Grower Summary

FV 377a

Leeks: improving risk assessment for free-living nematodes

Final 2012

Disclaimer

The results and conclusions in this report may be based on an investigation conducted over one year. Therefore, care must be taken with the interpretation of the results.

Use of pesticides

Only officially approved pesticides may be used in the UK. Approvals are normally granted only in relation to individual products and for specified uses. It is an offence to use non-approved products or to use approved products in a manner that does not comply with the statutory conditions of use, except where the crop or situation is the subject of an off-label extension of use.

Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

Further information

If you would like a copy of the full report, please email the HDC office (hdc@hdc.ahdb.org.uk), quoting your HDC number, alternatively contact the HDC at the address below.

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Project Number:	FV 377a
Project Title:	Leeks: improving risk assessment for free-living nematodes
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Industry Representative:	Philip Lilley of Hammond Produce Ltd
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Headline

- Pot experiments indicate that threshold levels to control nematodes in leeks are higher than the guidelines so potentially, if the results reflect the field situation, the management of nematodes in leeks can be altered.

Background

Free-living nematodes (FLN) are important pests of leeks as they can reduce crop vigour and growth. Currently there is no approved chemical control option for these pests. Vydate 10G has a SOLA (EAMU) for use on bulb onions and shallots (SOLA 20061890) and there was an EAMU for use on leeks which has now lapsed. While it may be possible to pursue a SOLA for leeks again, Vydate 10G is already on the restricted list of certain retailers and its continued commercial acceptability is questionable. It will therefore become increasingly important to be able to determine in which fields leeks can be grown in the absence of nematicide without the significant risk of nematode damage.

The risk from free-living nematodes is currently assessed by considering field history, previous cropping and representative soil testing for the pests. There is however little information available on the species that are most damaging to leeks and at what level they pose a risk. With pressure from retailers to reduce nematicide use in general, the ability to predict those fields at risk from FLN using the results of reliable soil testing will become increasingly important.

The first and most fundamental component of risk assessment is to understand the nematode infestation level that justifies treatment. Currently, guideline thresholds for leeks have little scientific basis and are based on anecdotal information. Work is required to develop robust thresholds for UK nematodes and soil types quoted as numbers per volume or weight of soil. This work was done in tandem with a similar study in onions FV 377 Onions: improving risk assessment for free-living nematodes an approach which allowed much more cost-effective use of research funding and sharing of resource between experiments.

Growers are supportive of soil sampling as a part of risk assessment but at present do not have the necessary information to be able to relate nematode numbers confidently to the potential risk of damage for the most important free-living nematode species.

This project aims to provide thresholds for FLN in leeks to help with interpreting the results of soil analysis and predicting where the crop can be grown with minimal risk of FLN damage. In future, protecting crops from free-living nematode damage will become increasingly reliant on integrated strategies that combine cultural and chemical control. Robust risk assessment will be fundamental to the success of such IPM programmes.

The specific objective of this project is as below:

1. To measure the effect of different populations of stubby root, needle, stunt/spiral and root lesion nematodes on the growth of leeks, in order to determine which species are potentially most damaging.

Summary

Objective 1: Pot experiments to establish the most damaging nematode species to leeks

A range of populations of needle, root lesion, stubby root and stunt/spiral nematodes were created by soil dilution. This involved mixing soil infested with nematodes with the same soil which had been sterilised by heating to 60ºC for 30 minutes. For example, to achieve a target nematode population of 1000 stubby root nematodes/l of soil, 1 l of soil containing 2000 stubby root nematodes/l soil was mixed with 1 l of sterile soil. A total of 30 target populations was created for each nematode group (Table 1).

Table 1. Target and actual population ranges for root lesion, stunt/spiral and stubby root nematodes to be achieved by soil dilution – 2012

Nematode group	Provisional threshold (no/litre soil)	Target population range (no/litre soil)	Actual population range (no/litre soil)
Needle	50	0 – 810	0 - 1035
Root lesion	2,500	0 – 6,960	0 - 4197
Stubby root	200	0 – 1,900	0 - 1175
Stunt/spiral	10,000	0 – 2,700	0 - 7225

The target populations were made up in 1.5 l pots and sown with 20 leek seeds (cv. Belton or Phuston). Pots were maintained in a polythene tunnel and watered as necessary. Numbers of stunt/spiral nematodes were lower than the provisional threshold. A count of 2,700/l soil is, however, higher than has been recorded in 73% of samples over the last 10 years and therefore represents a higher than average population of the pest. The highest population created of stunt spiral nematode was 7225/l, which is higher than 96% of samples analysed

over the last 10 years. Actual population of stunt spiral nematode can therefore be considered a significant infestation.

Nematode numbers were also assessed to determine how the actual populations compared with the target populations.

For needle nematodes the target population was very close to the actual population. For root lesion and stubby root nematodes the actual population was just over half of the target population and for stunt/spiral nematodes the actual population was almost twice that of the target population.

To assess the impact of nematode populations on leek growth seedling emergence was monitored daily and leek dry matter yield measured. There was no obvious effect of populations of needle, root lesion, stubby root or stunt/spiral nematodes on leek growth or yield. These results suggest that current guideline thresholds for free-living nematodes are far too conservative and that the crop can tolerate much higher populations of these pests. If these results reflect the field situation, potentially nematicide use in leeks could be reduced, which could greatly improve crop profitability.

Financial Benefits

Results suggest that guideline thresholds for free-living nematodes are far too conservative. If this is the case then growers can be much more confident that most land will not require a nematicide treatment unless it is infested with stem nematodes. This could potentially realise a saving of approximately £200/ha.

Action Points

- Growers should continue to sample land for free-living nematodes but specifically to assess the risk for stem nematode. These nematodes are only rarely recovered but can have a significant impact on the crop if present. With the exception of stem nematode, the majority of other free-living species appear to have limited effect on leek growth.
- Growers can have increased confidence that unless numbers of most free-living species are exceptionally high they will not require nematicide treatment. This could have a significant impact on gross margins.