Root Knot Nematodes

What are root knot nematodes?

Fig. 1 Potato roots showing swelling caused by root knot nematode

Root knot nematodes are plant parasites related to potato eelworm (potato cyst nematodes) and are among the most damaging nematodes found, causing massive reductions in crop yields and quality. Nematodes invade host plant roots where they start to feed, causing abnormal root morphology and loss of root function.

Typically, nematode feeding will cause roots to swell up forming the characteristic root knots or galls from which the root knot nematode gets its name. Affected plants will exhibit a range of additional symptoms including yellowing stunted foliage, drought stress and premature senescence. In potato, skin blemishes and discolouration inside the tuber can lead to significant reductions in tuber quality.

Fig. 2 Skin blemishes on potato. Symptoms will vary depending on variety

Traditionally root knot nematode problems in North Western Europe were rare, but in the past decade occurrences of crop damage have been increasing, partly due to the reduction in use of certain pesticides but also as a response to warmer summer temperatures and milder winters.

Species of root knot nematode

In northern Europe a number of species are found causing damage to crops:
Meloidogyne naasi attacking mainly cereals. *M. hapla* attacking carrots, beet, kale, parsnips and ornamentals. *M. chitwoodi* attacking potato, carrots, wheat, maize and many other mono- and dicotyledonous plants. *M. fallax* attacking potato, carrots and many other mono- and dicotyledonous plants

Most recently, a new species of root knot nematode, *Meloidogyne minor* has been found attacking golf courses and sports pitches throughout Western Europe. *M. minor*, like *M. fallax* and *M. chitwoodi* has a wide host range and poses a threat to many crops including potato, carrot cereals and perennial ryegrass.

Meloidogyne minor

During 2007, *M. minor* was identified in potato fields in several European countries. These outbreaks showed potato crops to be vulnerable, with yield reductions of up to 70% recorded in affected plants. The effects of *Meloidogyne* on crop quality can be significant, with only a 5% tuber infection rate resulting in an unmarketable crop due to the presence of blemishes and discolouration in the tubers.

Fig. 3 ***M. minor*** **infestation producing patches of stunted potato plants (cv. Premiere).**

Affected plants often develop thickened roots with excess root hair development causing soil to stick to the roots and give a "bushy" appearance.

Fig. 4 *M. minor* **affected roots**

When examined under the microscope, these thickened roots contain hundreds of feeding female nematodes.

Fig. 5 *M. minor* **females feeding inside a potato root**

Fig. 6 Tuber flesh blemishes caused by *M. minor* **females**

Identifying root knot nematodes

Root crops, cereals and forage crops should be checked for any signs of unusual or poor growth. Yellowing or stunted plants will often be the first indication of a root knot nematode problem. Abnormal root growth is also sign that these parasites are present. Confirmation of root knot nematode attack is only possible by laboratory analysis and samples of roots and soil should be tested if you suspect you have a problem.

Managing root knot nematodes

The wide host range of *M. minor* means that control of this pest is difficult.

- *M. minor* may be found in all soil types but crops grown in lighter sandier soils are at highest risk
- Crop rotations are ineffective, with the nematode able to reproduce on most crops, grasses (especially ryegrass) and many weeds.
- Maize appears to be immune from *M. minor* attack.
- To give time for the pest numbers to decline in the soil, affected areas of fields should be kept plant-free (by spraying with a general herbicide) for at least 12 months.
- Good hygiene is also a key part of managing this new pest. Growers should ensure that soil and plant material are not moved from infested fields, especially when using machinery.
- In certain cases the use of approved nematicides may be appropriate but growers should seek advice if they are considering this option.

Root knot nematodes are new pests which pose a significant threat to agriculture and horticulture in Northern Ireland. It is important that spread of these pests is restricted. Growers should be vigilant and inspect their crops for any evidence of poor growth or abnormal roots.

For further advice or to arrange the analysis of soil and plant samples contact:

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