



Department
for Environment
Food & Rural Affairs

The nematode *Meloidogyne fallax*: status in the UK, symptoms of infestation and general biosecurity guidance

Plant Pest Factsheet

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This guide is relevant for growers of potatoes, leeks and carrots as well as suppliers and managers of sports turf, especially at grounds with under soil heating.

The key points are:

- *Meloidogyne fallax* is a root-knot nematode, which is damaging to turf and certain crops including potatoes, carrots, and leeks.
- *Meloidogyne fallax* no longer meets the criteria to be a quarantine pest because it is present in GB. Its distribution is limited, but there have been a few recent outbreaks in sports turf and agricultural land.
- The main risk posed by *M. fallax* is to UK agriculture and specifically potatoes, therefore it is now listed in the GB plant health legislation as a regulated non-quarantine pest (RNQP) on potatoes.
- Seed potatoes should be free of *M. fallax* (see Annex 1: RNQPs requirements for seed potatoes).
- As an RNQP, official action will only be taken against *M. fallax* when found in seed potatoes.
- For host plants other than seed potatoes, good biosecurity practice is recommended to reduce its introduction and spread.
- This pest must be reported to the relevant authority if found on seed potatoes for GB (or any crop for Northern Ireland) (see the Advisory Information section).

Background

Meloidogyne fallax is a root-knot nematode that invades the roots of plants. It has a wide host range including carrots, potatoes, and leeks. Yields can be affected as well as the quality and marketability of the crop. Symptoms and damage to crops have mainly been found on light land, that appears to favour the nematode. Damage has also been reported in sports turf, especially turf with under soil heating, which provides a favourable environment for this pest.

In England and Wales, *M. fallax* has a restricted distribution. There have been no findings in Scotland or Northern Ireland.

Since *M. fallax* was described in the Netherlands in 1996 it has been recorded in several other European countries including: Belgium, Germany, Sweden, France and Switzerland. It is however likely to be much more widespread. It is also present in South Africa, Australia, New Zealand and Chile.

Status of *M. fallax* in the UK

Until the end of 2020, *Meloidogyne fallax* was listed as a quarantine pest for the UK and all other EU member states. Under EU legislation, statutory measures were needed if the pest was found on any crop.

Since leaving the EU, new plant health legislation has been introduced for GB. The legislation for Northern Ireland has remained the same.

The status of pests in GB legislation reflects the crops that are grown and the agronomic situation in GB. As part of these changes, it was concluded that *M. fallax* no longer meets the criteria to be a quarantine pest due to its distribution within GB. It was also concluded that the main risk posed by *M. fallax* is to potatoes, therefore it is now listed in the GB plant health legislation as a regulated non-quarantine pest on potatoes. This means that statutory action will only be taken against findings of *M. fallax* in seed potatoes and that seed potatoes need to be free from *M. fallax* to move within GB (Annex 1).

In Northern Ireland *M. fallax* is still a quarantine pest and therefore must be reported if found on any crop (see advisory information).

Symptoms on potatoes

Root feeding by *M. fallax* on potato tubers can cause external galling and internal necrosis just below the skin (Figure 1 and Figure 2). These symptoms can also be caused by another non-native notifiable nematode *Meloidogyne chitwoodi*. In addition, *Meloidogyne minor*, which is already present in the UK, can cause similar symptoms.

Symptoms on other host crops can be seen in Annex 2.

Meloidogyne fallax can only be identified by extracting the nematodes from the soil or plant material before being diagnosed using a range of laboratory methods.



Fig. 1. Small pimble-like raised areas on the surface of the potato skin. UK Crown Copyright - courtesy of Fera



Fig 2. Spots on peeled potato. © Farhat Shah (Plant & Food Research, New Zealand)

Biosecurity guidance

If *M. fallax* is confirmed as being present in a seed potato crop it will not be possible to move those tubers for use as seed potatoes.

For fields that are known or suspected to be infested with *M. fallax*, the risk reduction measures below can be applied voluntarily to reduce the chance of *M. fallax* infesting other seed potatoes crops or other host crops.

- **Avoid planting seed potatoes and other host crops on infested land**
 - **Testing of soil prior to planting**
 - If symptoms of nematode damage are seen (Annex 2), soil should be tested to check for *M. fallax*, to detect any problems and to inform future crop selection. Recommendations for sampling are provided below:
 - The best time to sample is close to harvest of a host crop, as populations can decline in soil rapidly after harvest in the absence of another host crop.
 - To take surface cores, sampling after any period of rain is ideal, but sampling during extremely wet or cold weather is not recommended.
 - To be representative, the samples should ideally cover 500 g per ha and follow a systematic pattern using a soil corer to a depth of around 25 cm. Samples should be taken from around the fringe of damaged areas, and, if possible, from an unaffected area for comparison.

