United States Department of Agriculture

Pale Cyst Nematode (*Globodera pallida*) Eradication Program- Idaho Falls, Idaho

2016 1st Quarter Report (January - March)

Background

Pale cyst nematodes (PCN), *Globodera pallida*, are soil-borne organisms that do not infest potato tubers. The pests infest feeder roots, where the females attach, feed, and become sedentary. Nematodes reproduce sexually. Females form cysts containing 200 to 600 eggs, which can stay dormant for up to 30 years while the eggs inside remain viable. On host plants, large numbers of PCN can cause wilting, stunted growth, poor root development, and early plant death. If left uncontrolled, PCN can reduce yields up to 80 percent in potato fields. Even with only minor symptoms showing on the foliage, PCN can significantly reduce tuber size. PCN spreads primarily by the transport of cysts in soil. This may occur with the movement of soil on farming, construction, and other equipment; infested soil adhering to seed potatoes and other regulated crops; and any other items or means of transport such as water.

On April 19, 2006, officials of USDA's Animal and Plant Health Inspection Service (APHIS) and the Idaho State Department of Agriculture (ISDA) announced the detection of PCN, a major pest of potato crops. This was the first detection of the pest in the United States. The nematode cysts were detected during a routine survey of tare soil at an ISDA grading facility in eastern Idaho. Subsequent 2006 surveying to determine the possible origin and distribution of the pest in Idaho confirmed seven PCN-infested fields totaling 911 acres, all within a one mile radius in Bingham and Bonneville Counties, Idaho. The PCN-infested fields and an area surrounding the fields were placed under a Federal Domestic Quarantine Order and parallel State Rule in August 2006, establishing restrictions on movement of certain regulated articles from Idaho in order to prevent the spread of PCN.

As a result of continued intensive soil sampling since 2007, an additional nineteen PCN-infested fields have been found. All 26 known infested fields lay within a 7.5 radius spanning parts of northern Bingham and southern Bonneville Counties, Idaho. The fields associated with them through shared tenancy, farming practices, equipment, and/or shared borders have been extensively surveyed and regulated. Since program inception, approximately 55,000 acres have been regulated due to their infestation or association with an infested field. Non-infested, associated fields have been eligible for federal deregulation following a sequence of soil surveys with no PCN detections. To date, 45,100 acres have been released from federal regulation; however, some of that acreage was re-regulated due to a new association(s) with an infested field(s). Currently, 9,929 acres are regulated, 2,897 acres of which are infested.

Eradication treatments in PCN-infested fields have been ongoing since the spring of 2007 and have included methyl bromide fumigation, Telone II fumigation, and planting of biofumigants. Testing of the soil in infested fields indicates the average viability of eggs within the PCN cysts has declined by more than 99% since eradication treatments began. To date, 17 infested fields (1,939 acres) have triggered the greenhouse bioassay stage of evaluating eradication progress when viable eggs were no longer detected in cysts collected from those fields. Eight of the 17 fields (1,054 acres) have also successfully completed greenhouse bioassay testing, enabling them to return to potato production with certain regulatory and survey requirements remaining in place. Greenhouse bioassays for the other fields are ongoing at the University of Idaho in Moscow.

General PCN Program information can be found at: http://www.aphis.usda.gov/planthealth/pcn.
− Click on 'Regulated Fields Maps' under the heading "Quarantine Information" for a list of current and past regulated area maps.

− Click on 'PCN Regulations: 7 CFR 301.86' for the current Federal PCN rule, revised as of January 1, 2010.

Survey Information

Type of survey	Idaho soil samples collected		
	1st Quarter of 2016	2016 Year to date	Since program inception
Detection	0	0	229,775
Delimiting	0	0	257,746
Eradication	312	312	146,643
Total	***312***	***312***	***634,164***

Identification and Diagnostics

Type of survey	Samples processed by the Idaho PCN Laboratory		
	1st Quarter of 2016	2016 Year to date	Since program inception
Detection	4,897	4,897	240,056
Delimiting	0	0	249,263
Eradication	0	0	145,121
Total	***4,897***	***4,897***	***634,440***

Type of survey	Samples processed at other Idaho laboratories	
	Idaho Food Quality Assurance Laboratory (2006-2009, now closed)	Idaho State Parma Research and Extension Center (2006-2009)
Detection	52,670	69
Delimiting	10,227	896
Total	***62,897***	***965***

Program Research

Research is ongoing at the University of Idaho (Moscow, Parma, and Aberdeen campuses) to develop biological control agents and biofumigants against PCN, to elucidate genetic PCN immunity pathways, evaluate the effectiveness of litchi tomato (LT) as a trap crop for PCN, and determine agronomics for growing LT in southeast Idaho. Additional information about U of Idaho PCN research can be found at: http://www.uidaho.edu/cals/idahopcn.

