

Grower Summary

SF 146

New bio-control agents for
Western Flower Thrips on
protected strawberry

Annual 2015

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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.

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Before using all pesticides check the approval status and conditions of use.

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Project Number: SF 146

Project Title: New bio-control agents for Western Flower Thrips on protected strawberry

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GROWER SUMMARY

Headline

The predatory mites *Hypoaspis miles* (also known as *Stratiolaelaps scimitus*) and *Machrocheles robustulus* both reduced resultant numbers of WFT adults through pupal predation in soil-less substrate.

Background and expected deliverables

Western flower thrips (WFT), *Frankliniella occidentalis*, is a devastating pest of protected strawberries and experiences in 2013 have demonstrated that existing bio-controls are inadequate in hot conditions. Feeding by the pest on the flowers and developing fruits leads to bronzing of the fruit, which can cause downgrading to Class 2 or, in severe cases, to crop losses.

This project aims to identify potential predators not currently widely exploited for WFT control, which could be incorporated into a bio-control programme for the pest to replace or supplement *Neoseiulus cucumeris*. The efficacy of these predators will be determined in controlled environment conditions typical of those found under Spanish tunnels. Predators that are currently recommended for use on other crops but may be effective in protected strawberry will be evaluated. Other naturally occurring predators of WFT in crops and surrounding habitats will also be identified. In addition, the efficacy of commercial control agents that are applied to the substrate will be determined.

Summary of the project and main conclusions

In the first year of the project, the efficacy of commercially available predators applied both to the plant to control the larval stages of WFT and to the substrate for bio-control of the two pupal stages, were determined in controlled environment conditions typical of those found under Spanish polythene tunnels. The predatory mites *Amblyseius montdorensis*, *A. swirskii*, *A. limonicus* and the commercial standard *N. cucumeris* were all effective at reducing numbers of WFT at 30/20°C day/night temperatures (Light/Dark ratio of 14:10 h). The predatory mites *Hypoaspis miles* and *Machrocheles robustulus* both reduced resultant numbers of adult thrips through pupal predation in the substrate. *M. robustulus* was particularly effective at 30/20°C day/night temperatures. The effect of *Atheta coriaria* on pupal predation was not significant. Although *Anthocoris nemoralis* was tested as a predator this was not more effective than *Orius* spp.. Other naturally occurring predators found in crops infested with WFT and surrounding habitats have been identified and will be assessed for their suitability for commercial use.

Financial benefits

The majority (>80%) of strawberries sold by multiple retailers are grown under protection and late season production with everbearer varieties has expanded. WFT is a major pest of strawberries, and when conditions are favourable, pest numbers can increase rapidly. On some farms, where spinosad (Tracer) has failed to control the pest, WFT damage to everbearer fruit has been so severe that total crop loss has occurred for the latter third of the season (i.e. a loss of £18,000 per ha). More typically, on some farms, 20% of the fruit has been downgraded to Class 2 for half of the picking season.

There is great concern that the losses will become more widespread in future years with the spread of spinosad resistant strains of WFT.

The bio-control options currently available do not always control thrips effectively. Although bio-control agents such as *N. cucumeris* are being released, only partial control has been achieved with this predator on some farms. It is often used early in the season as a preventive rather than a curative measure. The predator is not always able to suppress thrips populations once they have increased later in the season. In seasons such as 2013, when conditions are hot and humid and optimal for WFT development, it has not been an adequate control measure on some sites leading to enormous crop losses. Problems with this pest continued to be seen throughout 2014 in glasshouse and polytunnel crops.

This project is assessing the efficacy of alternatives to *N. cucumeris* against WFT. Conditions under tunnels can fluctuate widely throughout the season and different biological control agents may perform better at different temperature/humidity levels. The project is comparing the efficacy of different insect and/or mite predators both alone and in combination with *N. cucumeris* to enable different solutions to be selected as the season progresses. Non-native predator species are not currently available for use in polytunnels, but they are being explored to determine effectiveness for glasshouse use. The project is determining the efficacy of commercially produced bio-control agents applied to the substrate, which therefore should not compete with *N. cucumeris*, and have an additive effect. If effective, and new biological control agents are identified in this project, this will enable growers to exploit a wider range of solutions for WFT control in strawberry and thus reduce the damage caused by this pest. The results obtained in the project will also provide additional information to inform the choice of biocontrol agents to be made throughout the growing season as conditions change.

Action points for growers

There are no new action points for growers at this stage in the season. .

Growers should continue to follow HDC recommendations for western flower thrips control made by Clare Sampson of Keele University in the 2014 HDC Report (Management of pesticide-resistant western flower thrips on tunnel-grown strawberry: a study of the reasons for successes and failures on commercial production sites) such as preventive introduction of *Neoseiulus* (*Amblyseius*) *cucumeris* early in the season for polytunnel grown strawberries.