Oregon
Department
of Agriculture
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2010 Plant Health Section Annual Report

Commodity Inspection Division

The Plant Health Section provides official field inspections and laboratory testing for Oregon's specialty seed, grass seed, and nursery industries. For other commodities, such as potatoes and wheat, we conduct surveys to establish pest-free status for specific counties or the state. These inspections, surveys, and testing are required for shipment to interstate and international markets. The section's pathologists also provide commodity groups and trade negotiation officials with official statements to facilitate the opening of new markets for Oregon's agricultural commodities.

The Plant Health Section has responsibility for several state quarantines, control area orders, and other regulations for plant pathogens. These administrative rules are designed to prevent exotic pathogens from being introduced or becoming established in the state and to provide quarantine pest-free production areas for Oregon growers.

In cooperation with USDA Animal and Plant Health Inspection Service - Plant Protection and Quarantine (APHIS/PPQ), the Plant Health Section conducts statewide surveys for exotic pathogens. These surveys are federally funded and help provide crucial data to keep interstate and international markets open to Oregon's agricultural products.

We are also active in helping to shape national policy on important issues such as *Phytophthora ramorum* and the National Clean Plant Network. Staff scientists are regularly consulted by APHIS/PPQ, and provide crucial input to national plant disease control efforts. Staff expertise is maintained and enhanced with a research program that develops and publishes new diagnostic protocols for regulated and emerging plant pathogens.

- In 2010, *P. ramorum* was detected in nine nurseries. Quick responses by the Plant Health Section and Nursery & Christmas Tree Inspection Program (Plant Division) allowed for the eradication of *P. ramorum* from six sites, although one of these sites remains under a State Administrative Directive because of recurring problems at the nursery. The three others remain under a Federal Emergency Action Notice.
- The number of seed lots sent in for testing increased almost 30% from last year to 7,017 seed lots. This suggests the market for Oregon seed crops is improving.
- The number of fields inspected by the seed field inspection program increased 22% during that same time period. This is consistent with reports that the vegetable and specialty seed industries perform better during periods of economic uncertainty than other industries.

- After 6-years, Dr. Mohamed (Sid) Sedegui left the program to join USDA APHIS PPQ in New Jersey. Dr. Sedegui is now an Export Certification Specialist.

With this consistently high workload, the staff managed to sustain the high level of competence expected of our Section, maintaining a low laboratory test error rate of 0.02%. It is a privilege to serve with such an exceptional and dedicated group.

Thank you for all your hard work.

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Plant Health Program Supervisor

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Cooperative Agricultural Pest Surveys

Potato Cyst Nematode Survey

The Plant Health Section surveyed seed potato fields for golden potato cyst nematode (*Globodera rostochiensis*) and pale potato cyst nematode (*G. pallida*). Samples were collected from seed potato fields and commercial potato fields as described in the 2009 Pale Potato Cyst Nematode National Survey and Diagnostic Cyst Sample Forwarding Protocols (USDA/APHIS/PPQ, April 29, 2009). The goal was to survey 25% of all seed potato acreage, 1% of all commercial potato acreage, and all research/breeding program acreage in the state. Soil was sampled at 5-lbs of soil per acre, with 100% of each field surveyed. At the research farms, 100% of each field was surveyed with three 5-lbs composite soil samples collected per acre. The soil was dried and then processed using a modified USDA soil cyst washer. No potato cyst nematodes have been detected to date (Table 1). The results of these surveys are being entered into IPHIS and NAPIS as samples are received and processing is being completed.

Table 1. Results through 12/31/2010, of the potato cyst nematode survey of Oregon potato fields.

County	Source	No. of fields	No. of acres	Results
Benton	Research farm	9	24	No *Globodera*
Jefferson	Research farm	16	66	No *Globodera*
Jefferson	Seed	4	53	No *Globodera*
Klamath	Research farm	9	66.5	No *Globodera*
Klamath	Seed	10	499	In process
Malheur	Commercial	6	120	In process
Malheur	Research farm	31	99	No *Globodera*
Umatilla	Commercial	3	263	In process
Umatilla	Research farm	9	135.5	No *Globodera*
Union	Seed	14	924	In process

Apple Orchard Survey

Funds were received to conduct a survey for two pathogens that affect apple trees, apple proliferation phytoplasma and Japanese apple rust (*Gymnosporangium yamadae*). Surveys were conducted in apple orchards in the predominant apple-growing counties in the state. Within each orchard, 5-10% of the trees were visually inspected for symptoms indicative of infection. Twelve commercial apple orchards were visually inspected for both diseases; four orchards in Hood River County and eight orchards in Umatilla County. Neither pathogen was identified during inspection. Survey results were entered into the NAPIS database.

Oak/Hardwood Survey

Funds were received to conduct a CAPS survey for several pests that attack ash, oak, alder, and laurel trees, including laurel wilt (*Raffaela lauricola*), Japanese oak wilt (*R. quercivora*), bluestain (*Ophiostoma quercus*), root rot (*Gymnopus fusipes*), oak decline (*Phytophthora quercina*), alder root rot (*P. alni*), and ash dieback (*Chalara fraxinea*). The goal of this survey was to examine imported nursery stock for the pests of concern. However, due to the economic situation within the nursery industry, none of the target host species were imported in 2010. We asked for and were granted an extension by APHIS/PPQ to complete this survey in 2011.

