PRATYLENCHUS NEGLECTUS (ROOT LESION NEMATODE)

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Please note: Results are preliminary, often based on limited trials and observations.

What is it ?

Two species of root lesion nematode, *Pratylenchus neglectus* and *P. thornei*, occur in the cropping regions of southern Australia. Both species cause root damage and yield loss.

Unlike cereal cyst nematode, root lesion nematodes have more than one generation per season and are able to migrate within and between roots and soil. Root lesion nematodes infect a wide range of plants, including cereals and grassy weeds, grain and pasture legumes, oilseed crops and many broadleaved weeds.

Adult nematodes are about 0.5 mm in length and nearly all individuals are female. Males are not required for reproduction.

Pratylenchus do not form cysts, but survive over summer in a dehydrated state. Mature, actively feeding females can lay about one egg per day. Eggs hatch within 7-9 days, and adults develop in 35-40 days (depending on plant type, temperature, moisture, etc.). In turn, these adults produce eggs and so nematode numbers in roots increase exponentially as the growing season progresses. The multiplication rate of the nematode increases when temperature rises in spring.

Symptoms

Damage caused by *P. neglectus* impairs root function, limiting water and nutrient uptake, leading to poor plant growth and loss of yield. Affected plants may show general unthriftiness or symptoms of nitrogen deficiency. Symptoms are exacerbated when plants are subjected to water and nutrient stresses, or when combined with root damage caused by various fungi.

Symptoms of infection on both primary and secondary root systems include:

- disintegration of the outer layers of root tissue (the cortex)
- reduction in numbers of root hairs
- a lack of, or stunting of, lateral branches along the main roots
- brown lesioning and discolouration of roots (lesions occur at random on the root system)

Root symptoms are often difficult to diagnose in the field, especially for cereals, and can be masked by the presence of root rotting fungi. Although nematodes infect plants soon after germination, root symptoms may not be detected until plants are older than 6-8 weeks. Root symptoms are generally more obvious on sandier soils and on grain legumes.

Distribution

P. neglectus and *P. thornei* are found throughout Australia. The species can occur together, but usually only one is present. In South Australia and the Victorian Mallee, *P. neglectus* is the more common species.

Distribution of *P. neglectus* within the soil profile has been examined on Eyre Peninsular (EP) in soils where few roots are found below 60cm. Most nematodes occur at 5-10 cm, with up to 90% being present in the top 20 cm (the zone of greatest root density).

Resistance

Resistant varieties reduce nematode multiplication, although nematodes may invade their root systems. Tolerant varieties allow multiplication and can carry high numbers of nematodes, but plants still grow and yield well. Breeders aim to produce varieties which are both resistant and tolerant.

SA rye, triticale, safflower, subclover, faba bean, field pea and lupin varieties are poor hosts and may help reduce *P. neglectus* numbers in the soil for the subsequent crop. Barley varieties and the wheats Excalibur and Aroona are intermediate hosts. Mustard, canola, chickpea, vetch and medic varieties are good hosts and may increase *P. neglectus* numbers (Figures 1 & 2).

Tolerance and Yield Loss

Results from trials in 1994 showed yield losses of up to 23% and suggest that differences in tolerance do exist in commercial varieties of cereals (Figure 3). Trials on EP and in the Lower Mid-North/Murray Plains gave similar results, except for the varieties Machete and Yallaroi (Figure 3.). These varieties appeared intolerant on EP but performed better in the Lower Mid-North/Murray Plains. Machete and Yallaroi perform poorly when under moisture and nutrient stress and so may be less tolerant of *P. neglectus* under these conditions. Stress factors were more extreme on EP than in the Lower Mid-North/Murray Plains and this might explain the differences in varietal tolerance.

In 1994, one nematode per gram of soil caused yield loss on EP, but higher numbers were required to cause yield loss in the Lower Mid-North/Murray Plains. Initial soil nematode numbers likely to cause yield loss and the magnitude of this yield loss will depend on season and site.

Management Practices

Nitrogen - Field and pot trials suggest that nitrogen application reduces *P. neglectus* numbers invading wheat roots. To obtain this effect, high levels of N (50-100kg N/ha) must be applied. Urea and ammonium sulphate are more effective than calcium nitrate, and application at or before sowing is more effective than after sowing.

Cultivation - Mechanical disturbance reduces soil nematode numbers particularly in warm, dry soil. Some nematodes over summer in dead roots in the soil and will not be affected by cultivation. Although numbers will be reduced by cultivation this may not be sufficient to reduce soil numbers below levels which cause yield loss.

