



NORTHERN

OCTOBER 2017

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GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

PEANUTS

SECTION 8

NEMATODE MANAGEMENT

TYPES OF NEMATODES | EFFECTS OF CROPPING HISTORY ON NEMATODE STATUS

Nematode management

Nematodes are microscopic, thread-like organisms that live in soil and plant roots. There are many species of agriculturally significant nematodes, and resistance and susceptibility of crops can differ for each root-lesion nematode (RLN) species. Peanuts tend to be affected most by *Pratylenchus brachyurus*, which can cause significant reductions in yield and quality. Pods are discoloured; therefore, the crop will not achieve nut-in-shell quality. Concerns also exist regarding the root-knot nematode *Meloidogyne hapla*.

In cereals, significant RLN species are *P. thornei* and *P. neglectus*. Peanuts are not hosts of these two species.¹

Symptoms of *P. brachyurus* include stunted bushes and small lesions on roots, pegs and shells that may not be obvious. Nothing can be done to treat these nematodes in the current crop and no chemicals are registered for use against nematodes in peanuts; however, crop rotation can reduce nematode populations significantly (Table 1). Maize is the most effective rotation crop.²

Table 1: Research showing effects of rotations on the incidence of known peanut pathogens.³

Pathogen	Continuous peanut, winter fallow		Continuous peanut, winter oats		Peanut rotated with soybean, oats and maize	
	Year 7	Year 9	Year 7	Year 9	Year 7	Year 9
Root-knot nematodes (g DW root)	465a	1,580a	690a	1,775a	32b	29b
Root-lesion nematode (g DW root)	480	215	668	63	376	201
Verticillium wilt at harvest (% plants)	16.5a	47.8a	4.4b	37.8ab	3.7b	23.1b
Sclerotinia at harvest (% plants)	0	5.8a	0	3.6a	0	15.9b
Plant mortality due to crown rot (% plants)	23.7a	20.7a	24.6a	17.8a	1.6b	6.3b

For each pathogen and year, means followed by the same letter are not significantly different

A survey of peanut plantings in North Queensland showed that the RLN *M. hapla* was confined to red basaltic soils around Tolga and Atherton with a long cropping history. The RLN *P. brachyurus* was widespread throughout the Atherton Tablelands but not found in soils that had recently been brought into cultivation. Infestations of both species were heavier where peanuts had been grown on the same land for two or more successive seasons. Yield responses were obtained only in trials where infestations of *M. hapla* were severe, and not where *P. brachyurus* occurred by itself.⁴

MORE INFORMATION

M Bell *et al.* (2003) The impact of crop rotation on peanut productivity in rainfed cropping systems. Australian Agronomy Conference.

GM Murray, JP Brennan (2009) The current and potential costs from diseases of wheat in Australia. GRDC Report.

K Owen *et al.* Root lesion nematode—Queensland. Fact Sheet. Soil Quality Pty Ltd.

QDAF brochure: Root lesion nematodes

¹ GM Murray, JP Brennan (2009) The current and potential costs from diseases of wheat in Australia. Report for Grains Research and Development Corporation, https://grdc.com.au/_data/assets/pdf_file/0026/203957/disease-loss-wheat.pdf

² QDAF (2012) Root-lesion nematodes. Department of Agriculture and Fisheries Queensland, <https://www.daf.qld.gov.au/plants/field-crops-and-pastures/broadacre-field-crops/peanuts/managing-peanut-diseases/root-lesion-nematodes>

³ M Bell, G Harch, J Tatnell, K Middleton (2003) The impact of crop rotation on peanut productivity in rainfed cropping systems. Australian Agronomy Conference, Australian Society of Agronomy, <http://www.regional.org.au/au/asa/2003/c/5/bell.htm>

⁴ RA Broadley (1981) Distribution and control of root-knot and root lesion nematodes on peanuts in north Queensland. *Australian Journal of Experimental Agriculture* 21, 223–226, <http://www.publish.csiro.au/paper/EA9810223.htm>

8.1 Types of nematodes

8.1.1 Root-lesion nematodes (*Pratylenchus brachyurus*)

Importance: Most widespread nematode affecting peanuts in Australia.

Damage: Can cause significant reductions in yield and quality. Pods are discoloured, meaning that the crop will not achieve nut-in-shell quality.

Symptoms: Stunted bushes. Small lesions on roots, pegs and shells may not be obvious (Photo 1).

