

Life History and Spread of PCN

Potato cyst nematodes (PCN) are devastating pests of potato and include two species, *Globodera pallida*, the pale (white) cyst nematode and *Globodera rostochiensis*, the golden (yellow) nematode.

Cysts are the dead female body of the nematode. Each cyst can be filled with 200-500 eggs which hatch only when a chemical stimulus called a hatching factor is released by a host plant such as potato. After hatching the J2 will infect roots of a host plant, such as potato (Fig 1). The life cycle of PCN is summarized in Fig. 2. It takes about 12-16 weeks for the nematode to complete its life cycle.

The ratio of male to female nematodes depends on a number of factors but the amount of nutrients is a major determining factor. A nutritious feeding site typically induces more females, whereas a predominance of males develop when the feeding site is poorer in nutrition as may happen if the plant is resistant or otherwise stressed. The cyst acts as a protective covering for the encysted eggs which remain dormant and viable for 30+ years in the soil in the absence of a host. Only once hatching factors are detected do eggs hatch to begin the cycle again.

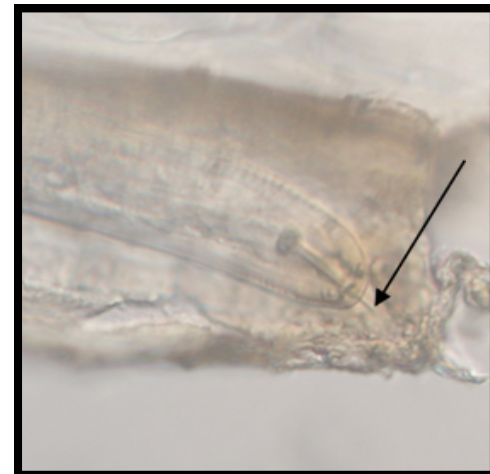


Figure 1: Close up picture of *Globodera pallida* head (Picture by Rinu Kooliyottil). Arrow pointing to stylet of nematode, used to penetrate plant cell walls.

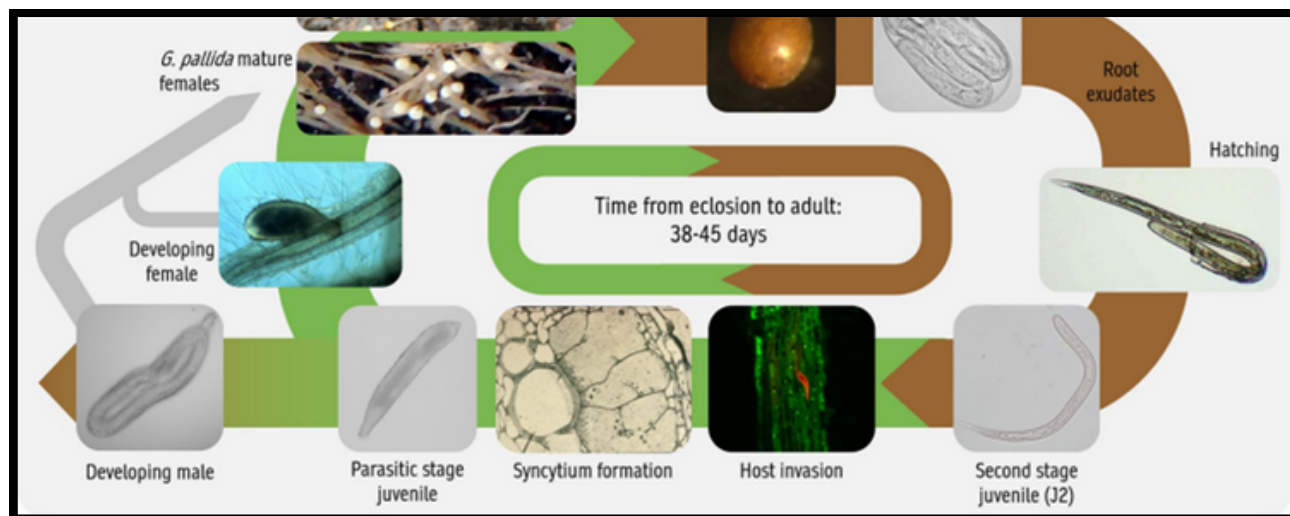


Figure 2: Life cycle of potato cyst nematodes (Price et. al. 2020).



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Because cysts are found in soil, they are easily spread in infested soil clinging to any type of equipment used in a field (Figure 3). Cysts can be spread in the following ways:

- Infested soil on:
 - Farm machinery/equipment
 - Tubers/plant material
 - Boots/clothing

Containment efforts focus on eliminating the spread of contaminated soil from farm to farm by sanitizing equipment and using certified seed potatoes in non-infested fields



Reference:

Price, J. A., Coyne, D., Blok, V. C., & Jones, J. T. (2021). Potato cyst nematodes *Globodera rostochiensis* and *G. pallida*. *Molecular Plant Pathology*, 22(5), 495-507.

Figure 3: Spread of potato cyst nematode cysts in infested soil in South America. A) Cysts in soil clinging to a researcher's finger. B) Cysts on a garden tool. C) Cysts on boots (Pictures taken by Dr. Louise-Marie Dandurand).

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