Pale cyst nematode *Globodera pallida*

The pale cyst nematode is a serious pest of potatoes around the world and is a target of strict regulatory actions in the United States. An introduction to Michigan may adversely affect production and marketing of potatoes and other solanaceous crops.

Michigan risk maps for exotic plant pests.

Other common names

potato cyst nematode, white potato cyst nematode, pale potato cyst nematode

Systematic position

Nematoda > Tylenchida > Heteroderidae > *Globodera pallida* (Stone) Behrens

Global distribution

Worldwide distribution in potato-producing regions.

Africa: Algeria, Tunisia; **Asia**: India, Pakistan, Turkey; **Europe**: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Cyprus, Faroe Islands, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, United Kingdom; **Latin America**: Argentina, Bolivia, Chile, Colombia, Ecuador, Panama, Peru, Venezuela; **Oceania**: New Zealand; **North America**: Idaho, Canada (a small area of Newfoundland).

Quarantine status

In 2006, the pale cyst nematode was detected at a potato processing facility in Idaho. This is the first detection in the United States. The nematode infestation appeared to be an isolated case and a regulatory program has been implemented in the regulated area. Since 2006, the United States and Canada have been practicing a joint surveillance program to monitor potato cyst nematodes (pale cyst nematode and golden nematode) in all fields associated with seed potatoes traded between both countries.

Plant hosts

Limited to Solanaceae (nightshade family). The most important hosts are potatoes (*Solanum* spp.). Other hosts include tomatoes (*Lycopersicum esculentum*) and eggplants (*Solanum melogena*).

Biology

Plant-parasitic nematodes are microscopic worms that attack plant roots. After egg hatch in the soil, juveniles of pale cyst nematode move to, penetrate and feed on host roots. After mating, fertilized eggs develop inside females that are attached to roots. When females die their skin hardens and becomes a protective brown cover (cyst) around the eggs. Each cyst contains hundreds of eggs, and it can remain viable for many years in the absence of host plants. One generation normally occurs during one growing season.

Mature females (white) and a cyst (brown) of potato cyst nematode attached to the roots. (Photo: B. Hammeraas, Bioforsk - Norwegian Institute for Agricultural and Environmental Research, Bugwood.org)

Identification

At flowering or later stages of a host plant, mature females and cysts can be seen by the naked eye as tiny round objects (about 0.5 mm, the size of a pinhead) on the root surface. Mature females are white and cysts are brown. Cysts may drop from roots easily.

Symptoms

A heavy nematode infestation may cause yellowing, wilting, death of foliage and patches of poor growth in the field.

Management notes

Detection strategies include surveying for mature females and cysts attached to the root surface of host plants and in soil samples (NAPPO).

Economic and environmental significance to Michigan

Invasion of potato cyst nematodes, such as pale cyst

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nematode and golden nematode, into Michigan may lead to strict regulatory actions and adverse economic impact. To contain the nematode contamination, solanaceous crops and nursery stock (fresh and seed potatoes, tomatoes and eggplants) in the affected area may be destroyed or restricted for sales. New plantings of these crops may be prohibited in the regulated area for many years because the cysts can survive in soil for many years. Intensive applications of nematicides (fumigants or systemic compounds) are possible as nematode eradication or management options, which may have adverse impact on non-target organisms and environment (e.g., non-pathogenic native nematode communities, other soil organisms, water quality).

Likely pathways of entry to Michigan

Sources of pale cyst nematode introduction include contaminated potato tubers and soil debris associated with nursery stock and used farm machinery and equipments (e.g., tractors) originated from Europe and Andean region of South America where the nematode is most prevalent.

If you find something suspicious on a susceptible host plant, please contact MSU Diagnostic Services (517-355-4536), your county extension office, or the Michigan Department of Agriculture (1-800-292-3939).

References

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