

Golden nematode *Globodera rostochiensis*

The golden 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.](#)

Systematic position

Nematoda > Tylenchida > Heteroderidae > *Globodera rostochiensis*

Other common names

Potato cyst nematode, yellow potato cyst nematode

Global distribution

Worldwide distribution in potato-producing regions.

Africa: Algeria, Egypt, Libya, Morocco, Sierra Leone, South Africa, Tunisia, Zimbabwe. **Asia:** Armenia, India, Israel, Japan, Lebanon, Oman, Pakistan, Philippines, Sri Lanka, Tajikistan. **Europe:** Albania, Austria, Belarus, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, Yugoslavia. **Latin America:** Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, Peru, Venezuela. **Oceania:** Australia, New Zealand. **North America:** New York (Long Island and Western New York), Canada (Newfoundland, small areas of Vancouver Island and Quebec).

Quarantine status

The golden nematode is a federally-regulated organism in the United States (Ferris 2008). The Golden Nematode Act of 1948 created quarantine on the interstate movement of this nematode from New York State. In addition, since 2006, the United States and Canada have been collaborating in a joint surveillance program to monitor potato cyst nematodes (golden nematode and pale cyst nematode) in all fields associated with seed potatoes traded between both countries.

Plant hosts

Limited to Solanaceae (nightshade family). Primary hosts are potatoes (*Solanum* spp.). Other hosts include tomatoes (*Lycopersicon esculentum*) and eggplant (*Solanum melogena*).



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

Biology

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

Identification

At flowering or later stages of the 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 yellow (in contrast with white mature females of pale cyst nematode, *Globodera pallida*) and cysts are brown. The cysts may drop from the roots.

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 the host plants and in soil samples (NAPPO).

Economic and environmental significance to Michigan

Invasion of the potato cyst nematodes, such as golden nematode and pale cyst 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 because the cysts can survive in the soil for many years. Intensive applications of nematicides (fumigants or systemic compounds) are possible as nematode eradication or management option,

which may have adverse impact on non-target organisms and environment (e.g., non-pathogenic native nematode communities, other soil organisms and water quality).

Likely pathways of entry in Michigan

The likely sources of golden nematode introduction include contaminated potato tubers and soil debris associated with nursery stock and used farm machinery and equipments (e.g., tractors) originated from potato-producing regions worldwide.

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

- CABI Publishing. 1999. Distribution maps of plant diseases: *Globodera rostochiensis*. (<http://www.cababstractsplus.org/DMPD/Reviews.asp?action=display&openMenu=relatedItems&ReviewID=16162&Year=1999>)
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- Hinch, J. 2006. Agriculture Notes: potato cyst nematode. The State of Victoria, Australia
- NAPPO. 2007. Golden nematode—update on the Canadian situation. North American Plant Protection Organization's Phytosanitary Alert System: (<http://www.pestalert.org/oprDetail.cfm?oprID=297&keyword=globodera%20rostochiensis>)
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