

Grower Summary

SF 117

Sex pheromone trap for monitoring
blackberry leaf midge

Final 2012

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

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Project Leader:	Professor David R. Hall
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Industry Representative:	Tom Maynard
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Headline

The female sex pheromone of the blackberry leaf midge has been identified and synthesized. Traps baited with the synthetic pheromone are now commercially available from Agralan and should provide a new, specific method for growers to detect the presence of this pest in order to make timely application of control measures.

Background

Blackberry leaf midge (*Dasineura plicatrix*) has recently developed as a serious pest of blackberry and has now spread to raspberry in the UK and elsewhere in Europe. It attacks the primocane shoot tips, killing the terminals, stunting growth and causing branching. Growers consider that it significantly affects yield in both crops, although no crop damage assessment trials have yet been done. Growers currently have no method of predicting or monitoring attacks or timing sprays to control it. Timing of application is critical with midge pests as the larvae quickly become protected within the leaf rolls and it important not to disrupt natural biocontrol mechanisms.

The female midge produces a powerful sex pheromone attracting males. Identification of the pheromone would make it possible to develop sex pheromone traps for monitoring the pest and timing measures for its control, as has been done for the raspberry cane midge and blackcurrant leaf midge. The traps will be ideal for timing application of control programmes developed by ADAS in project SF102.

The female-produced sex pheromone of blackberry leaf midge was partially identified in an HDC-funded PhD project of Lakmali Amarawardana (CP38 'The Chemical Diversity of Midge Pheromones'). This project aims to complete identification of the chemical structures of the components of the pheromone, to synthesise them and develop effective lures and traps for use by growers. It is anticipated that the traps will prove invaluable in monitoring the pest to assess the need for control measures and to time the application of these more effectively.

Summary of the project and main conclusions

(2*R*,*Z*6,*Z*9)-2-Acetoxy-6,9-pentadecadiene was identified as the major component and (2*R*,*Z*6)-2-acetoxy-6-pentadecene as the minor component of the female sex pheromone of the blackberry leaf midge.

When the synthetic compounds were tested in the field the minor component alone was unattractive to male blackberry midges when tested as the racemic or the separate enantiomers at two different loadings. In contrast, the (*R*)-enantiomer of the major

component was highly attractive. The (S)-enantiomer and racemic mixture were completely unattractive, indicating that the (S)-enantiomer actually inhibits the attractiveness of the (R)-enantiomer. Moreover, adding the minor component to the major at a 1:3 ratio significantly increased the attractiveness of the major component.

Further field trials in 2011 confirmed that blends of the two components from 1:1 to 10:1 were attractive to male *D. plicatrix*, and a 2:1 blend of (2*R*,6*Z*,9*Z*)-2-acetoxy-6,9-pentadecadiene and (2*R*,6*Z*)-2-acetoxy-6-pentadecene was adopted as standard. When different loadings of this blend were compared in rubber septa dispensers, loadings of 0.1 – 10 µg were more attractive than higher loadings. A loading of 10 µg was adopted as standard. The 2:1 blend at 10 µg loading of the major component was very significantly more attractive to male *D. plicatrix* than two virgin female midges. However, in this experiment the traps baited with female midges did not catch significantly more midges than unbaited traps suggesting that the females were not in good condition.

Pheromone traps baited with the synthetic lures were successfully used to monitor *D. plicatrix* in blackberry and raspberry fields in the UK and The Netherlands, although further work is required to correlate trap catches with actual adult numbers and subsequent infestations of larvae.

The traps and lures are now commercially available from Agralan.

Financial benefits

A leading grower estimates that attacks of blackberry midge can easily reduce yield of blackberry crops by 10% which would lead to losses of £3,000 per ha on a typical 15 t/ha blackberry crop. The pest is more serious on raspberry and can cause 60% loss in cane height on some modern primocane varieties. If the pest were not controlled and this occurred, 40% crop losses could be expected amounting to a loss of £12,000 per ha.

Action points for growers

Lures and traps for blackberry midge can be purchased from Agralan.

Their use to monitor populations and determine the need and timing for control measures against this pest should be evaluated.