Title	Blackcurrants: The role of nematodes in the establishment of blackcurrants
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Project leader	Jo Fitzpatrick
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AUTHENTICATION

I declare that this work was done under my supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

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INTRODUCTION

Growers have increasingly reported problems of poor growth when replanting blackcurrants. Such problems occur both during the propagation and establishment phases and are especially associated with the cultivar Ben Gairn. The cuttings either do not root, or after rooting, they do not grow. This could be associated with a variety of factors. It could be related to soil fertility, as blackcurrants are often planted after cereals and the soil fertility would be low. It could also be attributable to nematode damage; this may be the case where the crop is replanted after an older blackcurrant plantation had been grubbed .

In this preliminary project the role of nematodes was addressed. The object of the work was to test soil from both good and poor areas at 3 different sites that had experienced blackcurrant replant problems. The soil samples were then be assessed for the numbers and species of free-living nematodes to identify any differences in type and infestation density.

MATERIALS AND METHODS

Site and crop details

Three sites were chosen which had each experienced replant problems.

Farm 1: Hamrow Farm, Whissonset, Nr Fakenham, Norfolk
Grower: Neville Stangroom.

- Both sites were situated in the same field, both in Ben Hope.
- The ‘poor’ site was visually less well established than the ‘good’site.
- The poor area had a history of poor establishment and free-living nematode infestation.
- The field had been in blackcurrants for 20 years before having a break into set-aside for 3-4 years and then being replanted with blackcurrants in 2000.

Farm 2: Hall Farm, Gressenhall Nr Dereham, Norfolk
Grower: Brian Cross

- The ‘poor’ site was planted with Ben Gairn and the ‘good’ site was Ben Hope situated in adjacent fields.
- The poor area was replanted in 2000 and was previously in sugar beet for 2 years and blackcurrants and apples for 10 years.
- The good area was replanted in 1999 and was previously in sugar beet for 1 year and blackcurrants and apples for 10 years.

Farm 3: Old Shields Farm, Nr Ardleigh, Essex.

Grower: Alan Marshall

- The two sites were located within the same field.

- The 'poor' site was replanted with Ben Lomond in 1997 and had previously been down to ley for 2 years and before that, blackcurrants for 20 years.

- The 'good' site was also replanted with Ben Lomond in 1997 and had previously been down to onions for 1 year, apples for 10 years and blackcurrants for 10 years.

Sampling and nematode extraction

On each farm, poor and good areas of plantation were selected for soil sampling.

A standard sample of 40 soil cores at 0-15cm depth was taken in an M- shape across the area. The cores were taken from along the rows, bulked into one sample and sent to ADAS High Mowthorpe for extraction and identification of nematodes.

The extraction was done using the Seinhorst two-flask technique and the Flegg decanting technique.

RESULTS

The results show that the main cause for concern is the presence of *Xiphinema* spp. (dagger nematodes) in the Gressenhall 'poor' area, and both Whissonsett sites (Table 1). These nematodes can transmit viruses such as arabis mosaic virus (AMV) and strawberry latent ringspot virus (SLRV) to blackcurrants. There is also the potential for direct feeding damage by the combined populations of needle (*Longidorus*) and dagger nematodes in the Whissonsett 'poor 'site.

The nematode populations in all of the remaining sites were all below damage threshold limits when considered in isolation.

Table 1: Results from the nematode extraction

	Number of nematodes/litre soil					
Site	Stubby root	Stunt/ spiral	Cyst Juveniles	Root-lesion	Needle	Dagger
Gressenhall 'poor'	**75**	**825**	**0**	**50**	**0**	**20**
Gressenhall 'good'	**50**	**350**	**0**	**75**	**0**	**0**
Whissonsett 'poor'	**0**	**1325**	**0**	**100**	**45**	**75**
Whissonsett 'good'	**0**	**500**	**0**	**100**	**0**	**35**
Ardleigh 'poor'	**0**	**750**	**0**	**250**	**0**	**0**
Ardleigh 'good'	**0**	**3475**	**0**	**75**	**0**	**0**

DISCUSSION

The results from this work are not conclusive. However, the cumulative effects of nematodes are suspected to be a key factor in the failure of cuttings in the propagation and establishment phase in blackcurrants. The thresholds that are quoted are often not robust, especially if the plants are suffering stress from other factors, such as waterlogging.

Stubby-root nematodes (*Trichodorus* spp.) are not a particularly important species, but can be damaging above the threshold of 1000 l $soil^{-1}$.

Stunt/spiral nematodes (*Rotylenchus* and *Tylenchorhynchus* spp.) have a threshold set at 5000 l $soil^{-1}$.

Root-lesion nematodes (*Pratylenchus* spp.) have varying thresholds dependent on species. The threshold for *P. penetrans* is 50 l $soil^{-1}$, whereas for some of the other species, it can be 2000 l $soil^{-1}$. These nematodes are difficult to identify to species level.

Needle nematodes (*Longidorus* spp.) have a threshold of 100-200 l $soil^{-1}$, but 100 can be damaging, especially on young plants and cuttings.

Both dagger and stubby-root nematodes are virus vectors, which can cause additional problems for young plants. However, in this project no checks were made for the presence of viruses in the bushes.

The usual soil sterilant used prior to establishing blackcurrants is Telone (1,3-dichloropropene), although this is not applied as a routine treatment, only where a soil sample pre-planting dictates that thresholds for nematodes have been exceeded.

As Ben Gairn is particularly susceptible to establishment problems, it may be worth doing some further work to identify the causes of failure to establish and to experiment with various soil sterilants and other techniques to alleviate the problem.

CONCLUSIONS

The only 'poor' site that occurred with Ben Gairn was badly affected and nematodes were found in sufficient numbers to have caused the problems.

There were some differences between the samples and although this has not been conclusive, there may be a 'nematode complex' associated with replant problems.

Although there is no definite link between the types and number of nematodes found and the failure of the crop, this may be a key factor in poor establishment.

FURTHER WORK

In the case of replant problems in apple and cherry, soil-borne fungi, *Pythium* and *Thielaviopsis* respectively, are the cause. Further studies on blackcurrants should include checks on soil fungi.

A future project might involve planting a range of varieties on land where blackcurrants has recently been grubbed, with plots unsterilised, treated with nematacide or with a general purpose soil sterilant (methyl bromide or dazomet). The effects on establishment could then be related to cultivar and levels of nematodes/fungi in the soil.

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