- **Minimising introduction and spread**
 - **Planting seed potatoes**
 - Do not plant seed potatoes in a field known to be infested with *M. fallax*.
 - Do not grow farm saved seed from infested potato crops.
 - Inspect seed potatoes for symptoms (above) prior to planting.
 - Ensure your seed potatoes have a valid plant passport if originating from the UK (further details can be found in Annex 1).
 - **Machinery**
 - Cultivation machinery that has been used in an infested field should be cleaned of all soil and plant material before entering seed potato fields.
 - **Waste disposal**
 - Do not dispose of any plant material, wash water or soil onto seed potato growing fields that have originated from:
 - a *M. fallax* infested field
 - a pack house that processes vegetables (especially if the vegetables have been imported from countries where *M. fallax* is present)
 - The waste should instead be returned to the contaminated field or disposed of in another way which preferably avoids application to agricultural land.
 - There is a risk that waste turf and growing medium from sports grounds, especially grounds with under-soil heating could be infested with *M. fallax*. It is not advisable to dispose of such waste on agricultural land.

Advisory Information

If *M. fallax* has been confirmed to be present in seed potatoes (any crop for Northern Ireland) following laboratory analysis or there is a strong suspicion that *M. fallax* is present in seed potatoes (any crop for Northern Ireland), the finding(s) must be reported to the relevant authority:

For **England and Wales**, contact your local APHA Plant Health and Seeds Inspector or the PHSI Headquarters, York. Tel: 0300 1000 313 (please select option 3 when calling)
Email: planthealth.info@apha.gov.uk

For **Scotland**:
Contact your local RPID officer for Agriculture crops

<http://www.gov.scot/Topics/farmingrural/Agriculture/AOcontacts/contacts>

Contact Horticulture and Marketing Unit for Horticultural crops

Email: hort.marketing@gov.scot

Web: www.gov.scot/PotatoHealthControls

For **Northern Ireland**, contact the DAERA Plant Health Inspection Branch:

Tel: 0300 200 7847

Email: planthealth@daera-ni.gov.uk

For additional information on UK Plant Health please see:

<https://secure.fera.defra.gov.uk/phiw/riskRegister/>

<https://planthealthportal.defra.gov.uk/>

<https://www.gov.uk/plant-health-controls>

<http://www.gov.scot/Topics/farmingrural/Agriculture/plant/PlantHealth/PlantDiseases>

<https://www.daera-ni.gov.uk>

References

EPPO Global Database: “*Meloidogyne fallax* (MELGFA), Distribution. [Meloidogyne fallax \(MELGFA\)\[World distribution\]](#), [EPPO Global Database](#), [data accessed: 04/06/2021]

EPPO (2009) EPPO Standard PM 7/41 (2) Diagnostics. *Meloidogyne chitwoodi* and *Meloidogyne fallax*. Bulletin OEPP/EPPO Bulletin 39, 5 – 17

Smarter Rules for Safer Foods Plant Health Regulation – Plant Passports:

<https://planthealthportal.defra.gov.uk/assets/uploads/PH-passports-factsheet-V.2.pdf>

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Annex 1: RNQP requirements for seed potatoes

Plants that may be hosts of RNQPs require a plant passport for movement within the UK.

These plants are also be subject to a range of measures to control the presence of RNQPs including inspections, sampling and / or testing.

Seed potatoes in the UK are subject to the following measures to control the presence of *M. fallax*:

1. the tubers originate in an area in which *Meloidogyne fallax* is known not to occur,

OR
2. where they originate in an area in which *Meloidogyne fallax* is known to occur:
 - a. that the tubers originate from a place of production which has been found free from *Meloidogyne fallax* based on an annual survey of host crops, by visual inspection of host plants at appropriate times and by visual inspection both externally and by cutting of tubers after harvest from potato crops grown at the place of production,

OR
 - b. that after harvest the tubers have been randomly sampled and checked for the presence of symptoms after an appropriate method to induce symptoms or laboratory tested, as well as inspected visually, both externally and by cutting the tubers, at appropriate times, and no symptoms of *Meloidogyne fallax* have been found.

Annex 2: Symptoms of *M. fallax* on hosts other than seed potato



Symptoms on carrot:

Yellowing foliage in a *Meloidogyne* infested carrot field. UK Crown Copyright - courtesy of [Fera](#)



Symptoms on Leek:

Meloidogyne infested leek field showing 4 central rows of plants with stunted growth and chlorosis. UK Crown Copyright - courtesy of [Fera](#)



Swollen root galls on a *Meloidogyne* infested carrot. UK Crown Copyright - courtesy of [Fera](#)



Top leek: uninfested; bottom two leeks: infested with *Meloidogyne fallax*, causing stunting and chlorosis. UK Crown Copyright - courtesy of [Fera](#)



Close up of root galls on a *Meloidogyne* infested carrot. UK Crown Copyright - courtesy of Fera



Close up of swollen *Meloidogyne* root gall on leek. UK Crown Copyright - courtesy of Fera



Meloidogyne gall on turf roots. © Colin Fleming, The Agri-Food and Biosciences Institute, UK.



Meloidogyne fallax can cause yellow patches and turf decline. © Colin Fleming, The Agri-Food and Biosciences Institute, UK.