

Project title: Improving integrated pest and disease management in tree fruit

Project number: TF223

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East Malling Research

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The results and conclusions in this report are based on an investigation conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.

AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

Robert Saville

Project leader, Plant Pathologist

NIAB EMR

Signature Date

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GROWER SUMMARY

Objective 7 - Pear sucker and natural enemies

Project TF 223 is a five year project which was commissioned to tackle a number of current pests and diseases affecting tree fruit crops. Objective 7 deals with pear sucker and the use of natural enemies to gain control in pear orchards.

Headline

- Six commercial pear orchards are being studied to improve our understanding of the levels of naturally occurring predators of pear sucker and their potential for commercial control.

Background and expected deliverables

Pear sucker, *Cacopsylla pyri*, is the major pest of pear. Sporadic population growth occurs in response to warm dry weather and also in orchards where significant populations of earwigs and anthocorids are not sustained. Evidence from other AHDB and Innovate UK projects has shown that earwigs are important control agents for aphids and pear sucker. Additional research in the USA also demonstrates predation of codling moth eggs. Aphid predators such as earwigs, hoverfly larvae, lacewing larvae, spiders and ladybirds are all able to penetrate the leaf rolls (galls) caused by the various apple aphid species.

There are large differences, between orchards, in earwig populations and Project TF 196 has demonstrated that crop protection product use and timing may be, at least partly, responsible. However, anecdotal evidence is showing that earwigs can be unevenly distributed within an individual orchard.

The aim of this study is to develop more effective monitoring, crop protection product use and natural enemy build-up in pear orchards. It is expected that any crop protection product interventions will be timed better and application improved.

Summary of the project and main conclusions

Six farms were involved in the study in 2016. All farm staff participating were trained in the monitoring technique at the start of the growing season. Each grower selected three orchards (high, medium and low pear sucker infestations) on each farm and allowed time for a worker

to systematically assess the chosen orchards each week. The results were collated at least fortnightly by NIAB EMR and then shared with all participants.

From March until September, in low, medium and high pear sucker infested orchards, numbers of pear sucker eggs, nymphs and adults, along with ladybirds, earwigs and anthocorids were recorded. The first peaks in pear sucker egg numbers were recorded either in mid to late-March or mid-April, depending on the location of the farm. The second generation of eggs were laid at the end of May and beginning of June with a subsequent smaller peak in pear sucker eggs in August. Anthocorids were released at one of the farms. In some orchards there was a late attack of pear sucker in September.

The majority of orchards never reached high numbers of pear sucker eggs. The exception was Farm 2, in a highly infested orchard, which reached 2,000 eggs per 30 shoots at the second egg laying peak at the beginning of June. Farms 1, 4 and 6 had significant numbers of earwigs and anthocorids and did not reach a peak of pear sucker eggs of more than 500/30 shoots. Farms 2 and 3 had very few natural enemies present in the trees.

Positive correlations existed between guilds of pear sucker averaged over the entire season. Hence where there were more adults there were more eggs and nymphs. There was a significant positive correlation between earwigs and anthocorids. Hence more earwigs were found where there were more anthocorids. This could be a consequence of crop management being more sympathetic to natural enemies on some sites.

There was no correlation between mean seasonal numbers of earwigs or anthocorids and pear sucker guilds. Ladybirds were positively correlated with all pear sucker eggs and nymphs and may have been attracted to these as a food source. Although this data is showing some trends, more seasonal data is required and future analyses could examine population trends over time.

Financial benefits

Close monitoring of pear sucker and natural enemies can prevent the application of unnecessary sprays and conserve natural enemies which control pear sucker. This will reduce the need for applications of products needed to control honeydew on trees. The reduction of pear sucker in the crop reduces crop loss through the maintenance of fruit quality and prevents damage to overwintering bud and tree health.

Action points for growers

- Monitor for pear sucker in the crop to accurately time Envidor applications and avoid sprays where unnecessary.
- Whilst monitoring for pear sucker, also monitor for natural enemies such as earwigs, anthocorids and ladybirds, to gauge the likely future control in the absence of sprays.