Grower Summary

TF 220

Further development of earwig-safe spray programmes for apple and pear orchards

Annual 2015

Disclaimer

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 this 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 Number:	TF 220
Project Title:	Further development of earwig-safe spray programmes for apple and pear orchards
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GROWER SUMMARY

Headline

- The results of this project are contributing to a growing evidence of the effects of several crop protection products on different growth stages of earwigs

Background and expected deliverables

Earwigs are important generalist predators in both apple and pear orchards. They play a key part in regulating populations of several highly damaging pests including woolly aphid and other aphid pests, mussel scale, codling moth and pear sucker. Recent laboratory tests and field experiments by EMR and experiments by other European scientists have indicated that several commonly used insecticides including thiacloprid (Calypso), indoxacarb (Steward), chlorpyrifos (various prouducts) and spinosad (Tracer) have harmful effects on earwigs and could be responsible for low populations in some orchards. However, growers need to be able to use products containing acetamaprid (Gazelle), thiacloprid (Calypso), abamectin (Agrimec) and spirodiclofen (Envidor) for control of aphids, mussel scale, weevils, capsids, pear sucker and sawfly (see Table 1 of the Science Section of this report).

This project will build on research carried out by EMR in AHDB Horticulture project TF 196, which showed that earwigs can be disrupted by routine crop protection programmes. It will test how to integrate key crop protection products into pest management programmes without causing harm to earwig populations in orchards and further investigate the sub-lethal effects (growth and reproduction) that these products have on nymph and adult earwigs in highly replicated laboratory trials.

Summary of the project and main conclusions

Twenty nymph, adult male and adult female earwigs were exposed to a dried insecticide residue on a leaf disk for 1 week in a laboratory test. The earwigs were then held in Petri dishes for at least 42 days post exposure and weighed weekly. The insecticides tested were acetamaprid (Gazelle), thiacloprid (Calypso), abamectin (Agrimec) and spirodiclofen (Envidor). All were compared to a water only control.

Earwig nymphs avoided feeding on leaves sprayed with Calypso, but Envidor appeared to stimulate adult earwig feeding. In addition, Calypso affected the growth of earwig nymphs

and adult males. Nymphs were generally more sensitive to the effects of Calypso than adult earwigs. There was a high natural mortality of nymph earwigs in the laboratory; 40% died (water only treatments). Only 20% of adult males died and none of the females had died by the end of the experiment in the water only treatments.

Gazelle and Agrimec appeared to be relatively safe to earwig nymphs and adults. However, Calypso appears quite toxic in terms of behavioural effects and leads to eventual mortality and may be better replaced with Gazelle at key times in the earwigs' lifecycle in tree fruit.

The results of this project are contributing to a growing evidence of the effects of pesticides on different stages of earwigs, a key predator of tree fruit pests. By using initial laboratory screening tests we have ascertained some of the effects of insecticides on earwigs that would not be observable in the field.

Future research will test the products in apple and pear orchards in the early- and mid-growing season, and 1-2 applications. The results from the long term toxicity effects of the lab study (still ongoing) will be reported in the 2016 report.

Financial benefits

- The industry will be provided with independently obtained information on the relative safety of critical orchard insecticides on earwigs; important natural enemies of several damaging pests.
- Growers will be able to judge when best to use which insecticides for essential pest control tasks such as control of codling moth, aphids, mussel scale and pear sucker.
- There will be fewer problems with many important pests if earwig populations are allowed to thrive.

Action points for growers

- Growers should make considered choices of pesticide products based on the knowledge of important predators in the orchard at the time of spraying (see Table 4 in the Science Section of this report).
- Growers can consult agronomists to determine which products are safe to apply at key times of the earwig lifecycle.
- Gazelle may be a better control option for mussel scale, aphid, rhynchites and sawfly post blossom, when earwig nymphs start to enter the trees.