



Potato cyst nematodes *Globodera rostochiensis* and *G. pallida* Exotic threats to Western Australia

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Background

Globodera rostochiensis, potato cyst nematode (PCN) and *G. pallida*, pale or white potato cyst nematode, pose a threat to the Western Australian Potato Industry. *G. rostochiensis* was detected in two states of Australia and these small areas are continually monitored by quarantine. *G. pallida* has not been recorded in Australia. The biology and symptoms caused by both species are similar.

Distribution

PCN originated from the Andean Highlands of South America and has been spread by the transport of potatoes and soil to many potato growing areas of the world. It occurs in Asia, Africa, Europe, North and South America, and New Zealand. It is found mainly in temperate regions, but it also occurs in coastal areas of the tropics. Different pathotypes or races of *G. rostochiensis* and *G. pallida* exist and are found in different parts of the world.

Crop symptoms. Note patches of dead and stunted potato plants

In Australia PCN occurs in quarantined areas of Victoria and was in the past detected in the Perth Metropolitan Region, Western Australia (WA). In WA, there are quarantine regulatory controls that prohibit the sowing of PCN host plants on the original sites where PCN was detected. Movement of machinery and soil is also restricted.

Potential impact

PCN has the potential to cause significant damage to the Australian Potato Industry through crop losses and through the loss of export markets. It can decrease potato yields of susceptible cultivars by up to 90%.

Stringent quarantine protocols are in place throughout Australia to handle any further detections of PCN. As has happened in the two areas where the nematode has been detected in Australia, potato production would be severely restricted in any area where the nematode is

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Cysts on a potato root. Younger cysts are white, older cysts are yellow or red-brown

found. PCN causes a decrease in the size of tubers but has no impact on the number or quality of the tubers.

In WA, PCN was identified in 1986, and a successful eradication program was implemented. There have been no further detections since 1989. There is an ongoing surveillance program and the properties in the quarantine area are surveyed every year to confirm freedom from PCN. WA has an established seed certification scheme incorporating the National Standard as a minimum. Seed and ware potatoes for export are tested for PCN.

Despite the quarantine status of PCN in Australia and the actions taken by governments and industry to contain this pest, the presence of PCN has affected the potato industry and will continue to do so if future outbreaks occur.

PCN can cause considerable production constraints to potatoes, but also restricts domestic and overseas market access and imposes additional costs for quarantine testing and surveillance.

Hosts

The major hosts of *Globodera rostochiensis* are restricted to the Solanaceae family. (e.g. potato, eggplant, tomato). Weeds that are present in WA and known hosts include *Solanum nigrum* (blackberry nightshade), as well as numerous other Solanaceous weed species such as *Oxalis tuberosa* (oca).

Season of occurrence and spread

PCN cysts can remain dormant in the soil for up to 30 years or until stimulated to hatch by exudates released from the roots of host plants. A cyst is the dead body of the female that may contain up to 500 eggs. The cyst is a protective package for the eggs and a means

of dispersal (cysts are spread by infested soil adhering to machinery, shoes, plant roots, bulbs, tubers or root vegetables). The optimum soil temperature for hatching and development of PCN is 15-20°C, but some populations have adapted to lower temperatures. Development from egg to adult can take 38 to 48 days. Moisture and exudates from a host plant are required for hatching and infective juveniles enter the roots of the newly planted crop.

Symptoms

The presence of the nematode is most easily confirmed in the field by the appearance of round pinhead sized white to golden yellow cysts on the roots of infested plants at the time of flowering. Cysts can be seen with the naked eye, but are best viewed with a hand lens. They are easily dislodged, so roots must be lifted and handled with care.

Plants show yellowing and wilting that are typical of many soil borne root pathogens, water stress or nutrient deficiencies. The plants are usually patchy within a field due to the uneven distribution of the nematodes. In heavily infested soils root systems may be shortened and excessively branched. This reduction in the root system can lead to the development of nutrient deficiencies.

Samples of suspect potato roots or tubers can be sent for testing to AGWEST Plant Laboratories and clearly marked as "Potato Cyst Nematodes" and the appropriate HortGuard box ticked.

Related publications

GardenNote 23 Nematodes in the home garden