Plum Pox Virus Survey

The Section received funds from the federal Farm Bill to conduct a survey for a pathogen of national concern that affects pome and stone fruit trees; plum pox potyvirus (PPV). The survey was conducted in nurseries identified as being at high risk for potential introduction of this pathogen and in pome and stone fruit orchards planted throughout the State. Samples were collected according to the USDA APHIS National Survey Protocol for this pathogen and were testing using the USDA-approved ELISA test kit. Samples were collected from 11 orchards in four counties and 13 nurseries in four counties (Table 2). All samples tested negative for PPV. Survey results were entered into NAPIS as required.

Table 2. Results from the 2010 PPV survey in Oregon.

County	Source	No. of samples	PPV ELISA results
Clackamas	Nursery	150	Negative
Hood River	Orchard	160	Negative
Jackson	Orchard	78	Negative
Multnomah	Nursery	119	Negative
Umatilla	Orchard	200	Negative
Wasco	Orchard	80	Negative
Washington	Nursery	99	Negative
Yamhill	Nursery	118	Negative

Corn Diseases Survey

This survey targeted three pathogens of national concern: *Harpophora maydis* (late wilt), *Peronosclerospora maydis* (downy mildew), and *Sclerophthora rassiae* var. *zeae* (brown stripe downy mildew). None of these pathogens has ever been reported in Oregon. Surveys were conducted in corn seed fields participating in the export field inspection program. Three fields in Malheur County, 10 in Umatilla County, and two in Morrow County were inspected during silking for the three pathogens. Five- to 20% of the plants in each field were inspected. A total of 436 acres were inspected. None of the pathogens of concern were detected. Survey results were entered in NAPIS.

Grape Vineyard Survey

This survey was a joint effort between Plant Division's Insect Pest Prevention & Management program and the Plant Health Section. The Plant Health survey focused on the detection of two pathogens of federal regulatory concern, brown root rot (*Phellinus noxious*) and grapevine yellows phytoplasma (*Candidatus* Phytoplasma australiense) in commercial vineyards. Within each vineyard, 2% of the plants were visually inspected for symptoms of brown root rot and grapevine yellows. For brown root rot, bark samples collected from symptomatic plants were brought to the Plant Health Laboratory for identification. Because plants infected with grapevine yellows may be symptomatic or asymptomatic, foliar samples were collected from each vineyard for testing, with samples preferentially collected from symptomatic plants. The foliar samples were then tested for grapevine yellows using PCR.

Eighteen vineyards in nine counties were visually surveyed (Table 3). Thirty-two samples from seven vineyards were identified in the field as potentially infected with brown root rot. All were negative for *Phellinus noxious* in the lab. A total of 168 foliar samples from 18 vineyards were submitted for testing for grapevine yellows. All were negative for grapevine yellows using PCR. Survey results were entered into NAPIS.

Table 3. Survey results for grapevines yellows and brown root rot in Oregon vineyards in 2010.

County	Grapevine yellows		Brown root rot	
	No. of samples	No. positive	No. of samples	No. positive
Douglas	30	0	14	0
Hood River	15	0	5	0
Jackson	10	0	5	0
Josephine	10	0		
Lane	10	0		
Polk	48	0	3	0
Wasco	10	0	5	0
Washington	25	0		
Yamhill	10	0		

Karnal Bunt Survey

Karnal bunt (*Tilletia indica*) is a fungal disease of wheat originally reported from India. After its discovery in Arizona wheat fields in 1996, a federal quarantine was adopted and a national survey strategy implemented to ensure US wheat export markets remained open. Oregon has participated in the national survey since its inception in 1996.
In 2010, we collected a total of 43 samples from 13 counties (Gilliam, Jefferson, Klamath, Malheur, Marion, Morrow, Polk, Sherman, Wasco, Washington, Umatilla, Union, and Yamhill), up by 16 % from the previous year. All samples were shipped to the national Karnal bunt-testing laboratory in Olney, TX, and were found to be negative. This is the fifteenth consecutive year Oregon has tested free of Karnal bunt. Survey results were entered into the NAPIS database.

Field Inspection and Certification Programs

Allium White Rot Inspection

In 2010, ODA staff inspected a total of 25 garlic (*Allium sativum*) fields (623.6 acres) in six counties for the presence of white rot caused by *Sclerotium cepivorum*. The inspected acreage decreased by 151% from 2009 due to cold damage in the spring. The program offers a 100% visual inspection designed to find single strikes or plants infected with white rot in the field. Allium white rot was found in four fields in 2010, with most infected fields found in central Oregon (Table 4).

Table 4. Allium white rot inspection results for 2010.

Number of	County					
	Crook	Jefferson	Klamath	Morrow	Sherman	Yamhill
Fields inspected	6	9	4	2	2	2
Acres inspected	187.9	201.9	28	96.2	57.8	51.8

Fields infected	1	3	0	0	0	0

Mint Verticillium Wilt Inspection

The ODA offers a mint (*Mentha* spp.) rootstock field inspection service to detect Verticillium wilt (*Verticillium dahliae*) in established control areas. Under the provisions of the control area order, any fields confirmed as infected with *V. dahliae* cannot be used as a rootstock source. In 2010, the ODA staff inspected four fields (141 acres) in Klamath County with no Verticillium wilt found, and one field (20 acres) in Union County with Verticillium wilt found.

