



Horticultural  
Development  
Company

# Grower summary

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## HNS 170

HNS: Initial evaluation of  
Trichogramma brassicae  
parasites for control of  
Carnation tortrix

Final Report 2009

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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

- This project has clearly shown (in cage tests) that the egg-parasitic wasp *Trichogramma brassicae* can attack the egg masses of carnation tortrix moth (*Cacoecimorpha pronubana*), and thus has potential for use in a biological control or IPM programme for this pest.

## Background and expected deliverables

The carnation tortrix moth (*Cacoecimorpha pronubana*) is a widespread pest of nursery stock and causes damage to many species including Photinia, Chaenomeles, Daphne, Euonymus and Choisya. It is endemic to Mediterranean regions and so is favoured by warm environments such as those provided by nursery stock grown under protection. Caterpillars feed on the leaves and growing points, reducing crop quality. Control with insecticides is difficult because the caterpillars hide inside rolled-up leaves where they are protected from spray deposits. The eggs are laid in a mass, composed of 15-50 or more eggs, on the upper leaf surface (see Figure 1). Egg masses are pale green in colour, and are easily missed during crop monitoring as they are very inconspicuous.

**Figure 1. Newly laid egg mass of carnation tortrix.**



Growers may have to spray many times during the summer in order to protect their plants and reduce foliar damage. No biological control organisms have been recommended for this pest, but the egg-parasitic wasp *Trichogramma brassicae* is commercially available, and has been used successfully against a wide range of moth species in Europe and elsewhere.

- The main aim of the project was to determine whether *Trichogramma* parasitoids would parasitise egg-masses of the carnation tortrix moth in small-scale cage tests.

## Summary of the project and main conclusions

The work used liners of *Chaenomeles*, known to be heavily infested with carnation tortrix in one of the single polythene tunnels at A commercial nursery in the West Midlands. The crop was inspected closely for egg masses at intervals, and plants with an egg-mass were removed and placed singly in a fine-mesh insect cage together with moth eggs which had been previously parasitized by *Trichogramma*. (The commercial product is a small card, with parasitized eggs stuck onto a circle in the middle of the card). The percentage hatch of carnation tortrix eggs was recorded within the cages.

Assessments showed that a high level of parasitism could be achieved providing the egg-mass was pale green when *Trichogramma* parasitoids were active. Eggs that were parasitized turned black and so were easily recognizable (see Figure 2).

**Figure 2. Egg mass parasitised by *Trichogramma* where all the eggs have turned black**



If the egg mass was more mature (i.e. a darker green or yellower in colour) at the time of exposure to the *Trichogramma* parasitoids, then parasitism did not occur. The age of the eggs therefore appears to be critical in determining the success of the parasitoid.

These results were obtained with parasitoids and eggs confined in small cages. It will be important to replicate this success with parasitoids released on a larger scale, such as in a commercial polythene tunnel.

## Financial benefits

- *Trichogramma* parasitoids are inexpensive; (2008 price was £8.00 for 10,000 parasitoids). Recommended rates are 1 card (containing 200 parasitoids) per 5-20 m<sup>2</sup> of crop. This is equivalent to 10-40 parasitoids per m<sup>2</sup> of crop, at a cost of 0.8-3.2p/m<sup>2</sup>.

However, it is likely that repeated releases during the summer months would be required for control of carnation tortrix, so the cost would increase *pro rata* depending on the number of releases. Assuming a total of 10 releases during the period May-September inclusive, this would cost a total of 8-32p/m<sup>2</sup> of crop per season. If control was effective after a few weeks, then the number of introductions could be reduced and thus the cost would also decrease. These costings are based on the full retail price as supplied by the manufacturer and discounts would be possible for a season-long programme from the supplier.

- Since *Trichogramma* prevents the caterpillars from hatching at all, crop damage is likely to be reduced and the cost of labour to apply regular insecticide sprays would also be either reduced or avoided completely.
- The likely costs, savings and viability of this approach cannot be determined accurately until field-scale trials have been completed.

## Action points for growers

- This pilot study does not indicate whether or not *Trichogramma* will work on a commercial scale. However, *Trichogramma* parasitoids are freely available from at least two UK suppliers as parasitized moth eggs on cards which can be hung on the crop. Growers could therefore try the parasitoids to determine their possible impact on carnation tortrix control on their own nurseries.
- Tests showed that it takes between 9 and 13 days for the *Trichogramma* parasitoids to emerge from commercially-available cards. If these were put out immediately they were received, it is likely that they would get damp and lose quality before parasitoid emergence had occurred, especially if overhead watering was in use.
- Best results are likely to be gained by regular monitoring of a few cards after receipt, only putting the whole batch of cards out on the crop once adult parasitoids have started to emerge.
- To be effective over the season, it is likely that repeated introductions of parasitoids would be needed. Further research work is needed to determine the frequency of introductions necessary and the economics of this approach.