

Grower Summary

SF 147

**Development of a sex
pheromone monitoring trap
for gooseberry sawfly**

Annual **2016**

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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 AHDB Horticulture office (hort.info.@ahdb.org.uk), quoting your AHDB Horticulture number, alternatively contact AHDB Horticulture at the address below.

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AHDB Horticulture is a Division of the Agriculture and Horticulture Development Board.

Project title: Development of a sex pheromone monitoring trap for gooseberry sawfly

Project number: SF 147

Project leader: Dr Michelle Fountain, East Malling
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6BJ

Report: Year 2 Annual Report

Previous report: Year 1 Annual Report

Key staff: Prof David Hall, Dudley Farman (NRI)

Location of project: EMR, NRI

Industry Representative: Scott Raffle

Date project commenced: April 2014

Date project completed (or expected completion date): March 2017

GROWER SUMMARY

Headline

- A potential component of the female sex pheromone of the gooseberry sawfly has been identified and will be tested during 2016.

Background and expected deliverables

The common gooseberry sawfly, *Nematus ribesii*, is a sporadic, localised and unpredictable pest of gooseberry with lesser attacks on redcurrant and whitecurrant. The feeding larvae are able to defoliate whole gooseberry bushes if not detected and controlled in a timely manner. The monitoring of the pest relies on the detection of the eggs on the underside of leaves in the centre of the bushes. Larval damage begins in the centre of the plants, low down, and radiates outwards devouring the leafy areas of the bush. Crop scouting in plantations for eggs and larvae is not always the most reliable method as an adequate search is time-consuming. This project aims to identify the gooseberry sex pheromone which would lead to the development of a sex pheromone monitoring trap: a more sensitive and rapid monitoring method. The production of a sex pheromone attractive to males by virgin female gooseberry sawfly was reported by other workers but never identified. In other work by NRI and EMR, potential components of the female sex pheromone of the closely-related blackcurrant sawfly, *N. olfaciens*, have been identified and synthesised.

Summary of the project and main conclusions

In the first year of the project (2014) larvae of common gooseberry sawfly, *N. ribesii*, were collected by growers and reared through to adults in the laboratory at EMR. Volatiles were collected from unmated males and females and analysed by gas chromatography (GC) with flame ionisation detection (FID) or linked to a mass spectrometer (MS). Collections from both males and females contained large amounts of long-chain hydrocarbons, probably derived from the cuticle, but the pattern of these was identical in male and female gooseberry sawfly and very similar to those in collections from male and female blackcurrant sawfly.

There were no obvious differences in the composition of volatiles from female or male gooseberry sawfly that might be attributable to potential components of a female sex pheromone. However, after fractionation of the collections to remove the hydrocarbons and analysis by GC-MS with selective ion monitoring to maximise sensitivity, traces of a mono-unsaturated, 16-carbon isopropyl ester, similar to one of the compounds proposed to be a component of the pheromone of the blackcurrant sawfly could be detected.

In the second year of the project, gooseberry sawfly were again collected by growers as larvae and reared through to adults at EMR. Collections of volatiles were made from virgin females and analysed by GC-MS at NRI. Similar results were obtained to those in the first year, and again there were indications of the presence of a mono-unsaturated, 16-carbon isopropyl ester.

In this second year, GC-EAG analyses were also carried out using male gooseberry sawfly. Strong EAG responses were obtained to the isopropyl esters previously identified as components of the sex pheromone of female blackcurrant sawfly. However, in analyses of volatile collections from female gooseberry sawfly no EAG responses were observed at the retention times corresponding to the 14-carbon or 16-carbon isopropyl esters. Instead a single EAG response was observed at a later retention time on the polar GC column. This seemed to be associated with one of the hydrocarbon components, ZZ6,9-23:H, but neither the synthetic compound nor the purified natural compound elicited an EAG response.

Unfortunately, no EAG response was observed in GC-EAG analyses of volatile collections on a non-polar GC column. This will be repeated next year and, taken with the data obtained to date, should indicate the structure of the compound responsible for the EAG response which is presumed to be a component of the sex pheromone.

In addition, virtually no gooseberry sawfly were captured on traps in growers' holdings or gardens where they were deployed (to date). The potential attractants, including the blackcurrant sawfly pheromone, will be further field tested in 2016.

Financial benefits

Gooseberry sawfly is a devastating pest of gooseberry which is difficult to predict and may lead to unnecessary plant protection products being applied for control. A trap and lure designed to accurately time and target sprays would decrease or even eliminate the use of unnecessary pesticide applications. Targeting products better, usually chlorpyrifos, thiacloprid, lambda-cyhalothrin or pyrethrins, would protect crops from defoliation and the related fruit losses.

'Invicta' and 'Careless' are the two principal varieties grown and it is estimated that there are at least 600 pick-your-own and farm shop growers (39% and 50% of fruit respectively), and 116 commercial growers registered with AHDB Horticulture growing gooseberries in the UK. At least three growers supply to supermarkets and 11% of fruit is grown for processing. 238 hectares of gooseberries are grown in the United Kingdom. In 2013, the price for gooseberry was ~£3.79/kg, and approximately 4,000 kg of fruit are produced per ha making the UK gooseberry industry worth over £3.5 million revenue per annum (238 ha x 4000 kg x £3.79).

Action points for growers

- Look for adults flying in April and May and target with approved insecticides to prevent egg laying.
- Check for eggs on the underside of leaves in the centre of the bush.
- Check for larval damage low down in the centre of the bush.
- Contact michelle.fountain@emr.ac.uk if you would like to trial the test trap and lure.
- Please send live gooseberry sawfly larvae, with leaves, in a crush proof box to Michelle Fountain, NIAB EMR, New Road, East Malling, Kent ME19 6BJ.