Potato Late Blight Inspection

In 2010, the ODA staff conducted field surveys for late blight of potato (*Solanum tuberosum*) for the export of fresh potatoes to Taiwan. A total of 125 fields (9,564.65 acres) from four counties were inspected for *Phytophthora infestans*, the causal agent of late blight (Table 5). No potato late blight was found.

Table 5. Potato late blight inspection results for 2009.

County	No. fields inspected	No. acres inspected	Results
Klamath	57	3,605.2	No potato late blight found
Morrow	15	1,035	No potato late blight found
Umatilla	50	4,770.45	No potato late blight found
Washington	3	154	No potato late blight found

Seed Crop Field Inspections

In 2010, the ODA staff inspected 846 seed crop fields (16,651.68 acres) for the presence of seed-borne or seed-associated pests of concern. The number of fields and acreage inspected increased 22% and 23%, respectively, from 2009 (Figure 1). Inspectors surveyed for the presence of more than 100 different pathogens and other pests associated with 29 different host crops in 19 counties. Around 21% (174 fields) of the inspected fields were found with at least one pest of concern. The five most commonly observed diseases were downy mildew of pea (*Peronospora viciae*), scape blight of onion (*Botrytis* sp.), stem rot of cabbage (*Sclerotinia sclerotiorum*), common smut of corn (*Ustilago maydis*), and bacterial leaf blight of carrot (*Xanthomonas campestris* pv. *carotae*). Their disease incidences were 57.1%, 54.2%, 28%, 13.6%, and 10%, respectively (Table 6).

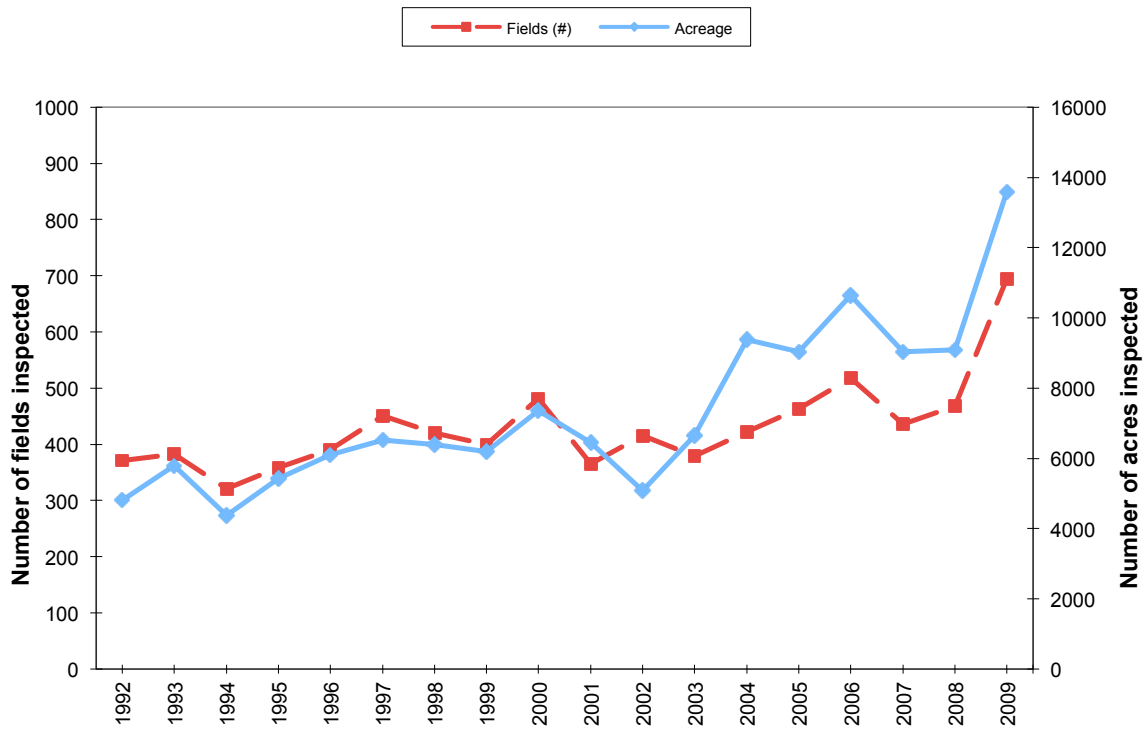

Figure 1. Historical record of seed field inspections from 1992 to 2010.

Table 6. Seed crop field inspection results by crop and county for 2010.

