

Survey Methods

PCN infestations may be associated with patches of poor growth. Affected potato plants may exhibit yellowing, wilting, or death of foliage, but these symptoms are not always present. For example, in Idaho, PCN was detected through testing infested soil in a potato-storage facility as part of a CAPS survey.

Pest survey specialists use two methods to collect soil samples for PCN testing: field or piler dirt surveys.

Field Surveys

Ten percent of the perimeter acreage of each field surveyed must be sampled at a rate of four 5-pound composite samples per surveyed acre. All samples must be collected and sent to an approved laboratory for diagnostic testing. If a USDA cyst extractor is available, each 5-pound sample will be processed in its entirety. If an extractor isn't used, the sample will be thoroughly mixed and only two subsamples (500 cm³ each) will be collected for processing at a time. The remainder of each 5-pound sample must be stored until the entire 5-pound sample has been processed.



Figure 6—Mechanical wheel soil samplers like this one were used during the PCN survey in 2006.

Piler Dirt Survey

Although field survey is the preferred method, the piler dirt survey offers a reasonable alternative. Piler dirt can be (1) an aggregate pile of dirt that results from movement of potatoes from the field to a transport truck or (2) a pile of dirt that results from the movement of potatoes from a transport truck to a storage facility. Soil samples from piler dirt accumulated from each field can be collected in plastic buckets and then transferred into paper bags. The number of samples collected varies based on the size of the harvested field. All soil samples will be shipped to an approved USDA laboratory for diagnostic testing.

The Benefits of Participation

Participation in the survey is voluntary and is fully funded by USDA–APHIS. However, the benefits of the survey to the entire potato industry are likely to be directly related to the level of participation. In other words, more participation in the survey will generate more information to demonstrate that, other than the isolated detection in Idaho, there is no PCN in the United States. This information will help to improve the domestic and international marketability of the U.S. potato crop. Even if additional isolated cases of PCN are detected through the survey, APHIS and its State partners are prepared to localize and contain any potential problems and minimize the negative effects that may result. In this



Figure 7—Cleaning and sanitizing farm equipment is important in preventing the spread of PCN contamination to new locations.

Figure 8—Producers share information on best management practices for minimizing the spread of the PCN.



way, survey and early detection will better protect the U.S. potato industry from the serious consequences of allowing PCN to spread unchallenged or become established in the United States.

Background on PCN, APHIS' Federal Order, the National Survey Plan, and other materials are available online at <http://www.aphis.usda.gov/plant_health/plant_pest_info/potato/index.shtml>.

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Photo credits: All the images in this leaflet except the microscopic shot of a PCN were taken by Potato Cyst Nematode Incident Command Center personnel in Idaho during 2006. The image in figure 1 comes from the Forestry Images Web site and is reproduced by permission.

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Potato Cyst Nematode National Survey Plan:

“Looking” To Keep Potato Markets Open



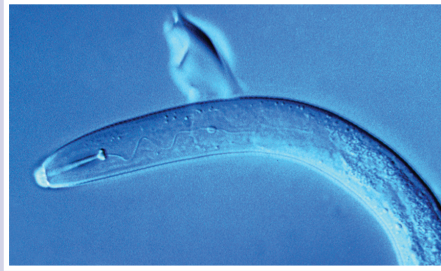


Figure 1— This is a microscope shot of the anterior part of a juvenile PCN.

Introduction

In the last two decades, trade with foreign countries has increased dramatically, opening new markets for U.S. commodities and filling American grocery stores with tastes from other nations. Similarly, international travel has exposed Americans to new cultures and brought visitors from all over the world to the United States. With these opportunities, however, come increased risks associated with the potential movement of plant pests and diseases into the United States.

The U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) uses agricultural safeguarding tools and techniques, such as early detection through surveillance, to prevent the establishment of foreign pests and diseases in the United States and to protect American agriculture. Infestations of exotic pests such as the potato cyst nematode (PCN)—*Globodera pallida*—can permanently damage agricultural resources. If PCN became established here, it could eventually shut down potato exports to many other countries.

