

Effects of infection by PCN

Damage to potato crops varies from small isolated patches of poorly growing plants to complete crop failure depending on nematode populations. In light PCN infestations, plants may have no above-ground symptoms, but yield can be decreased. Heavy infestations result in reduced numbers and sizes of tubers, and can lead to yield losses as high as 80%. Other pathogens such as *R. solanacearum* (the bacterial wilt pathogen) can also easily enter plant roots through wounds caused by PCN. PCN infection also reduces the sugar content and plate quality of produce as tuber flesh becomes darker with lower fry ratings and shorter shelf life.



Infected vs uninfected plant



PCN infected roots

Types and developmental stages of PCN

Potato Cyst Nematodes (PCN) exist as two main species, *Globodera rostochiensis* and *Globodera pallida*. So far, only *G. rostochiensis* has been reported as a pest of potato in Kenya. PCNs have the following key developmental stages: eggs, juveniles (larvae/young ones), adults and cysts (Fig 1). The eggs, juveniles and adult males can only be seen through a microscope while mature females and cysts are visible with naked eyes on roots of a potato plant from flowering stage onwards. Therefore, soil testing is the best way of detecting the presence of potato cyst nematodes.

Modes of PCN transmission

PCN is mainly spread through infested seed potatoes and contaminated soil adhering to potato tubers, farm machinery, tools, boots and plants or through runoff water or by wind. Once introduced into an area, PCN can survive for long periods in form of cysts even in the absence of a host plant.



Juvenile PCN



PCN Eggs

PCN Management

1. **Phytosanitary and Quarantine Regulation.** Carry out regular surveillance and adhere to regulatory measures to minimize spread of PCN to non-infested areas.
2. **Use of High Quality Seed.** Plant certified seed from registered seed merchants or high quality seed potato from reliable sources to avoid entry of PCN on land that might still be free of the pest or to avoid its increase.
3. **Field hygiene:** Avoid the spread of PCN through infested or contaminated soils adhering to farm tools and footwear; washing with water and disinfecting with 40% Kerol (or other appropriate disinfectant) should be done when entering and leaving a potato field.
4. **Control water runoff.** Dig trenches/cut off drains between and within plots to prevent the spread of PCN through runoff water.
5. **Roguing:** Uproot severely affected plants and destroy them by burning or burying in deep pits.

6. **Crop rotation.** Alternate planting of potatoes with non-solanaceous crops (e.g. maize, beans, cabbages, carrots, wheat and peas) for a period of at least 7 years. During this period, uproot volunteer plants of possible hosts of PCN, including potato, tomato, eggplant and black nightshade.
7. **Soil solarization:** Plough the fields to fine tilth to expose nematodes to desiccation and solar heat during hot months. Covering the ploughed land with clear polythene sheets for about one month can improve solarization.
8. **Bio-fumigation:** Plough in/incorporate into the soil residues from crops in the Brassica family (e.g. kale, cabbage, Indian mustard) so that they decompose to release natural chemicals that kill nematodes (bio-fumigation effect). This requires a month or more before planting.
9. **Trap Cropping:** Grow solanaceous plants such as potato, eggplant, tomato and black nightshade on land that has had heavy PCN infestation and destroy them when still young (5-6 weeks). Such plants trigger hatching of eggs into juveniles and development into young adults which get destroyed together with the plants through uprooting and subsequent burning or burying in deep pits.
10. **Chemical control:** Apply pesticides based on plant extracts (e.g. Achook, Nemrock, Neemraj Super and Nimbecidine) at planting. Synthetic nematicides/fumigants (e.g. Metam sodium and Basamid Granular) can also be used judiciously to decontaminate heavily infested land. It is advisable to follow instructions provided for each product.
11. **Use of resistant varieties.** Resistant varieties are important in the management of PCN where available.

For further enquiries Contact:
Kenya Plant Health Inspectorate Service (KEPHIS)

P. O. Box 49592-00100, NAIROBI.

Telephone: +254 020 3597201 – 3, 3536171-2,

Mobile. 0722 516 221, 0723 786 779, 0733 874274, 0734 874 141, Fax: 254 020 3536175,

Website: <http://www.kephis.org>, Email: director@kephis.org, kephisinfo@kephis.org

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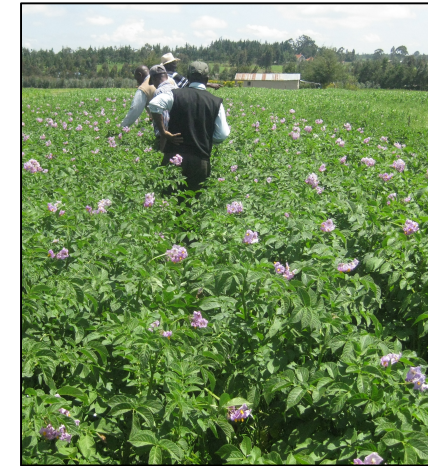
Kenya Plant Health Inspectorate Service (KEPHIS)

Potato Cyst Nematodes

A new threat to potatoes in Kenya



PCN Infested Potatoes



Healthy Potato Plants

Symptoms of Potato Cyst Nematode Infestation

Infested potato plants are stunted and leaves may become yellow or display a dull colour. A severely affected plant has a reduced root system which is abnormally branched and brownish in colour. Affected roots have a decreased capacity for water uptake, leading to wilting, with the possibility of eventual plant death. Since many other factors can lead to these symptoms, plants should be uprooted and visual checked for the presence of cysts and females on the roots.



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