Crop	County	# fields inspected	Acreage inspected	Pests of concern detected (No. of fields)
Alfalfa (*Medicago sativa*)	Malheur	10	239.07	
	Morrow	4	235	*Cirsium arvense* (1)
	Crook	3	120.6	
Allium - Garlic (*Allium sativum*)	Jefferson	10	210.7	*Sclerotium cepivorum* (1), *Sclerotinia sclerotiorum* (1)
	Marion	4	59	
Allium - Leek (*Allium porrum*)	Linn	1	4	
	Clackmas	1	1.5	*Botrytis* sp. (1)
	Crook	2	32	
Allium - Onion (*Allium cepa*)	Jefferson	3	40.2	*Botrytis* sp. (3)
	Linn	2	21.6	*Botrytis* sp. (2)
	Malheur	11	85.3	
	Marion	29	172.25	*Botrytis* sp. (20)
Bean (*Phaseolus vulgaris*)	Malheur	45	889.4	
	Umatilla	1	32	
Beta - Swiss chard (*Beta vulgaris*)	Marion	3	16	*Pseudomonas syringae* pv. *aptata* (3)
	Polk	1	7	*Peronospora schachtii* (1)
Carrot	Crook	10	253	*Xanthomonas campestris* pv. *carotae* (4)

	Deschutes	8	170	
(*Daucus carota*)	Jefferson	123	3,239	*Xanthomonas campestris* pv. *carotae* (11), *Alternaria radicina*(10)
	Malheur	7	27.4	
	Marion	1	3	
	Washington	1	35	
	Benton	1	72	
	Lane	1	150	
Clover (*Trifolium* sp.)	Linn	8	715	
	Marion	5	141.5	
	Washington	1	65	
	Yamhill	12	1,193	*Cirsium arvense* (1), *Orobanche minor* (1)
Coriander *(Coriandrum sativum)*	Crook	6	132	*Pseudomonas syringae* pv. *coriandricola* (6)
	Jefferson	4	163	
	Lane	4	78	
	Linn	4	265	
	Marion	2	42	
	Union	2	45	
Corn (*Zea mays*)	Malheur	32	511.3	*Ustilago maydis* (13), Symptoms of High Plains Virus (3)
	Morrow	28	491	*Ustilago maydis* (5)
	Umatilla	219	1,756.19	*Ustilago maydis* (20)
Corn salad (*Valerianella locusta*)	Marion	2	1	
Brassica – Arugula (*Brassica eruca*)	Lane	1	8	
Brassica - Cabbage (*Brassica oleracea*)	Benton	1	2	
	Clackamas	1	7	
	Douglas	1	10	
	Lane	5	57.5	*Peronospora parasitica* (1)
	Linn	8	63.5	*Leptosphaeria maculans* (4), *Mycosphaerella brassicicola* (1)
	Malheur	1	10	
	Marion	28	363.2	*Alternaria brassicae* (1), *Leptosphaeria maculans* (5), *Peronospora parasitica* (4), *Sclerotinia sclerotiorum* (14),
	Polk	2	15.4	
	Yamhill	3	39.9	*Alternaria brassicae* (1), *Leptosphaeria maculans* (1), *Sclerotinia sclerotiorum* (1)
Brassica – Collard (*Brassica oleracea*)	Malheur	1	25	
Brassica – Kale (*Brassica*	Marion	2	49.1	*Sclerotinia sclerotiorum* (1)
	Polk	2	49.95	*Sclerotinia sclerotiorum* (1)

oleracea)				
Brassica – Mustard (*Brassica* sp.)	Crook	2	30	
	Malheur	2	35	
Brassica - Turnip (*Brassica rapa)*	Malheur	5	133	
Cucurbit – Cucumber (*Cucumis sativus*)	Marion	3	22.5	*Pseudomonas syringae* pv. *lachrymans*
Curcurbit-Melon	Marion	2	22	
Dill (*Anethum graveolens*)	Linn	4	52	
	Malheur	2	30	
Lettuce (*Lactuca sativa*)	Union	2	12	
Oat (*Avena sativa*)	Linn	2	118	
Parsley (*Petroselinum crispum*)	Jefferson	3	30	
	Lane	1	4	
	Linn	1	5	*Septoria apiicola* (1)
Parsnip (*Pastinaca sativa*)	Marion	2	26	*Alternaria dauci* (1)
Pea (*Pisum sativum*)	Benton	2	27	*Peronospora viciae* (2)
	Jefferson	1	7	*Peronospora viciae* (1
	Lane	10	124	*Peronospora viciae* (6), Pea Enation Mosaic Virus (2)
	Linn	5	91	*Peronospora viciae* (5).
	Malheur	7	59	
	Marion	15	187	*Fusarium oxysporum* (1), *Peronospora viciae* (9), symptoms of virus (3)
	Umatilla	1	12	*Ascochyta pisi* (1), symptom of virus (1)
	Union	3	196	
	Wallowa	2	164	*Peronospora viciae* (2)
	Yamhill	3	31.5	*Peronospora viciae* (3), symptom of virus (2)
Radish (*Raphanus sativus*)	Benton	3	64	
	Crook	2	20	
	Lane	6	182	
	Linn	6	135	
	Malheur	26	529	*Alternaria japonica* (2)
	Marion	9	325	
	Polk	1	13	
	Union	2	33	
	Washington	1	5	
	Yamhill	2	100	
Spinach (*Spinacia oleracea*)	Benton	1	40	
	Clackamas	2	33	
	Lane	2	40	

	Linn	4	91	
	Malheur	1	14	
	Marion	7	132	
	Yamhill	2	35	
Sunflower (*Helianthus annuus*)	Umatilla	2	10.87	
	Union	17	1,015	Symptoms of Sunflower Mosaic Virus (3)
Tomato (*Lycopersicon esculentum*)	Jackson	1	1	
	Josephine	2	1.25	
Total: 29	19	846	16,651.68	21% (174) of the inspected fields with at least one pest of concern

