

## Studentship Project: Annual Progress Report 27/09/2022 to 27/09/2023

<b>Student Name:</b>	Vongai Chekanai	<b>AHDB Project Number:</b>	
<b>Project Title:</b>	<b>UTILISATION OF SINGLE AND MULTIPLE SPECIES COVER CROPS FOR THE SUPPRESSION OF SOIL-BORNE NEMATODES OF <i>NARCISSUS</i></b>		
<b>Lead Partner:</b>	Harper Adams University		
<b>Supervisor:</b>	Dr Matthew Back		
<b>Start Date:</b>	27/09/2021	<b>End Date:</b>	27/09/2024

### 1. Project aims and objectives

- To assess the sensitivity of *Pratylenchus* spp. to isothiocyanates via *in-vitro* experiments.
- To examine the susceptibility of different cover crop species to *D. dipsaci* and *Pratylenchus* spp. in greenhouse host status experiments.
- To determine the suppressiveness of cover crops on *D. dipsaci* and *Pratylenchus* populations in narcissi fields.
- To investigate the effect of cover crops on non-target nematode communities using NGS sequencing.

### 2. Key messages emerging from the project

#### *Field experiments in Scotland and on St. Marys (Isles of Scilly)*

Stem and bulb nematodes (*Ditylenchus* spp.) were present in both sites but at low numbers (<50 nematodes per kg<sup>-1</sup> soil) therefore it was impossible to assess the impact of cover crops.

Incorporating cover crop residues into the soil had no impact on plant-parasitic nematodes but induced positive effects on fungivorous and free-living nematodes. Oilseed radish had the strongest effect on free-living nematodes probably due to the high biomass produced which stimulates bacterial decomposition.

Growing French marigold significantly reduced root lesion nematodes (*Pratylenchus* spp.) by 81% in IOS and 37% in Scotland. Oilseed radish significantly reduced *Pratylenchus* spp. in IOS (p<0.05). Indian mustard significantly increased *Pratylenchus* spp. while phacelia and Japanese oats maintained nematode populations. Based on the results, French marigold was confirmed as being effective at suppressing root-lesion nematodes in *Narcissus*.

The results described in this summary report are interim and relate to one year. In all cases, the reports refer to projects that extend over a number of years.

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### 3. Summary of results from the reporting year

The report above is from experiments that address objective 3. For the rest of the objectives; Greenhouse experiments were conducted to evaluate the susceptibility of different cover crop species to *P. penetrans* in greenhouse host status experiments, and a manuscript is under development. Objective 1 was report in the first-year annual report. Next generation sequencing will be starting in the coming weeks and another field experiment is still running.

### 4. Key issues to be addressed in the next year

ACTIVITY	Year 3, Oct 2023-Sep 2024					
	Oct - Nov	Dec -Jan	Feb - Mar	Apr - May	June -July	Aug -Sep
Field experiment and soil sampling						
Nematode extraction and quantification						
Molecular analysis- QPCR						
Annual leave						
Data analysis and publications						
Thesis writing and submission						

### 5. Outputs relating to the project

(events, press articles, conference posters or presentations, scientific papers):

Output	Detail
Poster presentation	Hutchinsons Potato Day 2023 - AH Worths Farms-Spalding
Report	Responses of plant parasitic and free-living nematodes to cover cropping in Narcissus fields.
Press article	<a href="https://cropscience.bayer.co.uk/blog/articles/2023/03/cover-crops-for-pcn-and-other-plant-parasitic-nematodes-which-species-work">https://cropscience.bayer.co.uk/blog/articles/2023/03/cover-crops-for-pcn-and-other-plant-parasitic-nematodes-which-species-work</a>

### 6. Partners (if applicable)

Scientific partners	James Hutton Institute, Harper Adams University
Industry partners	Sottish Agronomy, Hutchinsons, Affiliation of Isle of Scilly growers, Grampian growers

<b>Government sponsor</b>	
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