Management strategies:

- Chemical: Nothing can be done in the current crop, except to identify nematodes as the cause. No chemicals are registered for use against nematodes in peanuts.
- Cultural: Crop rotation can reduce nematode population significantly. Maize is the most effective rotation crop.⁵



Photo 1: Root-lesion nematodes: the dark markings on these pods are caused by nematodes burrowing into the shell. The small white lumps are lenticels (or pores) which swell up in wet soil.

8.1.2 Root-knot nematodes (*Meloidogyne hapla*)

Importance: Not a major problem in traditional peanut areas, but may become important in new production areas.

Symptoms: Typical root galls are formed and in severe cases, plants are stunted (Photo 2).

Management strategies:

- Chemical: No action is possible in an affected crop, except confirming nematodes as the cause of the damage. No chemicals registered for use against nematodes in peanuts.
- Cultural: Rotation with cotton, sorghum or maize will reduce the population.⁶

MORE INFORMATION

GRDC Tips and Tactics: [Root-lesion nematodes](#)

EL Davis, AE MacGuidwin (2000) Lesion nematode diseases. *The Plant Health Instructor*.

GRDC fact sheet: [Plant parasitic nematodes](#)

⁵ PCA/DPIF (2007) Managing disease. Peanut Company of Australia/Department of Primary Industries and Fisheries Queensland, http://www.pca.com.au/bmp/pdfs/4a_disease.pdf

⁶ PCA/DPIF (2007) Managing disease. Peanut Company of Australia/Department of Primary Industries and Fisheries Queensland, http://www.pca.com.au/bmp/pdfs/4a_disease.pdf

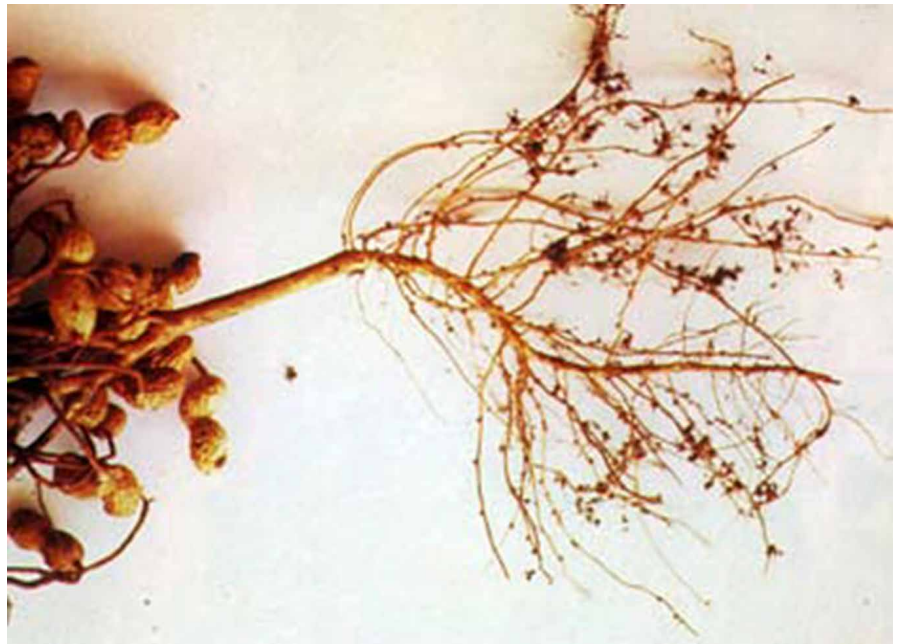


Photo 2: Root-knot nematodes: the typical root galls should not be confused with N-fixing nodules.

8.2 Effects of cropping history on nematode status

Nematode (*Pratylenchus*) numbers build up steadily under susceptible crops and cause decreasing yields over several years. The amount of damage caused will depend on:

- the numbers of nematodes in the soil at sowing
- the tolerance of the variety of the crop being grown
- the environmental conditions.

Growers cropping peanuts in rotation with cotton should consider the effect of RLN species on crops following cotton. Some researchers report that the nematode is quite often found in cotton.⁷

MORE INFORMATION

Pratylenchus brachyurus. Atlas of Living Australia.

⁷ A Machado, L Ferraz, M Inomoto (2012) Pathogenicity of *Pratylenchus brachyurus* on cotton plants. *The Journal of Cotton Science* 16, 268-271, <http://www.cotton.org/journal/2012-16/4/upload/JCS16-268.pdf>