Laboratory Seed Testing

Export seed

In 2010, Plant Health staff conducted tests to detect specific seed-borne fungi, bacteria, nematodes, viruses, pests, and other miscellaneous problems. Seed were tested according to standard, officially accepted protocols for the target organism(s). A total of 11,758 different tests were conducted on 7,017 seed lots from more than 15 different crops, mainly grass and vegetable seed. This represents a 29.5% increase from 2009. About 5.9% of the lots tested positive for one or more organisms of regulatory concern (Table 7). The lots were tested at the request of Oregon seed exporters to meet the phytosanitary requirements of their international and interstate customers.

Endophyte testing

In 2010, the Plant Health Laboratory received 162 seed lots of forage grass seed varieties to be tested for the presence of the endophyte fungus, *Epichloe* sp. The endophyte fungus produces alkaloids that can be toxic to livestock. To qualify for an endophyte tag, no more than 5% of the seeds in a lot can be infected with the fungus. Twenty-seven seed lots tested positive for *Epichloe* sp. and were ineligible to receive the endophyte tag.

Table 7. Laboratory tests conducted on grass, vegetable, and other seed lots in 2010.

Pathogen/pest tests	# Seed lots tested	# Seed lots passed	# Seed lots failed
Pests and Diseases	**6,529**	**6,339**	**190**
Fungi			
Israel wash	34	31	3
Korea wash	626	564	62
Tilletia sp.	1537	1517	20
Urocystis sp.	162	157	5
Ustilago sp.	25	16	9
Gloeotinia sp.	237	223	14

Grow-out (*Phoma, Kabatiella*)	139	136	3
Other fungi	86	84	2
Fungi total:	**2846**	**2728**	**118**
Nematodes			
Anguina sp.	883	870	13
Subanguina sp.	0	0	0
Ditylenchus sp.	134	134	0
Other	825	800	25
Nematode total:	**1,842**	**1,804**	**38**
Bacteria			
Corynebacterium rathayi	276	258	18
Clavibacter sp.	26	20	6
Pseudomonas sp.	31	21	10
Xanthomonas sp.	33	32	1
Bacteria total:	**366**	**331**	**35**
Weeds and parasitic seed plants			
Orobanche minor	133	133	0
Glyceria declinata	49	49	0
Weeds and parasitic seed plants total:	**182**	**182**	**0**
Viruses	**13**	**11**	**2**
Grand Total	**11,758**	**11,395**	**383**

Official certification and testing programs

Virus Certification of Nursery Stock

Twenty-three nurseries participated in Oregon's virus ornamental and fruit tree certification program in 2010. *Malus* (apples and crabapples), *Prunus* (fruiting and ornamental cherries, fruiting and ornamental plums, peaches, apricots, etc.), *Pyrus* (domestic pears, Asian pears, and flowering pears) and *Cydonia* (quince) are included in the testing program. All of the participating nurseries, except for one, grow their materials in the Willamette Valley.

Individual *Prunus* mother trees (scions) and rootstock are tested each year for prune dwarf virus (PDV) and Prunus necrotic ringspot virus (PNRSV). *Malus*, *Pyrus,* and *Cydonia* scions and rootstocks are tested for tomato ringspot virus (TomRSV). Foliar samples were collected in the spring and tested for the target viruses using commercially available ELISA test kits. A total of 11,738 samples were tested. About 0.2% of the field samples were PDV-positive, 0.1% PNRSV-positive and 0.0% TmRSV-positive for this season.

A summary of the virus-free varieties grown by each participating nursery is sent yearly to state, federal, and Canadian officials to facilitate the movement of the nurseries' products.

In 2010, the Plant Health Section entered the second season of a pilot study with USDA APHIS to examine the possibility of using a systems approach for virus certification of ornamental and fruit tree nursery stock. The Pennsylvania and Michigan Departments of Agriculture are also participating in the study. The three state agencies have developed a common regulatory framework for the study, including the required pest management manual of the nurseries. In addition, the Plant Health Section is comparing the accuracy and efficiency of ELISA testing to molecular testing for the target viruses. Development of the nursery pest management manuals is underway. The pilot study began in September 2009 and has been funded through August 2011.

Blueberry Virus Testing

We continued the official testing program of blueberry nursery stock for blueberry scorch virus (BlScV) and blueberry shock virus (BlShV) in 2010. This program was implemented in 2004 at the request of nurseries to comply with the regulatory requirements of other states and countries. Nursery Inspectors collect official samples from participating nurseries and submit the samples to the laboratory for testing. All testing is done with commercially available ELISA test kits. This year, 27,045 leaf samples were tested. About 5.7% of lab samples were infected with BlShV. The infected samples came from three nurseries. The nursery owners were informed of the positive samples. No samples were positive for BlScV.

