



Horticultural  
Development  
Company

# Grower summary

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## HNS 177

HNS: further evaluation of  
Trichogramma brassicae  
parasitoids on a commercial  
scale for long term biological  
control of carnation tortrix.

Final Report 2010

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The results and conclusions in this report may be based on an investigation conducted over one year. Therefore, care must be taken with the interpretation of the results.

## **Use of pesticides**

Only officially approved pesticides may be used in the UK. Approvals are normally granted only in relation to individual products and for specified uses. It is an offence to use non-approved products or to use approved products in a manner that does not comply with the statutory conditions of use, except where the crop or situation is the subject of an off-label extension of use.

Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

## **Further information**

If you would like a copy of the full report, please email the HDC office ([hdc@hdc.org.uk](mailto:hdc@hdc.org.uk)), quoting your HDC number, alternatively contact the HDC at the address below.

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## Headline

Weekly introductions of *Trichogramma brassicae* egg parasitoids to mixed HNS crops in a polythene tunnel gave good control of a natural infestation of the light brown apple moth, *Epiphyas postvittana*, on *Chaenomoles*. Two supplementary sprays of the IPM compatible insecticide *Bacillus thuringiensis* (Dipel DF) were needed to gain complete control.

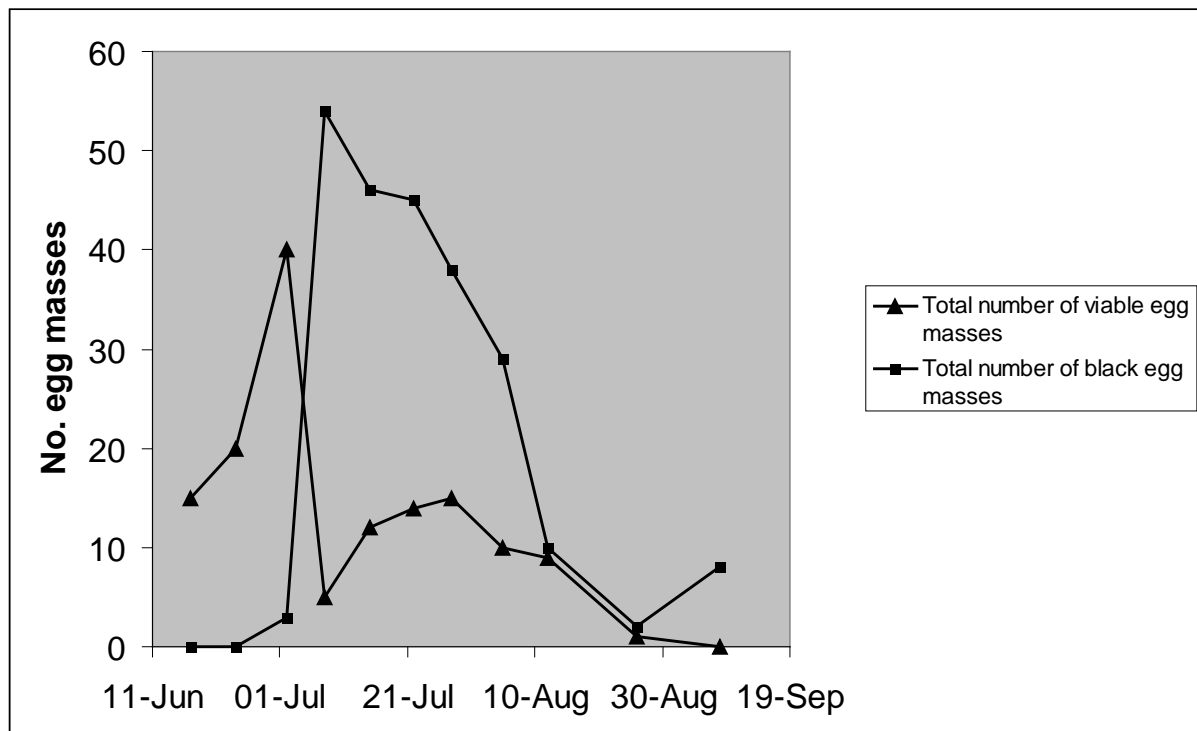
## Background and expected deliverables

- Carnation tortrix moth (*Cacoecimorpha pronubana*) and light brown apple moth (*Epiphyas postvittana*) are widespread pests of nursery stock, and cause damage to many species including *Photinia*, *Chaenomoles*, *Daphne*, *Euonymus*, and *Choisya*. Carnation tortrix is endemic to Mediterranean regions, while light brown apple moth is endemic to Australia, and so both are favoured by warm environments such as nursery stock grown under protection. Caterpillars of both species are similar in morphology and habit; they feed on the leaves and growing points, reducing crop quality. Control with insecticides is difficult because the caterpillars hide inside rolled up leaves and are protected from the spray deposits.
- The eggs of both species are laid in an egg mass, composed of 15-50 or more eggs, laid on the upper leaf surface. Egg masses are pale green in colour, and are often missed by growers during crop monitoring as they are very inconspicuous.
- Growers may have to spray up to 7 or 8 times during the summer, using IPM compatible insecticides such as Conserve or Dipel DF, in order to protect their plants and reduce the foliar damage.
- No biological control organisms have been recommended for these pests, but the project HNS 170, carried out in 2008, showed that the egg parasitoid wasp *Trichogramma brassicae* could successfully parasitise egg masses of carnation tortrix in cage tests.
- The aim of this project was to evaluate *Trichogramma* parasitoids on a commercial scale, by introducing them at weekly intervals to a polythene tunnel with a natural infestation of carnation tortrix, and to evaluate the economics of this approach.

## Summary of the project and main conclusions

- Liners of *Chaenomoles* which were naturally infested with light brown apple moth were used in this work, which was based in a polythene tunnel of 500 m<sup>2</sup> area at Wyevale nurseries, Hereford. Carnation tortrix moth had been present in previous years, but light brown apple moth was the dominant species in this project.
