Agricultural Pest Survey, pale cyst nematode was only detected by testing residual soil that accompanied potatoes into the storage facility.

Pest survey specialists follow established survey guidelines to collect soil samples for PCN testing. During these surveys, each field must be sampled at a rate of one 5-pound sample per surveyed acre. All samples are collected and sent to an approved laboratory for diagnostic testing. Each soil sample is then processed in its entirety to get accurate test results.

The Benefits of Participation

Participation in the survey is voluntary. As a grower, your support is key to a successful survey and brings benefits to the entire potato industry. The more growers who participate in the survey, the more information we will have to show that—other than the isolated PCN detections in Idaho and New York—these pests are not present in the United States. This information will help improve the U.S. potato crop's marketability at home and abroad.

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

Even if we find more isolated cases of PCN through the survey, APHIS and the States are ready to contain any potential problems and minimize the negative effects that may result. In this way, survey and early detection will better protect the U.S. potato industry from the serious costs of allowing PCN to spread unchecked or become established here.

For More Information

To learn more about PCN, the National Survey Plan, and related topics, visit the APHIS Web site at **www.aphis.usda.gov/planthealth/pcn.**

If you have specific questions or want to join the survey, please call your nearest APHIS office. Contact information is listed on our Web site at **www.aphis.usda.gov/planthealth/sphd.**

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

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

Photo credits: All of the images in this leaflet (except for the microscopic shot of PCN) were taken by pale cyst nematode personnel in Idaho during 2006. The microscope photo comes from the Forestry Images Web site and is reproduced by permission.

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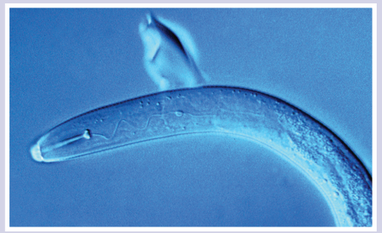
Potato Cyst Nematode National Survey Plan:

"Looking" To Keep Potato Markets Open



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

Introduction

In the last few 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 that invasive plant pests and diseases will enter our country.

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 keep foreign pests and diseases out of the United States and protect American agriculture. Infestations of exotic pests such as the pale cyst nematode *(Globodera pallida)* and the golden nematode *(G. rostochiensis)* can permanently damage agriculture and natural resources. Collectively, these pests are known as potato cyst nematodes (PCN). If PCN became established in the United States, their presence could eventually shut down potato exports to 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 or years—even decades—without vigilant surveillance. When plant pests are detected early, we have more opportunities to effectively control them; minimize pesticide use; enhance product quality and marketability; and ensure an abundant, readily available, and affordable supply of food, fiber, plants, and plant products for domestic and export markets.

A laboratory technician analyzes extracted soil samples, looking for evidence of PCN.

The orange balls are PCN cysts on a potato root.

Background

PCN are major pests of potato crops in cool weather areas. Pale cyst nematode was detected for the first time in the United States in 2006 at a grader facility in eastern Idaho. After conducting rigorous surveys, agriculture officials isolated the pest to potato fields within a small 7.5-mile radius spanning two counties in southeastern Idaho. Golden nematode was first detected in 1941 in Long Island, NY (Nassau County). Since then, it has been confined to small areas within eight counties in that State.

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

Both nematodes originated in South America and are now widely distributed in many potato-growing regions throughout the world. In North America, the pale cyst nematode and golden nematode are also present in Quebec, Alberta, and on the islands of Newfoundland and Vancouver Island in Canada.

The main host plant for PCN is potatoes. Other plants within the potato family, including tomatoes, eggplants, and some weeds, can also serve as hosts. PCN are soil-borne, microscopic nematodes that infest 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 to 600 eggs. Cysts can stay dormant for up to 30 years while the eggs inside remain viable. When there are large numbers of nematodes, they 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.

Preventing the Spread

To keep PCN from spreading, APHIS restricts the interstate movement of certain products from regulated areas in Idaho and New York. These products include the following:

- potatoes and other PCN host crops
- root crops
- nursery stock
- soil, compost, humus, muck, peat, and decomposed manure
- grass sod
- hay, straw, fodder, and plant litter
- used farm and construction equipment
- garden and dry beans (Idaho)
- small grains and soybeans (New York)
- ear corn, except shucked (New York)

These products can be moved outside of a quarantined area only when accompanied by a certificate or limited permit signed by a State or Federal inspector.

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 multiyear, science-based National Survey Plan to detect PCN in potato-producing States. The survey's intent is to find any potential problems early and gather information to show trading partners that U.S. potatoes are PCN-free.

If a new detection of PCN occurs, APHIS and State officials will take regulatory actions, such as quarantines and eradication efforts, to protect other potato fields and minimize the impact on the potato industry as a whole. In such an event, APHIS is committed to working with potato growers and State counterparts to develop a reasonable and appropriate response.

Survey Methods

PCN infestations may show up as patches of poor growth. Affected potato plants may have yellowing, wilting, or dead leaves, but these symptoms are not always present. For example, in Idaho in 2006, as part of a survey through USDA's Cooperative