Survey and Eradication Programs

Phytophthora ramorum - Curry County

The ODA *Phytophthora ramorum* quarantine area in Curry County remained at 162-mi^2 in 2010. Surveys during the course of the year detected 120 new infected trees on 83 sites, all within the existing quarantine boundary. Most new sites included only one or a few infected trees. Thus, a total of 27 newly infested acres were found (Figure 2). The ODA and its cooperators, the Oregon Department of Forestry (ODF), USDA Forest Service, and Oregon State University, continued to work with affected landowners to eradicate *P. ramorum* from infested areas, with the standard treatment consisting of cutting, piling, and burning all infected plants and all asymptomatic susceptible plants within 300-feet of each infection center. Tan oak stumps are treated with herbicide to prevent re-sprouting. The sites are monitored periodically after treatment to determine if the pathogen has been eradicated.

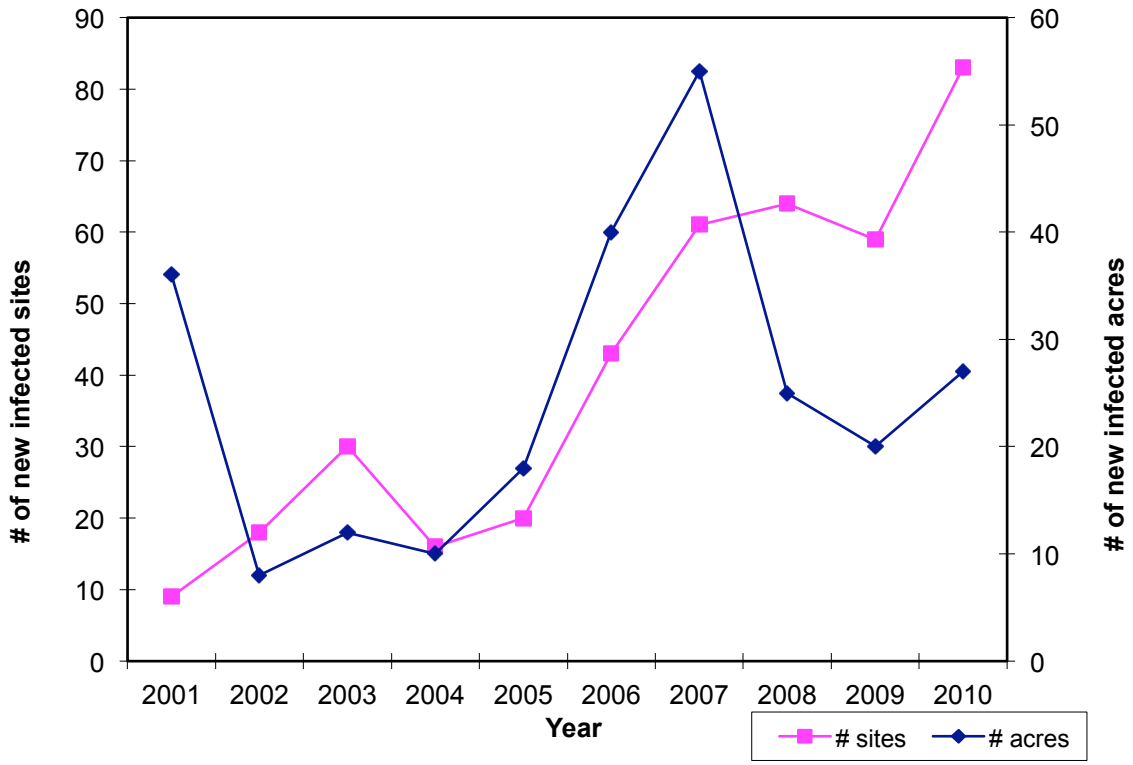

Figure 2. Number of new *P. ramorum*-infected trees and acres in Curry County since 2001.

In 2010, we continued to monitor the efficacy of the treatments as was done in 2009. Survey plots were placed within each treated site with each plot centered upon stumps from known infected trees. Within each plot, at least five plant samples were collected; symptomatic plants were collected when possible. Soil samples were also collected, with samples collected at regular intervals according to a pre-established grid. All samples were processed according to USDA-approved testing methods. Surveyors also recorded information on re-vegetation within the treated sites. Data from the 2009 and 2010 post-treatment monitoring surveys are still being analyzed.

The last 2-years have been difficult ones for the eradication and containment effort in Curry County. Although the USDA Forest Service continues to support the effort, an inability to find sufficient matching funds for the federal dollars led to work slowdowns and stoppages. As of Dec. 31, 2010, work could not be completed on more than 555 acres slated for treatment because of budgetary constraints. The *P. ramorum* Interagency Task Force met to discuss the possibility of halting eradication activities and transitioning into strictly containment activities within Curry County. Stakeholder input must be obtained before any final decisions are made.

In Curry County, we continue to work with landowners and other stakeholders to develop innovative ways to limit the spread of *P. ramorum*. We are currently working with a group that is interested in developing new commercial uses for tanoak. The eventual goal is to provide landowners with incentives to remove tanoak, particularly within areas at high risk for disease spread.

