A 10 percent reduction of Scotch broom alone by biocontrol agents would yield \$1.5 million in annual benefits.

Section five—Native Plant Conservation Program

Nearly 4,000 native plant species are known to occur in Oregon, with an estimated 2 percent of these in danger of extinction in the foreseeable future. Under ORS 564, the Native Plant Conservation Program (NPCP) at ODA pursues the conservation and protection of naturally occurring plant species on Oregon public lands, with the goals of improving habitat and reducing species losses. Developed in 1987, the NPCP focuses on (1) providing support to state and local agencies (and the general public) in dealing with native plant protection issues, as required by federal and state law; (2) developing conservation and management plans for state-protected species; (3) assessing research and commercial activities associated with listed species on state lands; and (4) reviewing and commenting on federal regulations regarding listing and conservation decisions for Oregon plants under the Endangered Species Act (ESA).

Support to cities and state agencies

One of the primary issues currently facing state and municipal agencies is reconciling the conservation of endangered species with the day-to-day realities of managing and utilizing public lands, particularly in settings where species conservation has not traditionally been a component of local planning. As additional plants and animals have been listed under the Endangered Species Act (ESA), more areas are grappling with the requirements of federal environmental regulations pertaining to these species. Most smaller cities and counties lack the resources and expertise to effectively address this issue, and integrating the protection of listed species with community planning has been a serious challenge.

In 2007, the NPCP began looking for ways to improve endangered plant species management at the local level in Oregon. Rather than relying on regulatory enforcement, the goal has been to develop creative solutions that result in proactive protective measures compatible with local planning goals. Our first efforts to provide this type of outreach were to the cities of Sutherlin (Douglas County) and Jacksonville (Jackson County), which both have endangered plant populations in several areas on city property. Through partnerships between ODA, the US Fish and Wildlife Service, and the two cities, the NPCP has helped develop management guides and cooperative agreements that foster local conservation efforts, while concurrently facilitating wetland management, recreation planning, and noxious weed control projects in sensitive habitats without fear of repercussion under the federal ESA.

Section six—Native Plant Conservation Program

Phytomining: Agricultural innovation or an impending weed invasion?

Serpentine soils world-wide are known for their natural concentrations of heavy metals, including nickel and manganese. Areas with large expanses of serpentine include regions as disparate as Cuba, New Caledonia, Albania, and southwest Oregon. The unusual properties of these soils are well known for supporting distinctive plant assemblages that are able to tolerate the harsh conditions. While fewer native plants occur on serpentine than on neighboring non-serpentine substrates, the species that do occur here are often unique and sometimes found nowhere else. Due to their chemical properties, these soils are also relatively devoid of noxious and other non-native weed infestations, making them one of the few relatively weed-free habitats in the state.

Mine tailings are often saturated with heavy metals residue, and one means for addressing this is by phytoremediation, where plant species that tolerate nickel and other metals are purposely grown on tailings. Such species are considered hypoaccumulators in that they concentrate heavy metal pollutants in their tissues as they develop, thereby depolluting contaminated soils. Phytomining takes the process one step further, where the hypoaccumulators are actually cultivated on mining waste sites with the goal of extracting the metals later from baled plant material (sometimes referred to as “bio-ore”) through a high-temperature smelting process.



*ODA botanist Kelly Amsberry (second from left) meets with Forest Service staff near unprocessed yellowtuft (*Alyssum murale*) bales in the Illinois valley.*

Section six—Native Plant Conservation Program

In recent months, ODA has become aware of a trial effort to use plants to “mine” the natural serpentine in the Illinois Valley of Josephine County. A small Texas-based company has contracted with local landowners and the county to plant hundreds of acres of yellowtuft (*Alyssum murale*), a non-native mustard species from southern Europe, to determine the commercial feasibility of using this species to extract nickel from the soil. Over the last year, visits by ODA have suggested that the operation may be having profitability issues. Efforts to contact the company have failed, and the fields (now full of residual *Alyssum* plants and seeds) have either been abandoned or are not being adequately monitored.

A task force including ODA, BLM, Forest Service, and local citizens has been evaluating the potential for *Alyssum* to spread outside the initial areas of cultivation and move onto undisturbed soils. If this happens it will represent a serious new pest species for Oregon, and one which is pre-adapted to serpentine, a habitat that has largely resisted weed invasions to date. Several weeks of survey work were completed by the NPCP and co-operators in 2007, and greenhouse experiments are underway to evaluate the germinability of *Alyssum* seed and the potential reproductive capacity of the species in the southwest Oregon environment. Assessments of the issue will continue in 2008.