Work continues at ARS-Prosser to develop favorable LT traits to increase its appeal to growers for use as trap crop, produce LT seed for future field trials, and to identify and characterize PCN hatching factors in potatoes, LT, and other non-solanaceous plants.

Eradication Activities

Methyl bromide has been applied to PCN-infested fields annually in the spring (2007-2014) and was applied to one field in fall 2011. Telone II was applied in the late summer of 2007- 2008 and 2010-2011. Telone II was not used in 2009 due to a world-wide shortage of the chemical. Biofumigants with nematicidal activity were planted in the infested fields in the summers of 2007 (oil radish), 2008 (clover), and 2009 (arugula). The University of Idaho and infested field operators planted the trap crop litchi tomato on 132 acres in 2015 and on 50 acres in 2016.

Regulatory Actions

On February 25, approximately 70 acres of associated fields in Bingham County were deregulated after completing a series of soil surveys with negative results for PCN.

Regulatory Treatments

Treatment type	Regulatory Treatments (# of pieces of equipment)		
	1st Quarter of 2016	2016 Year to date	Since program inception
Pressure Washed	82	82	20,448
Steam Sanitized	12	12	2,705
Total	***94***	***94***	***23,153***

Self-Certification Program (initiated in 2012)

Treatment type	Regulatory Treatments (# of pieces of equipment treated by stakeholders participating in the self-certification program)		
	4th Quarter of 2015*	2015 Year to date*	Since program inception*
Pressure Washed	87	593	3,923

*Self-certification data lags one quarter behind all other Program data in order to provide a stakeholder reporting period.

Regulatory Documentation

Documentation type	Regulatory Documentation		
	1st Quarter of 2016	2016 Year to date	Since program inception
Certificate (PPQ 540)	38	38	9,861
Limited Permit (PPQ 530)	15	15	2,761
New compliance agreements	1	1	183

Impacts on Commerce

In response to the initial PCN detection in 2006, Canada, Mexico and Korea shut off importation of potatoes from Idaho, while Japan cut off importation of potatoes from the entire U.S. The Mexico and Canada export markets have both been re-opened with the exception of potatoes from PCN-regulated areas. Both require PCN soil surveys from origin fields. The Korea market was reopened in June 2010 with the exception of potatoes originating from Bingham and Bonneville Counties, Idaho. The Japan market remains closed to Idaho potatoes but negotiations are actively underway to re-gain market access. Because of extensive field surveys conducted throughout production areas in Idaho, all of which have been negative beyond the twenty-six infested fields, the general opinion by our trading partners is that potatoes produced outside regulated areas do not pose the biological risk for introduction of PCN.

Communication and Outreach

General PCN Program information can be found at: http://www.aphis.usda.gov/planthealth/pcn.
− Click on Program Updates for the latest stakeholder update, due in July 2016.

- On January 21, PPQ held its annual pale cyst nematode (PCN) research meeting in Pocatello, Idaho. Participants included representatives from the local potato industry, Idaho State Department of Agriculture, local impacted growers, University of Idaho, and Agricultural Research Service in Idaho, Oregon and Washington. This year additional participants included a New York grower and a potato breeder and researcher from Cornell University to provide overview of golden nematode program along with a member of Science & Advice for Scottish Agriculture to give an international perspective. Topics included presentations of results from 2015 field and lab trials as well as recommendations for work to be conducted this upcoming year.

- On February 2, PCN program staff presented a PCN program overview to a group of 26 science students at Hobbs Middle School in Shelley, Idaho. The students learned about PCN biology, PPQ's response to the 2006 detection of PCN in Idaho, and the current regulatory and eradication program. The students enjoyed hands-on learning in the PCN laboratory where they learned how to use a dissecting microscope to identify PCN cysts extracted from soil samples.