P. ramorum – Nurseries

As of 12/31/10, 25,571 samples from 644 grower sites were collected and tested in the laboratory using federally approved protocols to meet the federal requirements for interstate movement of nursery stock (7 CFR 301.92). *Phytophthora* species were detected at 297 of the sites surveyed. *P. ramorum* was detected at seven sites on *Camellia*'Colonel Frey', *Camellia sasanqua*'Fire', *Camellia* sp., *Rhododendron* 'Holden', *Rhododendron* 'Exbury Molalla Red', *Rhododendron* 'Dora Amateis', *Rhododendron* spp. (seven blocks), *Rhododendron* 'English Roseum' (two blocks), and *Rhododendron* 'Skookum' (two blocks).

In addition to the federally required nursery certification survey, the ODA performed additional inspections at nurseries that grow and/or ship *Rhododendron* and *Camellia* out of state. When suspicious symptoms were found, samples were collected for laboratory testing as described above. As of 12/31/10, 1,739 additional samples were collected from 130 high-risk nurseries. *Phytophthora* species were detected at 70 of these sites, and *P. ramorum* at three of them. For one of the nurseries, this represented the second detection within the year; *P. ramorum*-infected plants were also found during the annual federal certification inspection. The *P. ramorum*-infected plants found during the high risk survey included *Kalmia latifolia*, *C. sasanqua* 'Cleopatra', and *Rhododendron*.

Delimitation surveys within the all of the *P. ramorum*-positive nurseries detected additional positives on *Rhododendron* cultivars English Roseum (three blocks), Baden Baden, Cunningham's White, Haaga, Grandifolia, Grandifolium, Minnetonka, PJM Compacta, and Vulcan, *Rhododendron* spp. (13 blocks), *P. japonica* cultivars Flaming Silver and Silver Flame, *P. japonica*, *Pieris* spp., *Trachelospermum jasminoides* (new host), *Viburnum tinus*, in the soil substrate (twice), in the potting media associated with an infected plant (twice), and in the cull pile. All of the nurseries have undergone the USDA Confirmed Nursery Protocol (CNP); three have yet to complete the process. One nursery for which this was the fifth consecutive year *P. ramorum* had been detected remains under an Administrative Directive that strictly regulates how plants are grown at and moved from the site. This nursery has also adopted mandatory best management practices to reduce their level of *Phytophthora* disease present.

The ODA also conducted trace out investigations at 18 sites with 51 samples collected for testing. *Phytophthora* species were detected at five of those sites with no *P. ramorum* detected. Finally, the ODA has inspected five incoming shipments of host and associated host species for *P. ramorum*. No *P. ramorum* was detected, although another *Phytophthora* was detected in three of the shipments.

The data from the nursery certification and high-risk surveys has been entered in NAPIS. We continue to be unable to enter the Curry County survey and monitoring data into NAPIS. USDA is aware of the issue.

Grower Assisted Inspection Program

In 2007, the Plant Health Section and Nursery and Christmas Tree Inspection Program (Plant Division) received a grant from the USDA Natural Resources Conservation Service to implement a novel grower assisted inspection program (GAIP) in Oregon's nurseries. The GAIP targets *Phytophthora ramorum* and other related *Phytophthora* species that can contaminate plants, water, and soil in nurseries and can be transported between nurseries or into the natural environment via infected plant material. Nurseries participating in the program are required to adopt best management practices (BMP) to address four mandatory critical control points (water, soil and potting media, used containers, and incoming plant material) where *Phytophthora* can be introduced into their nursery.

Sixteen farms remained with the program through 2010. Data from previous years indicated the program was having an effect on *Phytophthora* populations within nurseries. Several factors affected the efficacy of the program; 1) how long a BMP was in place, 2) nursery production practices, and 3) presence of *Rhododendron* nursery stock. Anecdotal evidence suggested BMP adopted for the GAIP were affecting other pests besides *Phytophthora*. In 2010, the Plant Health Program and Nursery and Christmas tree Inspection Program (Plant Division) initiated a new study involving GAIP nurseries. This study compared the efficacy of the GAIP, the US Nursery Certification Program (US NCP), and conventional inspection at shipping point (SPI) program at mitigating the risk of five pests moving through the trade of nursery stock. The five pests included Phytophthora root rot and foliar blight, root weevils, snails and slugs, and bittercress.

By the end of 2010, four nurseries had been surveyed, two GAIP and two US NCP. Data remained to be collected from two SPI nurseries. Preliminary results indicate Phytophthora root rot and snails and slugs were the pests most often encountered within the nurseries. However, until data can be collected from the SPI nurseries, no statistical comparisons can be made. Funding for this study runs through April 30, 2011.

As part of this new study, the Plant Health and Nursery and Christmas tree Inspection programs worked with Oregon State University Extension to provide training workshops for GAIP and other nurseries interested in BMP for CCP. The workshop series was presented in English and Spanish. Topics covered included biology and seasonal activity of *Phytophthora*, cultural control for pest prevention, water management, and media, substrate, containers, and BMP summary.

The programs also examined the latest scientific research to determine if changes need to be made to the GAIP. Water management was identified as potentially being of greater importance than initially surmised. Future program changes may include greater emphasis on this CCP.