Oregon Air National Guard

Surveys by an airport contractor in 2006 uncovered a small population of Applegate’s milkvetch, a federally-listed endangered species, growing between tarmac areas near runways at Kingsley Field in Klamath Falls. In addition to private and commercial aviation, the airport is home to the 173rd Fighter Wing of the Oregon Air National Guard, and is an important base for training air-to-air combat pilots and flight surgeons. The areas where the protected plants occur are depressions that collect water in the winter, attracting increasing numbers of waterfowl that are a hazard to aircraft operations. Reducing the standing water is imperative to maintaining flight safety.

NPCP staff wrote the original federal recovery plan for Applegate’s milkvetch several years ago, and as the state experts on the species, were called in during 2007 to help work out a plan to try and decrease winter inundation of the sites, while still preserving as much of the milkvetch habitat as possible. Several weeks of meetings and site surveys ensued, and mitigation plans are now being drawn up to allow enough drainage of the area to reduce its attractiveness to ducks and geese. Monitoring of the milkvetch populations (to gauge their response to a lowered water table), collection

of seeds for possible establishment of the species at another nearby locality, and surveys in the Klamath Valley for suitable locations that may support off-site mitigation work have been initiated, and will be continued in 2008.



Applegate’s milkvetch (Astragalus applegatei) in Klamath County, recently located along airport runways at Kingsley Field in Klamath Falls.

ODOT conservation initiative

The Oregon Department of Transportation (ODOT) actively manages more populations of endangered plant and animal species than any other state agency. They are also charged with maintaining and promoting the safety and integrity of our highway infrastructure. Highway repairs and maintenance can at times directly conflict with state and federal laws dealing with the protection and conservation of endangered species.

In late 2007, ODA began working to develop an important new strategy that will guarantee ODOT staff the ability to implement important highway maintenance actions and emergency road repairs, without concern of state sanctions or federal prosecution under the ESA. The goal is to create a climate of assurance, which ensures that public safety on Oregon’s roads is not compromised by species protection rules, while at the same time making certain that mitigation and conservation of listed plants are given top priorities in areas outside the operational roadway. In the meantime, the NPCP is working with ODOT and the US Fish and Wildlife

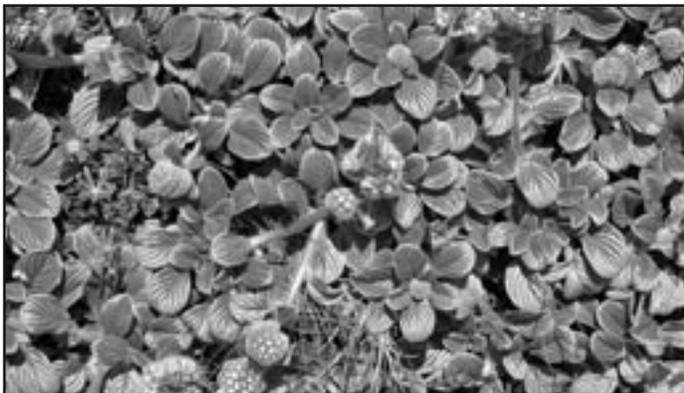
Service to implement a temporary operations agreement, which will allow critical roadwork to continue through the winter, while safeguarding critical habitat, and earmarking for later mitigation any impacted populations of listed species occurring within maintenance or repair areas.



ODA and ODOT staff confer regarding potential effects of right-of-way maintenance on native vegetation along Highway 99 near Corvallis.

Adjusting the State Endangered Species List

ORS 564 requires ODA to investigate the conservation status of native species in Oregon, and list (or delist) species as endangered or threatened, as appropriate. The first listings were accomplished in 1989, after extensive public hearings, and a second batch of listings was completed in 1995 after extensive evaluation by NPCP staff.



Silvery phacelia (Phacelia argentea), a south coast dune species that is potentially stable enough to remove from the threatened list, pending final status evaluation.

