PLANT AND SOIL NEMATODES

ROOT-LESION NEMATODE (*PRATYLENCHUS*): AN UNDERRATED PEST OF MANY AUSTRALIAN CROPS

Many species of *Pratylenchus* are found in Australia and most crops host at least one species. Collectively, these species cause huge losses but their impact is often underestimated because the symptoms they produce and their effects on plant growth are not as obvious as some other plant-parasitic nematodes.

Key *Pratylenchus* species in Australia

The genus *Pratylenchus* contains more than one hundred species. Many species occur in Australia and they generally have wide host ranges, with every agricultural crop hosting at least one species. Some of the most important species are listed below.

Examples of *Pratylenchus* species known to be economically important in Australia

Species	Distribution, and some important hosts
P. brachyurus	Hosted by peanut, cowpea and many other crops in the tropics and subtropics
P. coffeae	Present in all states on a wide range of crops
P. crenatus	Common in southern states, and an important pathogen of potato
P. goodeyi	A damaging pest of banana in some sub-tropical regions
P. neglectus	Widespread in all cereal-growing areas. Most cultivars of wheat and barley are susceptible, and other important hosts include canola and sorghum
P. penetrans	Common in cool climates where it is an important pest of horticultural crops, including apple, strawberry, potato, and many other vegetables
P. quasitereoides	Originally known as *P. teres*, this species occurs in Western Australian grain-growing soils. Hosts include cereals, lupins, chickpea, and canola
P. thornei	Occurs in all grain-growing regions but is the most important nematode pest of cereals in the northern grains belt. Many legumes are also hosts, including chickpea, soybean, mung bean and cowpea
P. vulnus	Mainly found on perennial horticultural crops such as grapevine, citrus, peach, and walnut
P. zeae	Common on grasses in the tropics and subtropics, and a major pest of sugarcane. A junior synonym (*P. jordanensis*) is hosted by perennial crops such as apple and grapevine

Features and life cycle

Pratylenchus is a vermiform nematode that is generally 0.4 to 0.7 mm long and about 20 µm in diameter. Females will always be present but males are common in some species and rarely seen in others. Two of the most conspicuous features of *Pratylenchus* are the relatively strong stylet, which is usually about 16 µm in length and readily visible at low magnification under a microscope, and the vulva of the female, which is always at the posterior end of the body (Fig. 1).

The length of the life cycle is temperature dependent and varies with species, but is usually completed in 4-8 weeks. Eggs are laid in roots and depending on whether those roots are still intact or have decomposed, they will either hatch in the roots or the soil.

Symptoms

Root-lesion nematodes are migratory endoparasites, and they use their stylet to force their way into a root. They then move through the root tissue, feeding on cells as they go (Fig. 2). Small, darkened lesions appear after root cells are damaged and the lesions continue to grow in size as feeding continues. Eventually, the root is girdled or the whole root is destroyed, and the nematode then moves on and invades another root. Aboveground symptoms include ill-thrift, leaf yellowing, and wilting under conditions of moisture stress.

Fig. 1. Female of *Pratylenchus thornei*

Fig. 2. Root-lesion nematodes in root tissue

Economic importance

Although root-lesion nematodes cause crop losses worth many millions of dollars every year, their importance as pests is often underestimated. The lesions and root rots produced by the nematode are relatively non-distinctive, as many other root pathogens cause similar symptoms. Aboveground, all plants in a field are usually affected to some extent and yield reductions of 5-15% may only be apparent when a non-infested plot or a nematode-tolerant cultivar is available for comparison. Thus, growers are often unaware of this pest, even though it may be preventing crops from reaching their full yield potential.

Another reason root-lesion nematodes are economically important is that the damage they cause to the roots provides entry points for other soilborne organisms. Thus, *Pratylenchus* exacerbates the damage caused by pathogens such as *Fusarium*, *Pythium*, *Phytophthora* and *Rhizoctonia*, and also allows fungi and bacteria that are normally not pathogenic to enter roots and cause damage. Apple replant disease is a good example, but there are many other situations where *Pratylenchus* may be contributing to a root disease complex that is affecting plant growth.

Management

As there are many situations where root-lesion nematode may be damaging the root system but above ground symptoms are not apparent, the first management step to take is to determine whether *Pratylenchus* is present at levels likely to be causing damage. Thus, regardless of whether crops appear healthy or not, soil and root samples should be collected and checked for the presence of plant-parasitic nematodes.

If *Pratylenchus* species known to be pathogenic are detected, the management options available will depend on the crop of interest. In annual crops, cultivars that are resistant or tolerant to the species present are sometimes available, and crops that are poor hosts should always be included in the rotation. In perennial crops, resistant cultivars and rootstocks can sometimes be used. However, regardless of the crop, it is important to minimise nutrient and moisture stress, as this will exacerbate the damage caused by the nematode. Thus, nutrient inputs must be adequate, and irrigation practices must be optimised when water is being applied.

Further reading

For information on the *Pratylenchus* species which attack grain crops, sugarcane, and perennial horticultural crops, see fact sheets PSN 033, PSN 037, PSN 048 and PSN 049.

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