Other Programs

Columbia root knot nematode

Nursery inspectors collected 72 soil samples for nematode testing from Oregon production nurseries in 2010. This annual survey is conducted at the request of Canadian agricultural officials to demonstrate that Oregon production nurseries are free of Columbia root knot nematode (CRKN, *Meloidogyne chitwoodii*). Plant-parasitic nematodes were detected in 75% of the samples with *Pratylenchus* spp. being the most abundant (present in 69% of the samples). *Meloidogyne hapla* was detected in three samples. *Meloidogyne naasi* was detected in one sample. No CRKN were detected in Oregon nurseries based on morphometric analysis of juveniles. Other nematodes detected included *Paratylenchus*, *Xiphinema*, *Mesocriconema*, *Tylenchorhynchus*, *Trichodorus*, *Scutellonema*, *Helicotylenchus,* and *Heterodera*, in order of most to least abundant.

Plant Health Laboratory Diagnostics

Plant samples are submitted to Plant Health for disease assessment to meet export or import requirements or for general diagnosis. In 2010, 24 samples were submitted to meet export requirements and 24 for general diagnostics. All export samples were free from pathogens of concern. Samples for general diagnostics had pest problems caused by fungi (33%), bacteria (1%) and insect (1%). Forty-two percent of the samples had symptoms from abiotic or environmental problems. Finally, seven samples were tested to meet Oregon importation requirements and eight rice samples were submitted for testing for GMO traits.

Quarantines and Control Area Orders

Three regulations were reviewed and updated in 2010. The control area order for white rot in Malheur County (OAR 603-052-0347) was amended to clarify the types of propagative materials that could be imported from Maricopa County, AZ, to clarify that garlic may only be grown for personal use within the control area, and to establish an industry-based committee to assist in the review of requests for Director's Exemptions to the regulation. The Laboratory Fees for Official, Regulatory, and Service Samples (OAR 603-052-1150) was updated to add a fee for molecular analysis of regulated pests. The fee schedule in the Field Inspection Fees and Charges Relating to Seed (OAR 603-056-0315) was updated to increase the inspection fee per acre and the minimum and maximum fees per field inspected. A fee was also added for the processing of seed field inspection applications.

Permit reviews

The Section continues to provide reviews of federal permits to import plants, pathogens and parasites, and genetically modified (bioengineered) organisms to our state. The permits are reviewed for compliance with existing Oregon quarantines and regulations. In all, 131 permits were reviewed; 69 for live pests and noxious weeds, three for plants for

post-entry quarantine, 10 for prohibited plants imported for experimental purposes, 10 for soil, and 39 for genetically modified organisms. Staff members also participated in federal inspections of facilities where permitted organisms, such as genetically engineered organisms or a regulated pathogen, were to be received.

National Clean Plant Network

The Plant Health Section is taking a leading role in the development and governance of the National Clean Plant Network (NCPN). The goals of the NCPN are to: 1) Protect US specialty crops, such as grapes, berries, and apples, from the spread of economically harmful plant pests and diseases, and, 2) Ensure the global competitiveness of US specialty crop producers by creating high standards for our clean plant programs. Currently, there are five commodity groups that are a part of the NCPN, the Fruit Tree Clean Plant Network (FTCPN), the Hops Clean Plant Network, the Citrus Clean Plant Network, the Berries Clean Plant Network, and the Grapevine Clean Plant Network (GCPN). The ODA has representatives on the Tier 2 Governing Boards for both the FTCPN and GCPN.

One goal of the FTCPN is to develop a harmonized, national standard for the virus certification of *Malus, Prunus, Pyrus, Chaenomeles,* and *Cydonia* nursery stock. Members of the Plant Health Section continue to participate on the FTCPN subcommittee that is refining a draft of the proposed national standard. The final draft is expected to be ready for public review in early 2011. The ODA is also participating in a pilot study to examine the efficacy of using a systems approach for virus certification of ornamental and fruit tree nursery stock. The Plant Health Section expects to continue to play a prominent role in the development and governance of the NCPN as this network continues to develop.

NPDN and WPDN

The National Plant Diagnostic Network (NPDN) was established in 2002 by legislative mandate in response to the need to enhance agricultural security through protection of the health and productivity of plants in agricultural and natural ecosystems in the U.S. With support from the USDA-NIFA and through the collective efforts of many individuals representing Land Grant Universities, federal agencies, state departments of agriculture, and other stakeholders, the NPDN has grown into an internationally respected consortium of plant diagnostic laboratories. The specific purpose of the NPDN is to provide a nationwide network of public agricultural institutions with a cohesive, distributed system to quickly detect high consequence pests and pathogens that have been introduced into agricultural and natural ecosystems, identify them, and immediately report them to appropriate responders and decision makers.

The Western Plant Diagnostic Network (WPDN) is one of five NPDN centers. WPDN is a consortium of land grant institutions and state departments of agriculture throughout the western United States and the U.S. territories in the Pacific that provide services for plant disease diagnosis, plant identification, and insect/pest identification. WPDN uses a

common software interface to process diagnostic requests and share information among diagnostic laboratories.

ODA is a sub-contractor to WPDN. ODA staff presented Plant Health Program updates and progresses in the WPDN annual meeting held at Davis, CA during Nov. 9 -10, 2010. ODA staff also participated in WPDN monthly conference calls and communicated with other states regarding new disease outbreaks, first detector training, and disease diagnostic progress.

Publications

Welliver, R., Hansen, M., and Osterbauer, N. 2010. Development of a national standard for virus certification of ornamental and fruit tree nursery stock. Phytopathology 100:S135.