Section six—Native Plant Conservation Program

The latest adjustment to the list was expected in 2007, based in part on ODA staff surveys and research during the 2006 and prior field seasons. The focus was to downlist or de-list several species, including pumice grapefern (*Botrychium pumicola*) of central Oregon and Davis' pepperweed (*Lepidium davisii*) of Malheur County and nearby Idaho, which were anticipated to be removed from the list due to factors such as increased habitat protection and the discovery of new populations. Other endangered or threatened species that have been identified in 2007 as potential candidates for de-listing include the Snake River goldenweed (*Pyrracoma radiata*) in Baker County, Tygh Valley milkvetch (*Astragalus tyghensi*) in Wasco County, Peck's milkvetch (*Astragalus peckii*) in Deschutes and Klamath counties) and *Phacelia argentea* (silvery phacelia) in Curry County.

Lack of resources thwarted the plan to move forward in 2007 with a final conservation status determination for these species, which would have allowed some or all of them to be removed from the endangered or threatened lists. The reduction in size of the state endangered species list can have a positive economic outcome, and will be pursued in the future. Only one five-year status review was completed for listed species in 2007, for the endangered Leiberg's clover (*Trifolium leibergii*) in eastern Harney County.



*NPCP Manager Bob Meinke in Harney County, visiting habitat of Leiberg's clover (*Trifolium leibergii*), one of the rarest native clovers in the United States, during a five-year status review in 2007.*

*Section six—Native Plant Conservation Program***2007 cooperative conservation and collaborative outreach**

Cooperative projects with state, federal, and other agencies continued in 2007, with 16 new or continuing field projects completed or initiated, providing important opportunities to improve state wide conservation efforts while allowing ODA to provide management input for endangered species in many areas. NPCP staff collaborated with OSU, US Fish and Wildlife Service, BLM, the Burns Paiute tribe, and the California Department of Fish and Game in cooperative programs designed to develop conservation plans for numerous native species, mostly on federal lands.

Projects completed in 2007 included work on the following listed species: White-top aster (*Aster curtus*), Wolf's evening-primrose (*Oenothera wolffi*), Willamette daisy (*Erigeron decumbens*), Gentner's fritillary (*Fritillaria gentneri*), Howell's thelypody (*Thelypodium howellii*), Applegate's milkvetch (*Astragalus applegatei*), Bradshaw's desert-parsley (*Lomatium bradshawii*), congested horkelia (*Horkelia congesta*), Nelson's checkermallow (*Sidalcea nelsoniana*), and rough popcornflower (*Plagiobothrys hirtus*).



White-top aster (Aster curtus)—a threatened Willamette Valley species found in Lane County, the subject of a sampling protocol study completed by ODA in collaboration with the US Fish and Wildlife Service.



*ODA botanist Rebecca Currin and biologist Mark Mousseaux, Medford BLM District, working on a cooperative conservation project focusing on Gentner's fritillary (*Fritillaria gentneri*) near Grants Pass.*



ODA botanist Kelly Amsberry (left) and biotechnician Rhiannon Thomas measure density and response of native species in burn plots near Tumalo, in central Oregon.

Watershed health projects

Measure 66 funds were used in 2007 to directly implement a wide range of habitat rehabilitation and native plant restoration projects, while also providing important matching dollars critical to attracting federal funds to further support watershed health and related planning efforts within Oregon communities. Relevant program activities initiated in 2007 included:

- Implementing a conservation and management plan to assist the City of Sutherlin in meeting federal guidelines for wetland species protected under the ESA in Douglas County.
- Assisting Marion County and the City of Salem in improving wetland habitat along Marion Road, by growing and outplanting native plant species to improve habitat quality and native plant composition in areas disturbed by road and drainage work.
- Continuing a partnership between the City of Jacksonville, BLM, OSU, and ODA to further enhance on-going upland rehabilitation projects in the Jackson Creek drainage, aimed at reducing or eliminating extensive weed populations (and replacing them with native shrubs and grasses) in order to improve the overall condition of selected slopes in the area.
- Transplanting riparian species of *Artemisia* (sage) along the Columbia River for use in re-vegetation projects near the mouths of the Deschutes and John Day Rivers.
- Using *Pleuropogon oregonus* (Oregon semaphore grass), an unusual native aquatic species, in riparian restoration work in Grant and southern Lake counties.
- Working with BLM, Berry Botanic Garden (Portland), and the Malheur National Wildlife Refuge to improve the quality of upland areas near Malheur Lake, by reducing exotic grasses and re-introducing native forb species.
- Setting up habitat conservation projects in Baker County, by partnering with US Fish and Wildlife Service, Baker SWCD, and Baker County to improve and maintain vegetation quality in selected greasewood habitats in the Powder River drainage near Haines.
- Conducting field trials on BLM, ODOT, and Douglas County lands designed to evaluate destructive effects of pennyroyal, an exotic wetland mint species from Europe (now spreading in Oregon) that is listed as a noxious weed in California.

