



Grower Summary

TF 218

Increasing hoverfly populations
in apple orchards for control of
apple aphids

Final 2017

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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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Project title: Increasing hoverfly populations in apple orchards for control of apple aphids

Project number: TF 218

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Report: Final report 2017

Previous report: Year 2 report

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Date project commenced: 1 April 2014

Date project completed 31 May 2017
(or expected completion date):

GROWER SUMMARY

Headline

- Dispensers of the plant volatiles methyl salicylate and phenyl ethanol, with or without (*E*)- β -farnesene or a mix of farnesene isomers, increased the number of hoverflies caught in baited traps indicating adult attraction.

Background and expected deliverables

Apple aphids are ongoing pest problems and biological control can help to reduce the severity of attack or eliminate the pest altogether. Hoverfly larvae are voracious predators of aphids and if adults can be attracted into the orchard early in the season, and/or encouraged to overwinter in or close to orchards (hoverflies overwinter either as adults or pupae depending on the species), this increase in predators would be an important component of an IPM strategy. Biocontrol is particularly effective where ants are discouraged from protecting the aphids. Hoverfly adults respond to plant produced volatiles and to components specific to aphid feeding.

This project aimed to determine whether volatiles can be used to attract hoverflies into orchards and whether they then act as effective predators of aphids, reducing aphid populations in the orchard.

Summary of the project and main conclusions

Replicated experiments were carried out over three years to determine whether volatile compounds, either applied individually or as blends of volatiles, were attractive to hoverfly adults in apple orchards. The volatiles were soaked onto dental roll held inside a polyethylene sachet. These were hung inside delta traps, with sticky bases, which were placed in apple orchards. The species and numbers of hoverflies in the trap catches were recorded.

In 2016, twenty nine different species of hoverflies were found in the orchards, with 1,700 individuals identified. Species found in the spring included *Episyrphus balteaus*, *Eupoedes spp.* and *Platycheirus spp.*. Some species, such as certain *Platycheirus spp.* are thought to be able to overcome ant defence which is important when considering effective aphid control. There were clear indications that synthetic volatiles acted as attractants for hoverflies found naturally in apple orchards.

These results showed that a blend of volatiles was consistently attractive to hoverflies, significantly increasing the number of hoverflies in trap catches. In particular a dispenser with the two volatile chemicals methyl salicylate and phenyl ethanol, or a dispenser with the three volatiles methyl salicylate, phenyl ethanol and (*E*)- β -farnesene are promising. Sachets containing methyl salicylate are already marketed in the US as PredaLure™ to attract

beneficial insects. In addition to the hoverfly attraction, a combined dispenser may also attract other orchard beneficials such as lacewings, as shown in our 2015 results. The use of beneficial species is compatible with IPM and organic control programmes in orchards. Whilst there are no recommendations for growers as yet, the results from the work will be taken forward in another AHDB project, TF 223, where the dispensers will be assessed in large plots in newly planted orchards.

Financial benefits

Apple trees are subject to a number of aphid pests including the rosy apple aphid (*Dysaphis plantaginea*), the rosy leaf curling aphid (*Dysaphis devectora*), the green apple aphid, (*Aphis pomi*), the woolly apple aphid (*Erisoma lanigerum*) and the apple grass aphid (*Rhopalosiphum insertum*). When conditions are favourable pest numbers can increase rapidly. The rosy apple aphid is the most damaging of these and high numbers result in curled leaves and misshapen fruits, which can lead to economic losses. The Assured Produce threshold for RAA suggests that crop protection product application is justified if one aphid is found in the orchard pre-blossom. Some organic orchards suffer 100% crop loss from rosy apple aphid.

In this project hoverflies were attracted to traps baited with volatile lures. Now that suitable volatile blends have been demonstrated we may be able to manipulate beneficial species numbers in orchards in the future, with the aim of ultimately reducing pest numbers. The use of plant volatiles to attract beneficial species is compatible with Integrated Pest Management (IPM) and organic control programmes in apple orchards. IPM strategies reduce product inputs, residues on the fruit and the risk of development of pest resistance to products. Attraction of hoverflies into orchards would also be economically favourable as the adults are important pollinators; they are reported to be the most important pollinator group after wild or managed bees.

Action points for growers

- No specific recommendations for growers have resulted from this work, but it will be taken forward in Project TF 223.