- *Trichogramma* parasitoids supplied as black eggs on cards (as the product Tricholine from Syngenta Bioline) were introduced weekly at the rate of 20/m<sup>2</sup> from mid June until early September 2009, as parasitized moth eggs on cards. A total of 10 introductions were made.
- The parasitisation of egg masses was low at first, but after four weekly introductions it reached over 90%. For the next 4 weeks it varied, but always exceeded 70%. The numbers of viable and parasitized egg masses over the period of the experiment are shown in Figure 1. In order to provide complete control, two supplementary sprays of Dipel DF were needed.
- Successfully parasitized egg masses turned black and so were easy to recognize. In all cases, even though the number of eggs within an egg mass varied, 100% of the eggs within an egg mass were successfully parasitized.
- The previous related project (HNS 170) showed that *Trichogramma* parasitoids could attack egg masses of carnation tortrix in cage tests. This project has shown that they are also effective against egg masses of the light brown apple moth in a commercial situation.
- Emergence of the parasitoids from the cards is delayed because they are delivered in a state of diapause and this needs to be considered when planning IPM programmes. Emergence can take between 9 and 13 days (mean 11 days) depending on temperature, and if the cards are put out immediately upon receipt, they deteriorate with overhead watering. This could adversely affect their performance. Best results would be gained by retaining the cards until hatching occurs, and then placing them in the crop immediately.

**Figure 1.** Number of viable and parasitized egg masses of light brown apple moth on *Chaenomoles*, following introduction of *Trichogramma* weekly from 17 June



## Financial benefits

The *Trichogramma* parasitoid programme of 10 introductions cost a total of 31 p per m<sup>2</sup> over the season, (this cost includes the cost of the two sprays of Dipel DF which were needed), compared to a conventional insecticide programme using IPM compatible insecticides (six applications of Conserve, active ingredient spinosad, and two applications of Dipel DF, active ingredient *Bacillus thuringiensis*), which would cost approximately 27 p per m<sup>2</sup>.

In addition, there would be less selection pressure for resistance in the tortrix population, which should allow existing chemicals to remain effective for longer, with financial benefits for growers in the long term. This is especially important given the fact that EC legislation is reducing the number of products available to growers.

## Action points for growers

- *Trichogramma* parasitoids are freely available from at least two UK suppliers, as parasitized moth eggs on cards which can be hung on the crop.

- They can attack egg masses of both carnation tortrix moth, and light brown apple moth, and so have great potential for use in IPM programmes for protected nursery stock.
- Eggs which have been parasitized turn black and so are easily seen.
- Tests carried out in project HNS 170 in 2008 showed, however, that it takes between 9 and 13 days for the *Trichogramma* parasitoids to emerge and so if the cards were put out immediately they were received, it is likely that they would get damp and lose quality before this time, especially if overhead watering was in use.
- The delay in emergence of the parasitoids need to be considered when planning an IPM programme to ensure that emergence is synchronised with the presence of tortrix egg masses.
- Best effects would be gained by regular monitoring of a few cards in the office, and only putting them out on the crop once adult parasitoids had started to emerge.
- A weekly programme of introductions would be needed to maintain control of the tortrix, and supplementary sprays may be required, depending on pest pressure. The product Dipel DF is ideal for use in conjunction with *Trichogramma*, because it is completely safe to the parasitoids.