

Vegetable -Matters-of- Fact

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POTATO

Root Knot Nematodes

- ◆ **SYMPTOMS** during early stages of infection on tubers can be confused with powdery scab.
- ◆ **PROBLEMATIC** when hot dry weather early in summer is followed by heavy rain or irrigation.
- ◆ **CLEAN SEED, CROP ROTATION** and **EVEN SOIL** moisture will reduce crop losses.
- ◆ **ROOT KNOT** nematode prefers sandy moist soils above 25°C.

Eelworm (or nematodes) are a group of microscopic worms that exist in soil in large numbers. The majority of species are harmless, feeding on decaying organic matter; but some attack the roots of plants, severely affecting plant growth.

Root Knot Nematodes (RKN) are the most economically damaging of all nematode pests world wide. They feed on the roots of a wide variety of plants including potatoes, tomatoes, beans, carrots, wheat, grapevines, ornamental flowers and many weeds. Pasture hosts include Subterranean Clover and the common weeds Fat Hen and Capeweed. Currently, no potato varieties are known to be resistant to RKN.

RKN species found in Victorian potato crops include *Meloidogyne arenaria*, *M. hapla*, *M. incognita*, *M. javanica* and most recently, *M. fallax*.

Symptoms

Above ground symptoms are similar to many problems including nutrient deficiencies, so it can be difficult to diagnose RKN until affected roots are examined. Infested roots exhibit swellings or galls, and beads or knots (hence the common name). Young galls on tubers appear as hard raised blisters or lumps and may be confused with the early stages of powdery scab. However, tuber symptoms may only develop during storage.

The roots of infested plants have difficulty supplying the above ground plant with nutrients and water. Above ground symptoms may include slow growth and stunting, pale green/yellow leaves and wilting on hot days, which may lead to plants dying prematurely.



Galls and egg masses on roots affected by RKN (left) compared with normal roots (right).



Infected plant (right) compared to healthy plant (left)



RKN gall on potato tuber



Early RKN damage can be mistaken for powdery scab



Potato tubers exhibiting severe RKN damage

Favourable Conditions

RKN prefer sandy, moist soils above 25°C. The nematodes can lie dormant until favourable weather conditions occur and overwinter as egg masses within soil. Greatest crop losses occur when potatoes are grown intensively or rotated with other susceptible crops or pasture.

Seasonal Conditions -The following practices are believed to increase the risk of RKN:

- Shallow ploughing
- Deep planting
- Compaction of the sub-surface soil causing poor drainage, and
- Delayed harvest after tops have died down.

Whilst greatest losses are generally reported in northern Victoria, significant damage has been reported in cooler climates, particularly during summer months when irrigation can create favourable soil conditions.

Infested potatoes are also more susceptible to bacterial wilt and fungal pathogens such as *Verticillium* and *Rhizoctonia*.

For more information contact:
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Management practices

Farm Hygiene - RKN may be spread in soil on tubers, field bins, machinery or other plants, and is virtually impossible to eradicate once established.

Seed Selection - Owing to the great difficulty of completely eradicating RKN, infested seed potatoes should not be planted.

It should be noted that planting infested potatoes may not lead to immediate display of symptoms in the crop. This is because the growing period of the new crop is too short to enable the RKN within the mother tubers to emerge and infect new tubers during the same season. However, they infest the soil and remain as a potential danger for subsequent crops.

Chemical control - Is difficult and may not be economical.

Rotation - The practice of growing potatoes following pasture often leads to severe losses as many plants, particularly clovers, are alternate hosts for RKN.

To reduce nematode numbers rotate crops with grasses, which are poor hosts e.g. sudan grass or cereals (barley, rye, wheat) in combination with a weed-free fallow period. Under Victorian conditions, rotating oats or rye-corn prior to planting potatoes will provide control over RKN, provided crops are kept free of alternate host plants.

Irrigation - Maintain even soil moisture levels by scheduling irrigation will decrease the risk of RKN damage

Testing for Nematodes

Both soil and tubers can be tested for the presence of nematodes. For more information or testing please contact:
Crop Health Services, DPI Knoxfield
Ph: (03) 9210 9356.

Resources used to prepare this factsheet

- Vanstone V and Nobbs J,(2007) "Pest Alert - Meloidogyne fallax"
www.australasianplantpathologysociety.org.au/Regions/May07.pdf
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- DPI-Vic (2006) "Root knot nematode on potatoes" AG0574
- G. R. Stirling and M. F. Wachtel (1985) "Root-knot nematode (*Meloidogyne hapla*) on potato in south-eastern South Australia" Aust. J. Exp. Agric. 25, 455-7