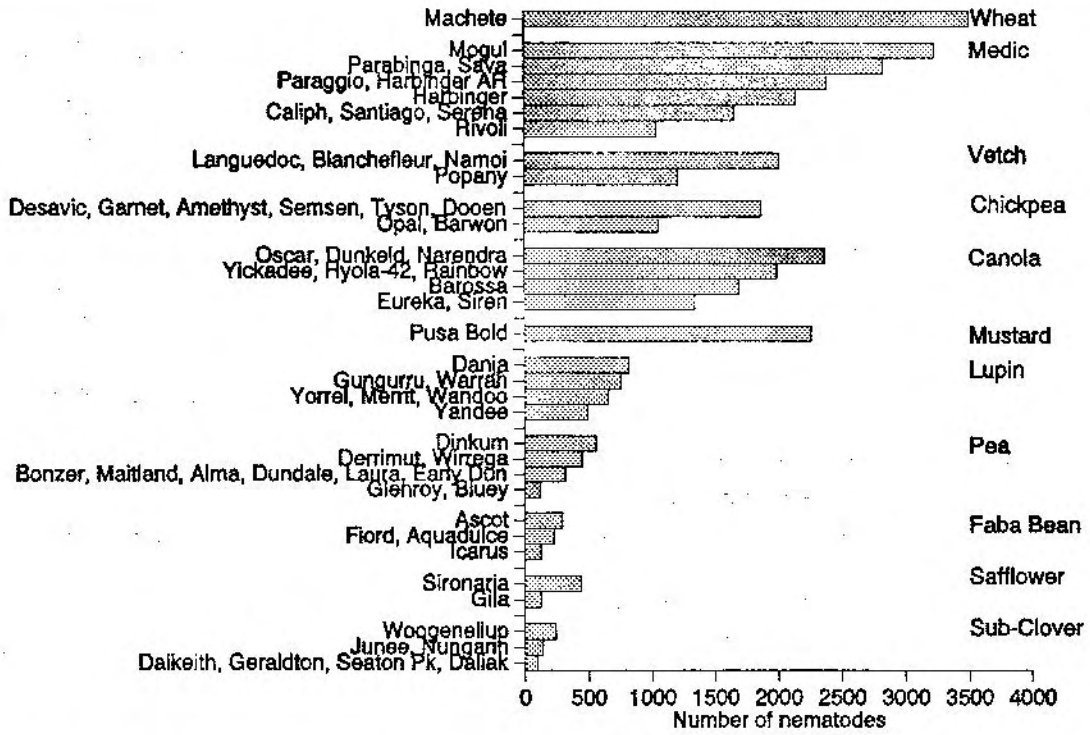

Figure 1. Multiplication of *P. neglectus* on rotational crops

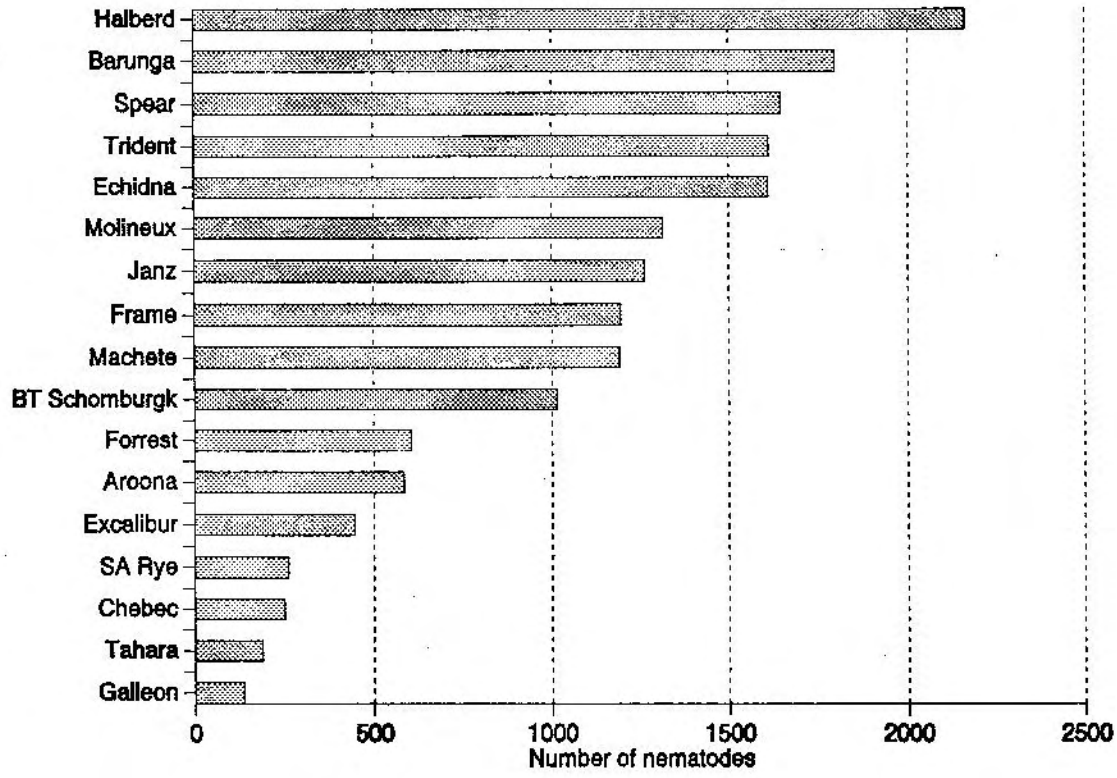

Figure 2. Multiplication of *P. neglectus* on cereals

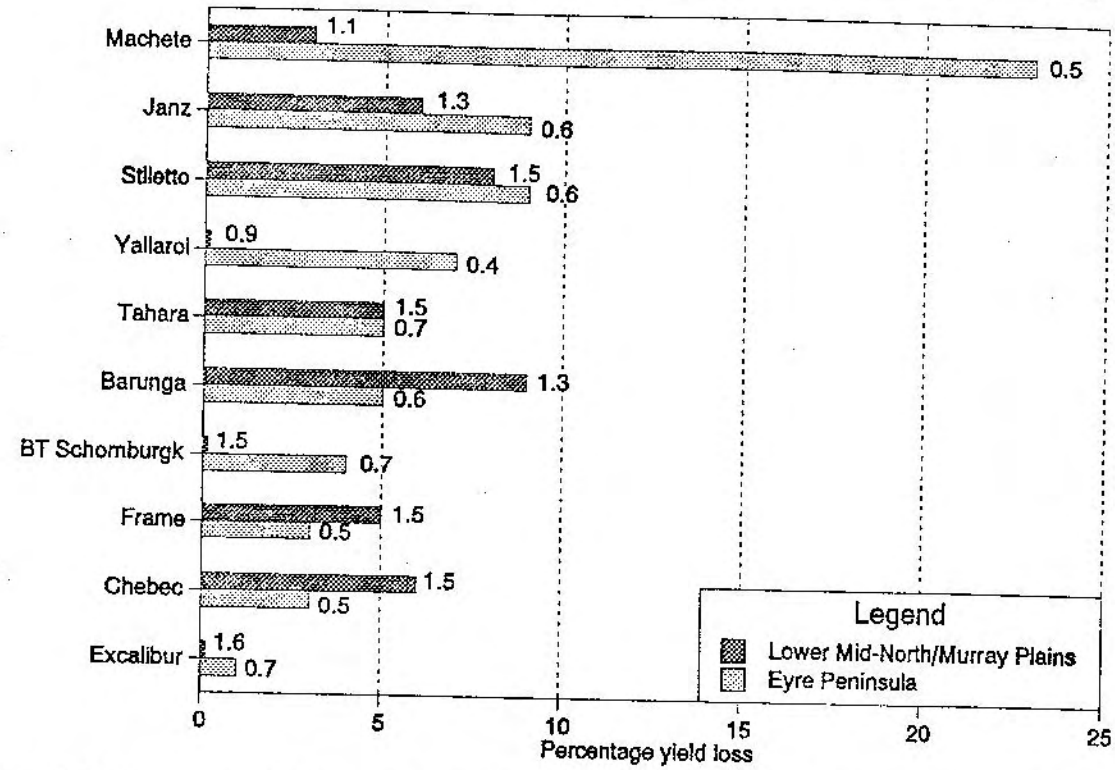

Figure 3. Yield losses caused by *P. neglectus* in South Australia, 1994. Values at the ends of columns are grain yields (t/ha)

SOIL TESTING FOR ROOT LESION NEMATODE

Russell Eastwood and Angela Smith, VIDA Horsham

For the first time a Root Lesion Nematode soil testing service is available for farmers. Trials in recent years in Victoria and South Australia have shown that Root Lesion Nematode is causing more than 40% yield loss in some cereal and legume crops. In the Wimmera, populations are likely to be high in rotations which have included a high frequency of wheat and/or chickpeas, however there are two species of this nematode (*Pratylenchus thornei*, and *Pratylenchus neglectus*) and between them they have a wide host range, so crops in many different rotations may be at risk.

To make use if the bioassay service samples need to be taken by mid April to ensure results are available in time for seeding, Cost is $70 per sample. Sampling should be the same as for the CCN bioassay ie. sample to 15cm (6") depth, discarding the top 2.5cm (1"). A total of 50 soil sub-samples should be taken for each 40 hectares (100 acres maximum) and bulked together, mixed and then subsampled to a final weight of approximately 2kg soil. Samples should be placed into a strong plastic bag and kept cool and dry until delivered to VIDA. The attached form should be completed and accompany the sample. Estimates of nematode populations will be given in nematode/g of soil and recommendations for crop rotation made for each paddock.

Samples can be delivered or sent to: **Angela Smith, VIDA Private Bag 260, Horsham, 3400**
Phone (053) 622 111