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

April 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 as per the Guidelines indicate 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, within docket # APHIS-2006-0143, is available at:
http://regulations.gov.

Survey Information

Type of survey	Idaho soil samples collected	
	Apr 2010	Since program inception
Detection	6849	89,814
Delimiting	320	128,058
Eradication	2012	50,276
Total	*9181*	*268,148*

Soil survey activities resumed in Idaho during April, 2010, and are running at full speed.

Identification and Diagnostics

Type of survey	Samples processed by the Idaho PCN Laboratory			
	Apr 2010	Since program inception	Apr 2010 Results	Results since program inception
Detection	2,425	28,651	Negative	Negative
Delimiting	678	116,391	Negative	Negative[1]
Eradication	1,440	48,338	N/A	N/A
National	0	24,687	Negative	Negative
Total	*4,543*	*218,067*		

[1]Except for samples confirmed for the nine infested fields

Type of survey	Samples processed by the Idaho Food Quality Assurance Laboratory	
	Since program inception	Results
Detection	35,524	Negative
Delimiting	31,097	Negative[2]
Total	*66,621*	

[2]Except for samples confirmed for the nine infested fields

Program Research

At University of Idaho, a second PCN hatching study using cysts from the Idaho PCN-infested fields is underway. A second fumigant efficacy study is being planned and will reuse soil from the first fumigant efficacy study in the second study. PCN rearing work is improving in that rearing success is becoming more consistent. A greenhouse study will be conducted this summer to identify herbicides that are effective at killing sticky nightshade.

USDA ARS Researchers in Prosser WA have produced large amount of potato root exudate using hydroponics. Hydroponic exudate is cleaner than soil root exudate and will give simpler LCMS

profiles, facilitating compound purification. Total hatching activity of the exudate is being evaluated by trial and error in various purification steps. Active root exudates are present in low concentrations and are chemically dilute, indicating that hatching factors are very potent. These experiments are ongoing.

Eradication Activities

Methyl bromide application to the PCN-infested fields resumed on April 15, 2010. Approximately 600 acres have been fumigated, but high winds and rainy weather have slowed application progress. Fumigation is expected to be completed in early May. Methyl bromide was applied to the PCN-infested fields previously in the spring of 2007, 2008, and 2009.

Telone II application to the PCN-infested fields is scheduled for late summer, 2010. Telone II was applied in the late summer of 2007 and 2008. There was no Telone II application 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 amended on April 26, 2010, when 209 acres were deregulated following a series of soil surveys without PCN detections.

Regulatory Treatments

In April, 63 pieces of farming and/or heavy equipment were pressure washed, and eight pieces of farming and/or heavy equipment were steam sanitized because they came in contact with PCN-regulated or infested soil. Since program inception, more than 7,700 pieces of equipment have been sanitized to support the program goal of preventing the spread of PCN.

Regulatory Documentation

In April, 26 certificates (PPQ form 540) and 42 limited permits (PPQ form 530) were issued to document the movement and treatment of farming and heavy equipment that came into contact with PCN regulated or infested soil. Since program inception, more than 6,200 certificates and 1,150 limited permits have been issued for the sanitation and movement of regulated articles.

One new compliance agreement was issued to an external stakeholder in April. Through the end of April, a total of 132 compliance agreements have been issued by the PCN Program since its inception.

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 and Japanese markets remain 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. A Korean nematologist is scheduled to visit the program in May, which should facilitate the re-opening of that market.

Communication and Outreach

An interview was granted the Shelley Pioneer newspaper about progress toward eradication, and next steps for the program. New Mexico State University visited the program to better understand soil extraction and reading processes, and to further their project to automate sample reading via an electronic scanning device. Jonathan Jones, national program coordinator, Kai Caraher, environmental compliance, and Dave McNeal, assistant regional director, all visited the program in April. During their visit, they participated in survey, saw methyl bromide fumigation in progress, provided environmental monitoring guidance, and planned deep-sampling and other future operations with program staff. There is a regional sewer project being built in Shelley which will encompass many surrounding communities. The project plans to lay its main collection pipe along Country Club road, which has infested fields on each side of the road. Regulatory and sanitation issues will have to be brought to the attention of project principals.

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