Grower Summary

SF 168

Survey of earwig abundance in blackcurrant plantations in the main growing areas of the UK in 2016

Final 2017

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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 leader:	Dr Michelle Fountain, NIAB EMR
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Location of project:	NIAB EMR, Grower sites
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Date project completed (or expected completion date):	April 2017

GROWER SUMMARY

Headline

- A survey of earwig abundance and its influencing factors has been carried out in blackcurrant plantations across the UK in 2016.

Background and expected deliverables

The common European earwig, *Forficula auricularia* L., is the most frequently encountered species of earwig in UK fruit plantations (Fitzgerald and Solomon, 1996; Solomon et al., 1999). Earwigs are omnivorous feeding on other arthropods, plants, pollen, microscopic algae and fungi, and are sometimes cannibalistic. They are important predators of many pests including scale insects (McLeod and Chant, 1952; Karsemeijer, 1973), psyllids (Lenfant et al., 1994; Solomon et al., 1999), woolly apple aphid, *Eriosoma lanigerum* Hausmann (Phillips, 1981; Ravensburg, 1981; Noppert et al., 1987; Mueller et al., 1988; Nicholas et al., 2005; Dib et al., 2010) and codling moth, *Cydia pomonella* L. (Glen, 1977). Hence, they also have the potential to be an important predator of soft bodied pests in blackcurrant plantations (aphids, sawfly eggs and larvae, midge larvae and caterpillars).

Research at NIAB EMR has shown large differences in earwig populations in apple and pear orchards (EMR, 2014: Annual report, p 20-21). Reports that earwigs are declining in some orchards (Gobin et al., 2008) have raised concern for this effective, natural enemy in apple and pear orchards, but to date there is no comparative data on the abundance of earwigs in blackcurrant plantations. Research by NIAB EMR and other researchers across Europe and New Zealand identified that earwigs can be adversely affected by applications of some insecticides (reviewed in Fountain and Harris (2015) and TF 220 (2015)). Little is known about the impact of insecticide applications on earwig populations in blackcurrant plantations.

Summary of the project and main conclusions

Five of the main UK blackcurrant growing regions were surveyed in 2016 to determine earwig abundance in blackcurrant crops. Ten plantations were surveyed in each region. In collaboration with Harriet Roberts, LRS, ten refuges (confidential design, see p.4 of the Science Section of this report) were deployed at the edge and centre of each plantation for a minimum of 45 days. Grower spray programmes for 2015 and 2016 were collected to examine effects of insecticide spray programmes on earwig abundance within each plantation. Toxicity scores of commonly used insecticides in blackcurrant crops were used and summed for each crop. Earwig numbers varied greatly between blackcurrant plantations within and between farms (mean 0 – 110 earwigs per refuge). However, no significant correlation between earwig

abundance and the toxicity score of the insecticide spray programmes was found. Nonetheless, blackcurrant plantations which received an insecticide spray programme with an overall toxicity score greater than 14 had fewer earwigs (<20 earwigs per refuge) and with a score greater than 25 had no earwigs. Earwig numbers varied between plantations where insecticide spray programmes were similar. For example, the insecticide spray programmes for farm A had the same overall toxicity score on each of the plantations whilst mean earwig numbers varied from 3 to 63 earwigs per refuge per plantation. This suggests that other abiotic and biotic factors may have influenced earwig abundance in blackcurrant plantations in addition to spray programmes. Further studies are needed to determine what other factors influence earwig populations in blackcurrant.

Financial benefits

Approvals for chlorpyrifos and pirimicarb have been discontinued on blackcurrant, so a reliance on natural enemies is becoming increasingly prevalent. Earwigs have been recognised as effective at controlling pests in apple and pear orchards and increasing earwig numbers in blackcurrant could help to suppress many common blackcurrant pests. If earwigs are found to be sufficient at controlling pests then fewer insecticides will need to be applied reducing residue levels in the fruit and reducing the cost of insecticide inputs.

Action points for growers

- Assess earwig presence and abundance in blackcurrant plantations by tap sampling or using corrugated cardboard bottle refuges.
- Foster and encourage populations of earwigs by considering the choice and timing (females in canopy Apr, nymphs in canopy May – Sep) of insecticide products applied.
- Monitor pest incidence alongside general natural enemy numbers.