



Symptoms of *P. penetrans* on (a) field pea roots, (b) carrots, (c) field pea crop and (d) a male adult nematode.
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Common Name: Root lesion nematode (RLN), plant-parasitic nematode

Classification: K: Animalia, P: Nematoda, C: Secernentea, O: Tylenchida, F: Pratylenchidae

Identification: Head low and flattened, three annules, stylet short with large basal knobs. Oesophageal gland overlaps the intestine ventrally with a relatively long overlap and a well developed median bulb. Adults 0.34-0.81mm long with tail rounded and smooth tipped. Easily distinguished from *Pratylenchus neglectus*, which is similar morphologically, by a large proportion of males.

Lifecycle: *P. penetrans*, a plant-parasitic nematode, is a migratory endoparasite which enters roots to feed, but may live for some time in soil. It relies on sexual reproduction and lays 1-2 eggs/day in roots or soil. It has five stages of development from egg to adult which takes 30-86 days depending on the soil temperature and host. Eggs can hatch at temperatures as low as 2.7°C. All vermiform stages can invade roots. It can survive in a dehydrated form or as eggs.

Host Range: It is found mostly in temperate areas including Australia, Canada, Europe, India, Japan, New Zealand, Philippines, Russia, and USA. It has a wide host range which includes many horticultural and broadacre crops, fruit trees and weeds. It is found most often in sandy soils and reproduces best between pH 5.2 and 6.4. *P. penetrans* occurs infrequently in broadacre crops in Western Australia (WA), but severe damage has been observed on roots of wheat, oat and field pea. It is more common in horticultural crops with a recent survey detecting it in 17 of 24 carrot/potato fields in the south west of WA. There is very little published information on the impact of *P. penetrans* in Australia.

Symptoms and Impact: Infested plants grow poorly, crop growth is uneven, leaves are chlorotic, yields are reduced and crops may wilt in moist soils. Affected roots have distinct or extensive dark brown/reddish lesions. Roots are thin and the number of lateral roots is

reduced. Infested carrots have delayed maturity and branching of taproots. Potato tubers may show symptoms similar to common scab (*Streptomyces scabies*).

This nematode facilitates secondary invasion by other soil microorganisms such as *Verticillium dahliae* and *Fusarium*. Internationally, a combination of *V. dahliae* and *P. penetrans* has been shown to increase the severity of 'early dying syndrome' in potato crops where plants yellow and die early. In Eastern Australia, *V. dahliae* and RLN were found in 80% and 92% of potato growing fields which indicates that 'early dying' could be an issue in Australia.

Management and Control: Ensure plants have adequate nutrition and water, this helps them to be more tolerant to infection. Using less susceptible crops and varieties and rotation with resistant break crops or weed free fallow between cash crops is a way to decrease nematode numbers. *P. penetrans* has a wide host range, so it is difficult to find resistant alternatives. More resistant choices include Saia oats, Marigold (*Tagetes erecta*), sorghum-sudangrass, or grain and forage pearl millet. Crops known to increase *P. penetrans* numbers are red clover, cereal rye, chickpea and lupin. Little research has been done in Australia on rotation crops. Root-knot and RLNs are often found together and crop susceptibility may be different for each, so it is important to know which nematode species are present.

In horticulture, preplant nematicides and soil fumigants are widely used, but are too costly in broadacre farming. Chemicals do not eradicate plant-parasitic nematodes, but may reduce numbers below yield limiting levels. To lessen biodegradation of chemicals it is important to rotate control strategies.

References and Further Reading:

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3. Vanstone, V. A. (2007). Root Lesion and Burrowing Nematodes in Western Australian cropping systems. Western Australia, Department of Agriculture and Food Western Australia. Bulletin 4698.

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