

## New Project Summary Report for FV 414: Carrot fly control using pyrethroids and Coragen

<b>Project Number</b>	31304140
<b>Title</b>	Carrots: Optimising carrot fly control using pyrethroids and Coragen.
<b>Short Title</b>	FV 414
<b>Lead Contractor</b>	University of Warwick
<b>Other Contractors</b>	
<b>Start &amp; End Dates</b>	01 February 2013 - 30 March 2014
<b>Industry Representative</b>	Mr Ian Hall, Tompsett Burgess Growers Ltd
<b>Project Budget</b>	£12,074
<b>AHDB Contribution</b>	£12,074

### The Problem

Following an application which was submitted to the UK regulators by the HDC, an authorisation for the use of 'Coragen®' on carrots was approved. The EAMU (0615/2012) was emailed to growers on 24 April 2012. This new EAMU (formerly SOLA), permits the use of 'Coragen®' (active ingredient DuPontT Rynaxypyr® chlorantraniliprole) as an insecticide for controlling carrot fly on carrot.

For over ten years, carrot fly (*Psila rosae*), has been controlled effectively using pyrethroid insecticides, applied either as seed treatments or foliar sprays (lambda-cyhalothrin, deltamethrin, tefluthrin seed treatments). Whilst there is no evidence that populations of carrot fly have become resistant to pyrethroids, the addition of this new active offers industry another tool to control this pest and could reduce the risk of resistance developing through reliance on just one group of insecticides.

In HDC-funded trials (FV 312 and FV 375) looking at the control of carrot fly, Rosemary Collier and Andrew Jukes of Warwick Crop Centre demonstrated that programmes containing Coragen provided levels of control that were at least as effective as, and sometimes better than, the standard insecticide programme used in the trials. As this is a new active for carrot growers, a summary document was produced in May 2012 to summarise the results from HDC projects FV 312 and FV 375 and this was sent to growers.

However, Coragen is more expensive than foliar sprays of pyrethroids and so it is important to work out where Coragen would fit best in a spray programme for carrot fly control. In the projects FV 312 and FV 375, Coragen was used in the same way as a pyrethroid insecticide might be used in terms of timing and the intervals between treatments. However, there are indications that it may be possible to 'optimise' its use and this requires a better understanding of the activity and persistence of individual Coragen treatments and therefore of the likely role of Coragen in a full spray programme.

## **Aims and Objectives**

### ***(i) Project aim(s):***

To determine how 'Coragen' can be used most effectively (overall timing and interval between treatments) as part of a spray programme to control carrot fly on carrot.

### ***(ii) Project objective(s):***

Obtain information from field and laboratory trials on the activity and persistence of foliar sprays of 'Coragen' when used to control carrot fly on carrot.

## **Approach**

The aim of the project is to determine the best way to use Coragen as part of a carrot fly control programme by gaining more information about its activity and persistence.

### ***(i) Methods***

It is proposed that the information is obtained through two field trials and one laboratory experiment using the population of carrot fly maintained at Wellesbourne. Each trial has been costed separately (see section 17) to provide scope for prioritisation.

### ***(ii) Workplan and approaches to be taken***

#### Experiment 1

- Undertake a replicated field trial consisting of spray programmes and individual or pairs of treatments (the latter treatments to estimate persistence).
- Covers made of fine mesh netting can be used to exclude carrot fly for pre-determined periods of time to improve understanding of optimum timing and spray intervals.
- The trial will be sown in late May to avoid infestation by the first generation of carrot fly
- There will be 10 treatments x 4 replicates (plot size 1 bed x 3.5 m)
- Questions to be answered:
  - o Will a single spray of Coragen offer control through a whole season
  - o Will 2 sprays of Coragen alone offer control through a whole season at 2 different timings
  - o Does later application of Coragen give control to the end of the season?
- Possible treatments – to be discussed with industry representative(s):
  - o Coragen x 1 at start of second generation egg laying (T0)
  - o Coragen x 2 at T0 – 1 week and T0 + 3 weeks
  - o Coragen x 2 at T0 and T0 + 2 weeks
  - o Coragen x 2 at T0 and T0 + 4 weeks
  - o Cover until T0 + 2 weeks, uncover – no treatment
  - o Cover until T0 + 4 weeks, uncover – no treatment
  - o Cover until T0 + 2 weeks, uncover and Coragen x 2
  - o Cover until T0 + 4 weeks, uncover and Coragen x 2
  - o Hallmark x 4 and Decis x 2 starting at T0 (standard programme in previous trials)
  - o Untreated control
- Trial will be harvested and assessed in late autumn 2013 and samples of roots (80-100 per plot) will be scored for damage.

#### Experiment 2

- Undertake a small-plot field trial to determine whether Coragen kills carrot fly larvae (foliar sprays of pyrethroids do not kill larvae).
- The trial will be sown in late May to avoid infestation by the first generation of carrot fly
- There will be 5 treatments x 4 replicates (plot size 1 bed x 2m).

- Likely treatments:
  - o Coragen applied to foliage only
  - o Coragen applied to soil only
  - o Hallmark applied to foliage only
  - o Hallmark applied to soil only
  - o Untreated control
- Trial will be harvested and assessed in late autumn 2013 and samples of roots (80-100 per plot) will be scored for damage.

#### Experiment 3

- Undertake small-scale laboratory tests to confirm whether Coragen kills adult flies (foliar sprays of pyrethroids kill adult flies).
- Carrot fly pupae will be collected in February/March 2013 by digging soil from around overwintered infested carrots
- Pupae will be extracted from soil and stored until spring/summer 2013 when laboratory cage experiments will be undertaken.
- Carrot seedlings will be grown in pots.
- Foliage will be sprayed with Coragen.
- Flies will be exposed to treated and untreated plants in small cages.
- Mortality will be assessed over time.
- It should also be possible to assess persistence if enough flies are available.

All data will be summarised and analysed by Julie Jones (statistician).