- Continuing with a cooperative project with OSU to collect and cultivate seed and bulbs of several native species, for revegetation work in Jackson, Douglas, Marion, Baker, Josephine, Deschutes, and Klamath counties.



ODA biotechnician Rhiannon Thomas (left) and OSU graduate student Liz Martin sort thousands of endangered lily bulbs for future propagation studies in Corvallis.

*Section seven—Miscellaneous***Section six—Miscellaneous****Employee training**

Staff members have taken advantage of a variety of training opportunities such as: advanced driving course, export certification, GPS training, and pesticide applicator and consultant licensing. In addition, staff have attended a variety of professional society meetings including the Oregon Vegetation Management Association, CAPS, Entomological Society of America, Western Horticultural Inspectors Society, and Western Plant Board. Employee training, continuing education and career development remain a high priorities of the Plant Division

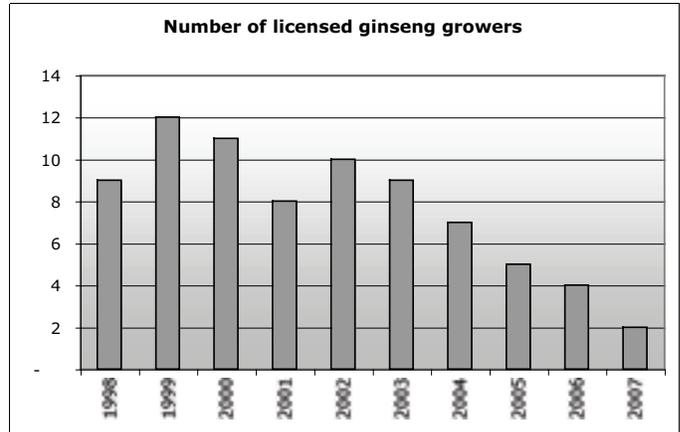
Oregon Invasive Species Council

Plant Division Administrator, Dan Hilburn, has served on the Oregon Invasive Species Council since it was created in 2002. He served his second term as chair of the council in 2007. Tristen Berg, our office manager, provided administrative support for the council, and serves as the OISC Web site publisher. In December, Lisa Druyckere was hired as the new Invasive Species Council coordinator on a two-year contract. Contact information: Creative Resource Strategies, LLL, 6159 Rosemeadow Lane NE, Salem, OR 97317, 503-371-5939, lisad@createstrat.com.

Information about the council and its activities in 2007 is available online at <http://oregon.gov/OISC>.

Ginseng

Since 1997, the Plant Division has administered a small Ginseng Management Program. The purpose of the program is to allow Oregon-grown, cultivated ginseng to be certified for export. Licensed growers are supplied with certificates of origin and can self-certify their ginseng crop. Although, the number of licensees shrank to only two in 2007 and we have not been able to fill seats on the Ginseng Advisory Committee, we will continue to provide services to the growers.

**ODA Plant Division Web pages**

In 2007, the Plant Division Web site pages were maintained and updated by a team of staff members; Tristen Berg, Shannon Brubaker, Jo Davis, Bonnie Rasmussen, Lisa Rehms, Kerri Schwarz, Rebecca Currin, and Melissa Carr. The team worked diligently in the spring to migrate Web content to new mini-sites developed for each division program. The team met three times in 2007 for Web site planning and design, and attended two ODA TeamSite training sessions and a migration workshop. We continue to add new pages and look for new ways to bring our programs to the public. The division's Web page is online at: <http://oregon.gov/ODA/PLANT>

Federal permits and compliance agreements

In 2007, Plant Division staff reviewed 40 PPQ 526 applications to import live plant pests or noxious weeds. Of those applications, 14 were for butterflies. There were five permits to import soil. Fifteen biotech permits or notifications for genetically modified crops were also reviewed. There were six PPQ 588 applications to import plants or plant products.

