United States Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine

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

September 2010 Report

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 spread 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 in 2007 and 2008, an additional two PCN-infested fields were found in Bingham County, Idaho. The nine PCN-infested fields all continue to be within a one mile radius and the fields associated with them through shared tenancy, farming practices, equipment, and/or shared borders have been extensively surveyed and regulated. Since program inception, a total of 30,753 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, 29,327 acres have been released from federal regulation. Currently, 1,426 acres remain regulated, of which 1,100 are PCN-infested.

Eradication treatments of PCN-infested fields have been ongoing since the spring of 2007. Eradication treatments have included methyl bromide fumigation, Telone II fumigation, and biofumigant plantings. Testing of the soil in infested fields indicates the average viability of eggs within the PCN cysts have declined by more than 95% since eradication treatments began.

A description of the current PCN regulated area can be found at:
http://www.aphis.usda.gov/plant_health/plant_pest_info/potato/pcn-maps.shtml

The current Federal PCN rule revised as of January 1, 2010:
http://www.aphis.usda.gov/plant_health/plant_pest_info/potato/downloads/pcndocs/7cfr-10.txt

Survey Information

Type of survey	Idaho soil samples collected	
	September 2010	Since program inception
Detection	6,599	103,403
Delimiting	166	128,224
Eradication	0	52,586
Total	*6,765*	*284,213*

Identification and Diagnostics

Type of survey	Samples processed by the Idaho PCN Laboratory			Results		
	September 2010	2010 Year to date	Since program inception	September 2010 results	2010 Year to date	Results since program inception
Detection	1,197	40,499	71,329	Negative	Negative	Negative
Delimiting	0	2,513	117,615	Negative	Negative	Negative[1]
Eradication	404	4,422	50,736	N/A	N/A	N/A
Total	*1,601*	*47,434*	*239,680*			

[1]Except for samples confirmed for the eighth and ninth infested fields

Type of survey	Samples processed by the Idaho Food Quality Assurance Laboratory	
	Since program inception	Results
Detection	49,984	Negative
Delimiting	10,224	Negative[1]
Total	*60,208*	

[1]Except for samples confirmed for the first seven infested fields

Program Research

Research continues at University of Idaho, ARS in Prosser, WA and in Ithaca, NY. Bioassay of four field samples will begin this month in Moscow. The cysts are currently hydrating and the experiment will be planted Friday, October 15th. Besides three replicates of each sample there will be three replicates of positive and three replicates of negative controls resulting in the first experiment having 18 pots. An alternate host study has just been completed at Moscow, with good to excellent cyst production on the controls and varied among the different potential alternate hosts indicating the experiment produced good and useful data. Cyst counts are being finalized now. The evaluation of potato breeding lines for resistance to

PCN is currently in the soil processing phase. The first biocontrol study using microorganisms collected from Southern Idaho field PCN cysts was initiated in the greenhouse the end of September. A biofumigation study using *Brassica juncea* seed meal was started this week. Various rates of meal were mixed with soil carrying a cyst bag and then the pots were bagged since *B. juncea* will produce glucosinolates as a gas. After fumigating, potato tubers will be placed in the soil to determine the impact of the meal on cyst production. A diapause study will be started once the last cyst increase pots are processed to provide fresh cysts for this study. It is hoped this study will provide information on the appropriate diapause for the Idaho PCN population. Testing mustards as green manure and evaluating when is the best time to deploy them in Idaho fields, spring or fall.

The ARS in Prosser is evaluating sticky nightshade as a trap crop is complete except for the Desiree positive controls. Cysts reproduced in the Russet Burbank positive controls, but no reproduction was observed in 52 replicates of the sticky nightshade. At the ARS Laboratory in Ithaca transgenic potato lines are ready to be checked for resistance to PCN infection.

Eradication Activities

There were no eradication activities in September, 2010.

Telone II was applied in the late summer of 2007, 2008, and 2010. Telone II was not applied in 2009 due to a world-wide shortage of this chemical.

Biofumigants with nematicidal activity were planted in the infested fields in the summers of 2007 (oil radish) and 2009 (arugula).

Regulatory Actions

The PCN-regulated area was not amended in September.

Regulatory Treatments

Treatment type	Regulatory Treatments (# of pieces of equipment)		
	September 2010	2010 Year to date	Since program inception[1]
Pressure Washed	23	342	>6,500
Steam Sanitized	28	180	>800
Total	*51*	*522*	*>7,300*

[1]A review of regulatory data is underway while new data collection and management tools are developed.

Regulatory Documentation

Documentation type	Regulatory Documentation		
	September 2010	2010 Year to date	Since program inception[1]

Certificate (PPQ 540)	18	191	5,480
Limited Permit (PPQ 530)	0	203	1,179
New compliance agreements	0	6	136

[1]A review of regulatory data is underway while new data collection and management tools are developed.

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 Mexican and Canadian 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 Korean market was reopened in June, 2010 with the exception of potatoes originating from Bingham and Bonneville Counties, ID. The Japanese 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 nine 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

The regional sewer project to lay a main collection pipe along Country Club Road in Shelley moved through the northern edge of three infested fields in August and September. The project contactor cooperated fully with program regulations and sanitation requirements.

The next stakeholder update is due out in December, 2010. Stakeholder updates are available at:
http://www.aphis.usda.gov/plant_health/plant_pest_info/potato/pcn_stakeholder.shtml