Some plant pests, such as the Japanese beetle and Asian gypsy moth, leave almost immediate evidence of their presence. Others, like PCN, can go undetected for months, even years, in the absence of vigilant surveillance. Early detection of pests minimizes the use of pesticides, enhances product quality and marketability, and results in an abundant and affordable supply of food, fiber, plants, and plant products for domestic and export markets.

Figure 2— A laboratory technician analyzes extracted soil samples, looking for evidence of the PCN.

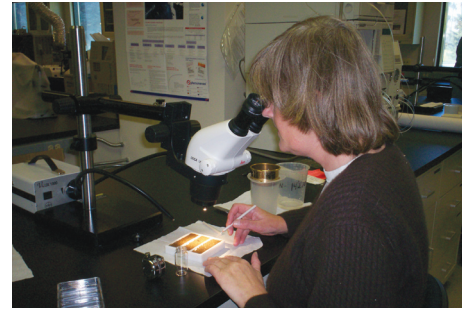


Figure 3—The orange balls are PCN cysts on a potato root.



Background

A major pest of potato crops in cool areas, PCN was detected for the first time in the United States in April 2006 in a grader facility in eastern Idaho. After launching a rigorous survey, agriculture officials isolated the pest to just seven potato fields in southeastern Idaho. PCN primarily affects plants within the potato family, including tomatoes, eggplants, and some weeds. If left uncontrolled, PCN can reduce yields up to 80 percent in potato fields.



Figure 4—Here, potatoes move on a conveyor belt into a storage cellar.

PCN is a soil-borne microscopic worm that does not infest potato tubers. It infests feeder roots, where the females attach, feed, and become sedentary. Nematodes reproduce sexually. Males are attracted to females by a pheromone (sex attractant) and may mate several times. Females form cysts containing 200–600 eggs, which can stay dormant for up to 30 years while the eggs inside remain viable.

PCN originated in South America and is now widely distributed in many potato-growing regions throughout the world. In North America, the nematode is also known to be present on the island of Newfoundland, Canada.

Detection

In April 2006, USDA–APHIS, in coordination with the Idaho State Department of Agriculture (ISDA), confirmed the finding of PCN in a soil sample collected from a potato-processing facility in Idaho. Evidence indicates that the nematode was found shortly after it arrived in the country. This relatively early discovery is credited to ISDA's participation in the Cooperative Agricultural Pest Survey (CAPS), a surveillance program managed jointly by APHIS and State departments of agriculture. An extensive survey of Idaho production and seed-potato fields, packing facilities, and storage sheds revealed that the nematode was present in only seven production fields within an isolated regulated area.

In August 2006, APHIS issued a Federal Order to restrict the interstate movement of certain products from the designated regulated area in Idaho to prevent the spread of PCN. That Order specifically restricted the movement of the following regulated articles: potatoes; nursery stock; soil, compost, humus, muck, peat, and decomposed manure; grass sod; small grains and soybeans; hay, straw, fodder, and plant litter; ear corn, except shucked; used farm equipment; and any other articles deemed to present a hazard for spreading PCN. These articles can be moved interstate only when accompanied by a certificate or limited permit signed by a State or Federal inspector.



Figure 5— A survey specialist collects soil samples from a potato field during the PCN survey in 2006.

National Survey Plan

Working closely with the potato industry, APHIS' Plant Protection and Quarantine (PPQ) program developed a 2-year, science-based National Survey Plan for the detection of PCN in all potato-producing States. The intent of the survey is to detect any potential problems early and to gather information to demonstrate to trading partners that U.S. potatoes are PCN free.

Since seed potatoes pose the greatest risk (pathway) for PCN introduction and contamination from one field to another, the survey in each State will target all seed fields and approximately 10 percent of production fields. While the selection of production fields is designed to be random, special attention may be paid to fields with a higher likelihood of infestation and detection. If a new detection of PCN occurs, regulatory actions will be taken to protect other potato fields and lessen the effects on the potato industry as a whole. In such an event, APHIS is committed to working with potato growers and State counterparts to develop reasonable and appropriate regulatory actions.