



Horticultural
Development
Company

Grower summary

PC/SF 276

Pheromone technology for
management of capsid pests to
reduce pesticide use in
horticulture crops

Annual Report 2008

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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), quoting your HDC number, alternatively contact the HDC at the address below.

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Headline

- Progress is being made in the development of sex pheromone monitoring traps for capsids.

Background and expected deliverables

This project aims to reduce the use of broad-spectrum insecticides to control capsid pests on a range of horticultural crops whilst maintaining or improving the level of control in both conventional and organic produce. Building on previous research at East Malling Research (EMR) and Natural Resources Institute (NRI), progress is being made to develop effective and practical pheromone lures for monitoring three species of capsids.

A major objective is to identify and confirm the components of the female sex pheromones of the capsid species *Lygus rugulipennis*, *Lygocoris pabulinus* and *Liocoris tripustulatus*. Laboratory work and field bioassays will be undertaken to produce artificial lures. The use of such lures will;

- reduce the incidence of residues of broad-spectrum pesticides.
- substantially improve capsid control in organic crops.
- reduce the likelihood of resistance to insecticides developing.
- simplify implementation of biological control programmes for other pests.
- maintain and enhance biodiversity, including natural horticultural pest enemies.

In the past, lack of an effective monitoring tool has prevented effective control of capsids in horticultural crops and has led to unnecessary use of pesticides. In the future, the project will investigate the effects of host-plant volatiles on capsid behaviour and control. It is possible that the incorporation of host-plant volatiles into lures with pheromones could produce practical benefits in terms of enhancing the attractiveness and/or provide new attractants, particularly for female capsids.

Summary of the project and main conclusions

Collections of volatiles were made from individual males and females of *L. rugulipennis* and *L. tripustulatus*. With *L. rugulipennis*, previous results showing that only females produce hexyl butyrate, (*E*)-2-hexenyl butyrate and (*E*)-4-oxo-2-hexenal were confirmed. Preliminary results with *L. tripustulatus*, have shown that the same 3 compounds were produced by both males and females. However, the amounts and ratios of the compounds produced were very erratic. In the field, good attraction of male *L. rugulipennis* to standard green delta traps baited with unmated laboratory reared females occurred primarily in the morning. However, there was no obvious pattern of production of the compounds at different times of day in the laboratory.

Analysis of volatile collections by gas chromatography linked electroantennagrams (GC-EAG) from *L. rugulipennis* and *L. tripustulatus* showed weak and erratic responses to the 3 identified compounds and no significant responses to any other compounds.

Laboratory wind tunnel bioassays proved unsuccessful partly because it was not possible to determine when a female was 'calling'; releasing sex pheromone. *L. rugulipennis* males did not respond to females or synthetic lures. Some positive responses were obtained for both *L. rugulipennis* and *L. tripustulatus* in large cage still air bioassays. These suggested attraction of male *L. rugulipennis* to females, and of female *L. tripustulatus* to males, but, in the latter species, numbers responding were small and results were not wholly consistent.

Field tests were carried out with various combinations of the 3 compounds shown to be produced by female *L. rugulipennis* using either open capillary tube dispensers or capillary dispensers with a reservoir. No attraction was found even though attraction had been demonstrated in previous field experiments prior to this project.

The 3 capsid species were cultured in the laboratory, with most effort being devoted to *L. rugulipennis* and *L. tripustulatus*. This proved labour intensive, somewhat unpredictable and productivity declined later in the growing season due to the insects entering diapause as winter approached. Attempts to collect *L. pabulinus* from the field were largely unsuccessful as populations in 2007 were very low.

Future work will concentrate on confirming sex pheromone components and estimating the time of day males are attracted to females of *L. pabulinus*. The wind tunnel bioassay will be abandoned and efforts concentrated on the still air, large cage bioassay which will then provide the basis for laboratory testing the development of synthetic lures.

New lures and pheromone dispensing technologies will be employed for field testing blends and release rates of the 3 known compounds. Collection and analysis of pheromones from *L. rugulipennis* and *L. tripustulatus* will be repeated when the insects are highly reproductively active in the main season, including volatile release analyses at different times of day.

Financial benefits

No direct financial benefits to growers resulted from the trial this year, but the ability to monitor capsids in horticultural crops will result in reduced numbers and better timed pesticide applications in the future.

Action points for growers

- No direct action points have arisen from this work to date.