

ROOT LESION NEMATODE —NEW SOUTH WALES

Key points

- Root lesion nematodes (RLN) are microscopic worm-like animals that extract nutrients from plant roots causing yield loss.
- There are two main species of RLN in NSW, *Pratylenchus thornei* and *P. neglectus*.
- Crops and varieties can vary in their tolerance and resistance levels to both RLN species
- Rotations can effectively keep major RLN species to a minimum (e.g. narrow-leaved lupin, faba bean, field pea, lentil, rye, triticale, durum wheat and oats).
- Sow early where possible to 'get ahead' and maximise yield.
- Manage fertility to maximise nutrition, particularly early in the growing season.
- Control volunteer hosts and weeds during late summer/early autumn and in break crops.

Background

Root lesion nematodes (RLN) are microscopic worm-like animals (figure 1) that use a syringe-like 'stylet' to extract nutrients from the roots of plants, such as wheat and canola. *Pratylenchus neglectus* and *P. thornei* are the most common RLN species in Australia, where they have been shown to cause significant yield losses.

RLN's affect all cropping regions of southern Australia, and are an increased risk in areas where minimum tillage has been adopted. Under conventional tillage operations, disruption of dry topsoil is sufficient to kill many RLN's over-summering in a 'dehydrated' state.

Commercial pre-season testing of soil by the Predicta-BTM root disease testing service determines levels of *P. neglectus* and *P. thornei* present using a DNA detection technique. During the season, plants with suspected RLN infections should be sent to a laboratory for extraction and identification.

Symptoms and detection

Nematode symptoms are commonly confused with nutritional or other disease problems so the best way to confirm diagnoses is by laboratory test.

Above ground, crops appear patchy with unthrifty and/or yellowed plants with reduced tillering, not unlike the symptoms of water or nitrogen deficiency (figure 2).

Below ground, early infection symptoms show brown root discolouration, with fewer and shorter root branches (figure 3). In severe cases, plants are easily pulled from the ground as a result of root destruction.



Figure 1: Microscope image of a root lesion nematode. Notice the syringe-like "stylet" at the head end, which is used for extracting nutrients from the plant root. This nematode is less than 1 mm long. (Photo: Sean Kelly, DAFWA, Nematology.)



Figure 2: Patchiness in crop caused by RLN. (Photo by Vivien Vanstone, DAFWA, Nematology.)



Figure 3: Brown lesions indicate entry points of RLN on chickpea roots (left); cereal roots show general discolouration and reduction in length and number of lateral root branches. (photos: Vivien Vanstone, DAFWA, Nematology.)

Management

Prior to the growing season, RLN's are best managed by ensuring volunteer host crops and weeds are kept to a minimum, and resistant crop varieties are seeded where possible (table 1).

Crops that are not susceptible to the dominant species of RLN within a paddock should be used as a break-crop where a medium threat is detected. If RLN levels are high it may be necessary to use two consecutive resistant crops to reduce numbers sufficiently.

Early sowing also allows the crop to establish a solid root system before RLN's can have a significant effect, and good nutrition is very much related to this.

As nematodes are spread by surface water, and vehicular/machinery movement, employing strict hygiene measures will reduce the risk of contamination.

Table 1: Susceptibility of various crops to the most common and yield limiting species of RLN.

RLN SPECIES	SUSCEPTIBLE	MODERATELY SUSCEPTIBLE	RESISTANT		
<i>P. neglectus</i>	wheat canola chickpea mustard	barley oat medic durum wheat common vetch	field pea narrow-leaved lupin faba bean triticale	safflower rye narbon bean lentil	lathyrus clover bitter vetch
<i>P. thornei</i>	wheat chickpea faba bean vetch	barley mustard	field pea lentil triticale	lupin oat canola	

Further reading and references

The New South Wales Department of Primary Industries has further soil biology information ([online](#))

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