New Project

CP 92

HDC Studentship: Brassicas - the role of naturally occurring insect pathogenic fungi in regulating aphid populations on vegetable Brassica crops

Project Number:	CP 92
Project Title:	Brassicas - the role of naturally occurring insect pathogenic fungi in regulating aphid populations on vegetable Brassica crops
Project Leader:	Dr Dave Chandler
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Contractor:	Warwick Crop Centre, The University of Warwick
Industry Representative:	Andy Richardson, Allium & Brassica Centre
Start Date:	01/02/2013
End Date:	30/04/2016
Project Cost:	£67,650

Project Summary:

Aphid populations on horticultural crops increase in the spring and the autumn, interspersed with a period in midsummer when they decline rapidly, or 'crash'. Data collected at Warwick HRI, through HDC-funded projects, suggest that the crash is caused by naturally occurring fungal pathogens. Unfortunately, the timing of this crash cannot yet be predicted with accuracy. If the crash could be predicted, control programmes could be modified and insecticide sprays reduced.
This project will quantify the effects of naturally occurring fungal pathogens on populations of aphids on field brassicas. Natural outbreaks of fungal diseases on brassica aphids will be monitored in field experiments. Laboratory experiments will study the interactions between fungi and moisture in killing populations of the cabbage aphid. A model of fungal infection will then be developed and tested as a forecast of the outbreak of fungal disease.

Aims & Objectives:

(i) Project aim(s):

The proposed work will test the hypothesis that fungal epizootics are one of the principle factors causing the mid-season crash in populations of aphids on horticultural brassicas.
(ii) Project objective(s):

1.Identify insect pathogenic fungi associated with the cabbage aphid Brevicoryne brassicae on field brassicas.
2.Use laboratory bioassays to measure the susceptibility of the cabbage aphid to fungi collected from the field and compare to commercial mycopesticides.
3.Monitor populations of healthy and fungus-infected cabbage aphids on sequentially planted brassicas and study the link between the mid-summer population crash and epizootics of insect pathogenic fungi.
4.Model the effect of temperature and moisture on the pathogenicity of fungi to the cabbage aphid to forecast the outbreak of fungal epizootics.
5.Communicate the results with the industry.

The objectives of this project follow a logical sequence. Based on our previous experience in this area of research, these objectives are realistic and achievable.

Benefits to industry

Vegetable brassicas occupy 26,000 ha of land each year (Defra Basic Horticultural Statistics 2009). The presence of even small numbers of aphids in produce can lead to supermarket rejections. The project will increase brassica growers' knowledge of aphid biology and help them anticipate periods of aphid colonisation. It will establish whether there is a strong link between the mid-season aphid 'crash' and epizootics of insect pathogenic fungi. This should lead to better use of crop monitoring resources and improved targeting of insecticide treatments, particularly if insect pathogenic fungi are found to be one of the major causes of the aphid crash.
The project will provide the industry with forecasts of the outbreak of fungal diseases in field populations of cabbage aphid. Once validated, the forecasts could be generated locally using growers' own weather stations. There may be scope for the development of fungal control techniques on brassicas. Further work would be required to validate the forecasts.
At present, several sprays of insecticide may be applied to each crop for aphid control (average of 3 sprays per crop according to the Pesticide Usage Survey Report for outdoor vegetable crops for 2007) and a total area of 160,000 ha is treated with insecticides annually. Aphicides account for 39% of all specified insecticide applications.
The development of insecticide resistance in field populations of peach-potato aphid makes it desirable to use fewer applications of insecticides to brassicae crops. There is considerable pressure from retailers and consumers to reduce pesticide use, and any reduction in the numbers of insecticide sprays applied will have environmental benefits. Pest management systems which lead to targeted applications of lower numbers of sprays of insecticides would be favoured highly by consumers

If the results of the work provide a validated forecast that will help reduce the number of spray applications, then this will be taken up by the growers over a period of years. Similarly, any promising new control techniques or products will be followed up. The results of this work may provide opportunities for improved aphid control on other crops including salads.

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Further information

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