Grower Summary

SF 012 (GSK222)

Development of sex pheromone trap and evaluation of insecticides for control of blackcurrant leaf midge

Annual 2009

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

Read the label before use: use pesticides safely.

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Contractor/(s):	East Malling Research
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Further information

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GROWER SUMMARY

Headline

- Of seven plant protection products tested for control of blackcurrant leaf midge, only a novel product from Bayer showed promise for replacing Brigade (bifenthrin).

Background and expected deliverables

Blackcurrant leaf midge, *Dasineura tetensii*, has increased in importance in recent years and better methods of managing it are needed for UK growers. Currently one or more sprays of bifenthrin (Brigade) or chlorpyrifos (various products) are applied when midge galling damage is seen. This strategy results in less than optimum control. Furthermore, bifenthrin and chlorpyrifos are broad spectrum insecticides which are harmful to many important natural enemies of blackcurrant pests. Accurate timing of insecticide application is essential for control of this pest.

EMR and NRI have identified the sex pheromone of blackcurrant leaf midge and demonstrated that it is useful for monitoring male midge numbers and flight periods. Intensive work in 2008 resulted in the development of an optimised lure (a rubber septum loaded with 5 µg of the C stereoisomer of the pheromone) and a prototype trap design (red delta trap with excluder grids at the entrances and deployed at 3 cm above the ground).

The objectives of the work done in 2009 were to:

1. Field test the efficacy of the red delta trap prototype with and without excluder grids in comparison to a standard white delta trap.
2. Examine the relationship between trap catches and numbers of galls formed in different commercial crops to establish a trap threshold.
3. Identify alternative chemical treatments to Brigade for the control of blackcurrant leaf midge. Seven alternative chemicals (mostly applied as foliar sprays) were compared to Brigade and an untreated control including abamectin (Dynamec), thiacloprid (Claypso), acetamiprid (Gazelle), spinosad (Tracer), Bayer novel product and chlorpyrifos (Equity as a foliar or soil treatment).
4. Evaluate the efficacy of different timings of application of a novel Bayer product, Brigade and Equity for control of blackcurrant leaf midge utilising the sex pheromone trap. A single or double spray programme was compared to an untreated control.

For objectives 3 and 4, the first spray application was timed when the number of midges in the sex pheromone trap exceeded 30/trap.

Summary of the project and main conclusions

Objective 1

Red delta traps with excluder grids at their entrances and held at a height of 3 cm above the ground on integral legs, were optimal for trapping blackcurrant leaf midge using sex pheromone lures. Red delta traps without excluder grids caught more male blackcurrant leaf midges but were subject to the highest numbers of midge losses through predation and higher amounts of debris and non-target insect contamination. Red delta trap with excluder grids and integral legs are not currently commercially available but can be readily constructed (DIY) in small numbers. White delta traps did catch midges, but were much less effective than the red delta traps, which may delay the detection of midges early in the flight period. The poorer performance of this trap may have been because it was positioned higher in the crop where fewer midges are flying.

Objective 2

For non-cut down bushes, pheromone trap calibration showed weak positive relationships between numbers of gall per shoot and the total and peak catches of midge for the corresponding generation. Taking the worst case data, a total catch of 100 midges led to an average of about 90 galls per 100 shoots. A peak catch of 100 midges per trap led to an average of about 180 galls per shoot. For cut down bushes there was no relationship for either total or peak catches. It is suspected that females may have been attracted over long distances to the lush shoot growth in the small plots. There was considerable variability and more data is required over several years in a wider range of plantations to establish more robust nominal thresholds and to determine how these might be affected by variety.

Objective 3

Dynamec, Gazelle, Equity, Brigade and the novel Bayer product gave at least some curative activity against existing infestations of semi-mature and mature larvae in galls. However, only the Bayer coded product performed reliably throughout the trial equalling Brigade in its level of midge control. The Bayer coded product may be a suitable replacement for Brigade (and other bifenthrin products). It is a selective product and was able to kill larvae inside galls whereas Brigade is disruptive and probably did not kill more mature larvae in galls. None of the products produced any visual symptoms of phytotoxicity

Objective 4

The timing of the spray applications was critical for the control of blackcurrant leaf midge. To be effective, products needed to be applied early in the generation of the midge (oviposition or early stage larvae). Brigade was the most effective of the products tested when applied early (when cumulative trap catches reached 30 midges per trap). The second and third spray applications did not have any effect on the numbers of galled leaves or larvae in the galls. The second application of Calypso was beneficial at reducing the numbers of larvae within the galls (although this was too late to reduce the numbers of galls themselves). The Bayer coded product offered the best protection against the midge as it was equally as effective as Brigade at reducing the numbers of larvae, but also appeared to have a larger window of opportunity for treatment application. None of the treatments had any effect when applied at the end of the generation, probably because the larvae had completed development and left the gall, and/or because the gall had become tough and necrotic, limiting any trans-laminar effects of the insecticides. None of the products produced any visual symptoms of phytotoxicity.

Financial benefits

Losses due to blackcurrant leaf midge in blackcurrant plantations in the UK have not been quantified. However, the midge is a widespread and important pest. Severe attacks cause stunting of new growth (by > 30%).

Action points for growers

- Blackcurrant leaf midge sex pheromone delta traps should be used to direct and time insecticide sprays at the most vulnerable life stages of the blackcurrant leaf midge resulting in a significantly improved control.

- Brigade is the most effective insecticide of those available currently, but chlorpyrifos and Calypso are also partially effective. A novel selective product from Bayer appears highly effective but further work is needed before it can be made available to growers.

- The timing of sprays active against blackcurrant leaf midge is critical. First applications should be made a few days after the start of the first generation midge flight in spring as indicated by pheromone trap catches when egg hatch is commencing and larvae are most vulnerable.