Grower Summary

TF 219

Control of two-spotted spider mite (Tetranychus urticae) on protected cherry using the predatory mite Amblyseius andersoni

Final 2017

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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:	Control of two-spotted spider mite (*Tetranychus urticae*) on protected cherry using the predatory mite *Amblyseius andersoni*
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Report:	Year 3, Final Report 2017
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Date project completed **(or expected completion date):**	31 March 2017

GROWER SUMMARY

Headline

- *Amblyseius andersoni* introductions made at a rate of one Gemini sachet per 5 cherry trees under protection disperse evenly across the trees giving the potential to control pest mites.

Background and expected deliverables

Growing cherries under protection brings benefits of consistency of supply by reducing fruit splitting from frosting and rain. However, the increased temperature and humidity under tunnels also causes problems including pests and diseases which thrive in these conditions.

Pest mites on cherry include two spotted spider mite (TSSM, *Tetranychus urticae*) and the European fruit tree red spider mite (*Panonychus ulmi*). Due to the warm, dry conditions in protected cherry there has, in recent years, been a build-up in *T. urticae* close to harvest causing bronzing of the leaves and webbing. This was particularly problematic in 2013 when warmer dryer weather conditions promoted the population growth of *T. urticae* on cherry trees in tunnels. There was concern by agronomists that this may affect the subsequent years' bud growth. Products approved on cherry for spider mite control are either damaging to natural enemies, have short persistence or have harvest intervals which are too long.

Since 2012 the occurrence of the invasive pest, spotted wing drosophila (*Drosophila Suzukii* – SWD), which causes damage to developing fruits, there has been an increased range and number of applications of crop protection products to cherries. It was hypothesised that these products may have detrimental effects on naturally occurring predatory mites in cherry trees, resulting in the proliferation of spider mites in the crop.

Many species of predatory mites occur naturally and/or are available commercially. Naturally occurring predators offer some control of spider mites, but there can be a lag between the population build-up of the pest and the predator, resulting in spider mites overwhelming the trees before the predator can gain control.

Amblyseius andersoni is a generalist predator and will feed on many mite species including *Panonychus ulmi* and *Tetranichus urticae*. *A. andersoni* is a common predatory mite species on cherry trees, but it is not always present in sufficient numbers to control spider mite infestations. Commercial trials have shown promising results using *A. andersoni* Gemini sachets to control spider mites in outdoor apple trees.

The aim of this project was to test the efficacy of *Amblyseius andersoni* as a preventive and curative control agent of spider mites in protected cherry.

Summary of the project and main conclusions

In 2014 it was demonstrated, in replicated plot trials, that *A. andersoni* deployed in Gemini sachets on every fifth cherry tree, in two protected orchards, dispersed evenly on cherry leaves resulting in uniform numbers of predatory mites on each tree. Unfortunately, in that year, phytophagous mite populations never developed sufficiently in the untreated plots and hence we could not assess the effects of *A. andersoni* on the pest mites.

In 2015 it was demonstrated that a very low diversity of Acari (mites) was present on the cherry leaves in the study orchard; populations were almost completely dominated by *A. andersoni* even after a spray of lambda-cyhalothrin (Hallmark) before the trial began. This indicated that there may be at least some tolerance to this product in this orchard. *T. urticae* introduced on infested leaves did not establish in the cherry trees, even in the control plots which did not receive Gemini sachets. It is believed that this may be because the numbers of *A. andersoni* in this orchard were already at sufficient levels to control the pest. The experiment indicated that one *A. andersoni* per four leaves could be sufficient to control *T. urticae* in the absence of predatory mite damaging product sprays.

In 2016 we carried out a similar field trial to the previous year in a protected cherry orchard at NIAB EMR to test the efficacy of *A. andersoni* Gemini sachets to control or prevent *T. urticae* population build-up. The cherry trees had either, 1) Gemini sachets added and then *T. urticae* (preventative), or 2) *T. urticae* and then Gemini sachets (curative). These were compared to 3) an untreated control, where only *T. urticae* was introduced to the trees. In this whole trial *T. urticae* infested potted trees were tied to trees in the orchard. The plots were assessed on three occasions by collecting 40 leaves per plot and using ethanol extraction of the mites before counting under a microscope.

As with 2015, there was a low diversity of Acari (mites), even after two sprays of lambda-cyhalothrin and two sprays of chlorpyrifos in this strategic orchard (NB: chlorpyrifos applications are not approved in commercial cherry orchards). The numbers of predatory mites per leaf were higher than the previous year suggesting that *A. andersoni* could be tolerant to the products applied in this orchard. Although *T. urticae* managed to establish in significant numbers by the first assessment, by the final assessment *T. urticae* populations had reduced in all plots. It was likely that the naturally occurring *A. andersoni* in this orchard halted the population build-up of *T. urticae*.

Financial benefits

The economic damage caused by *T. urticae* feeding on cherry has not been estimated, but it led to economic losses in 2013 when some fruit was discarded. Supermarkets demand consistency of supply from year to year and many, e.g. Sainsbury's, are aiming to sell double the volume of UK fruit by 2020. Reliable control of *T. urticae* from early in the season would help to reduce the risk of damaged fruit nearer to harvest.

Action points for growers

- Assess cherry leaves for the presence of predatory mites early in the season – before flower.
- If naturally occurring predatory mites are low or absent in cherry orchards, Gemini sachets can be deployed as soon as the protective covers are placed over the crop.
- Releases of *A. andersoni* in Gemini sachets can be made at one sachet per 5 trees to supplement naturally occurring predatory mites for spider mite control in cherry orchards before spray programmes begin for *D. suzukii* control.
- Potentially, sprays applied for *D. suzukii* management could interfere with spider mite control, so supplementing with early, well-timed, predatory mite releases may prevent spider mite establishment before *D. suzukii* becomes a problem in the crop.