Publications

- Balciunas, J.K. and E.M. Coombs. (2007). Is the 'Code of Best Practices' Helping to Make Biological Control of Weeds Less Risky? In: Proc. XII International Symposium Biological Control of Weeds. April 22-27, 2007, La Grande Motte, France, Sforza, R. and M. Julian (eds.) (In Press).
- Coombs, E.M., G.P. Markin, and J. Andreas. (2007). Release and establishment of the Scotch broom beetle *Bruchidius villosus* in Oregon and Washington, USA. In: Proc. XII International Symposium Biological Control of Weeds. April 22-27, 2007, La Grande Motte, France, Sforza, R. and M. Julian (eds.) (In Press).
- Coombs, E.M., J.C. Miller, L.A. Andres, and C.E. Turner. (2007). Biological control of Mediterranean sage (*Salvia aethiopsis*) in Oregon. In: Proc. XII International Symposium Biological Control of Weeds. April 22-27, 2007, La Grande Motte, France, Sforza, R. and M. Julian (eds.) (In Press).
- Coombs, E. M., G. L. Piper, M. Schwarzländer, J. Milan, and J. Andreas. 2007. Biological Control. Pages 4-7 in: R. D. William, D. Ball, T. L. Miller, R. Parker, J. P. Yenish, T. W. Miller, D. W. Morishita and P. J. S. Hutchinson (eds.). Pacific Northwest Weed Management Handbook. Extension Services, Oregon State University, Corvallis.
- Eskandari, F., W. L. Bruckart, III, N. W. Shad, A. Sechler, E. Postnokova, and E. M. Coombs. (2007). First report of crown gall caused by *Agrobacterium* sp. on diffuse knapweed (*Centaurea diffusa*). Plant Disease (In Press).
- Hilburn, D.J. 2007. The Early Life of Riley. ISBN 978-1-4303-1824-8. Lulu.com. 78 pp.
- Hill, R.L., J. Ireson, A.W. Sheppard, A.H. Gourelay, H. Norambuena, G.P. Markin, R. Kwong, E.M. Coombs. (2007). A Global View of the Future for Biological Control of Gorse, *Ulex europaeus* L In: Proc. XII International Symposium Biological Control of Weeds. April 22-27, 2007, La Grande Motte, France, Sforza, R. and M. Julian (eds.) (In Press)
- Huffman, B.T., ed. Transgressing the Frontier: Modernity, American ideology, and Cinema. Reconstruction 7.3, 2007.
- Huffman, B.T. "Transgressing the Frontier: Modernity, American ideology, and Cinema." Reconstruction 7.3, 2007.
- Huffman, B.T. "Entomological Maginot Line." *Ecotone*, Spring 2007.
- Meinke, R.J. and T.N. Kay. 2007. *Kalmiopsis fragrans* (Ericaceae), a new distylous species from the southern Cascade Mountains of Oregon. Journal of Botanical Research Institute of Texas 1(1):9-19.
- Myers-Shenai, B. ed. 2007. Western US Invasive Plant EDRR Weed ID Guide. Oregon Department of Agriculture in cooperation with US Department of Agriculture, APHIS, PPQ.
- Mudge, A.D. and T.B. Adams. 2007. A new host record and first report of *Pleocoma dubitabilis dubitabilis* Davis (Coleoptera: Pleocomidae) as a pest of Christmas trees. The Coleopterists Bulletin. 61(2):292-294.
- Westcott, R.L. 2007. A new species of *Acmaeodera* Eschscholtz from Guatemala (Coleoptera: Buprestidae). The Coleopterists Bulletin 61(2):281-282.
- Westcott, R.L. 2007. The exotic *Agrilus subrobustus* (Coleoptera: Buprestidae) is found in northern Georgia. The Coleopterists Bulletin 61(1):111-112.
- Westcott, R.L. 2007. A new species of *Chrysobothris* Eschscholtz feeding on *Dudleya* spp. (Crassulaceae) from California and Baja California, with biological, distributional, and taxonomic notes on other North American Buprestidae (Coleoptera). Zootaxa 1630:23-37.
- Westcott, R.L. and W.F. Barr. 2007. Resurrection and review of the genus Knowltonia Fisher, with description of a new subspecies of *Chrysobothris* Eschscholtz from North America (Coleoptera: Buprestidae). Zootaxa 1481:49-58.