Travelling the Green Route to Soil Fumigation

Introduction

The control of weed seeds and soil-borne pests and diseases (Figures. 1 and 2) remains one of the biggest challenges for farmers and growers trying to reduce their reliance on synthetic pesticides. The soil-conditioning role of green manure and biofumigants crops may also help to improve the sustainability of pathogen control. By 2005 a number of biofumigants crops were already on the UK market but there had still been little independent assessment of their effectiveness. This project assessed two biocidal crops, namely Caliente Brands 99 and 119, each different blends of mustard, *Brassica juncea*.

Figure 1. Fanging symptoms on carrots

Figure 2. Fanging damage caused by stubby-root nematodes (unaffected carrot on the left)

Method

The trials were drilled in June 2005 at rates advised by Plant Solutions Limited (Caliente Brand 99 at 10kg per ha and Caliente Brand 119 at 15kg per ha) and achieved total ground cover by the end of that month. Following irrigation at the end of July they were chopped and incorporated at the beginning of August. Irrigation was applied again the day after incorporation. Sampling for pathogens took place before the crops were drilled, before they were incorporated and six weeks after incorporation (Figure 3).

Figure 3. Yellow mustard compared with a fallow area, where volunteer potatoes have taken hold, pictured nine weeks after sowing and just before incorporation

Figure 4. Weed cover after incorporating a mustard crop (above) compared with

Figure 5. Unsown but cultivated ground five weeks after incorporation and cultivation

Results and Conclusions

- Both mustards appeared effective at nitrogen capture, so they could help in nitrogen management and control of leaching
- By producing a total ground cover canopy in three weeks, they suppressed weeds well for the entire nine week life of the trial and for a further six weeks after incorporation (Figures 4 and 5)
- Neither of the mustards produced a significant overall reduction of plant-parasitic nematodes (Figures 6 and 7). Chopping and incorporation reduced nematode numbers, but the mustards themselves appeared to have stimulated nematode multiplication
- The effect of the crops on *Pythium* species was insignificant throughout the trial
- Long-term studies in the regular use of biofumigant crops might produce a different picture
- Site-specific factors, perhaps soil type or management techniques, appear to be overriding factors in nematode management and illustrates the importance of individual farm assessments in the development of sustainable pathogen control strategies

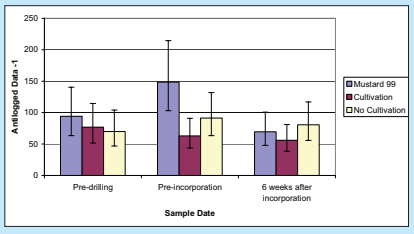

Figure 6. Numbers of total plant-parasitic nematodes on each sampling date - Mustard 99

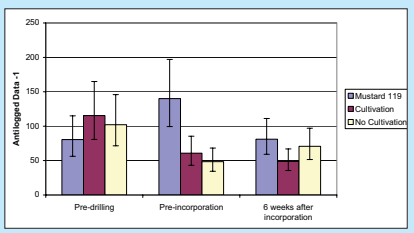

Figure 7. Numbers of total plant-parasitic nematodes on each sampling date - Mustard 119

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