Grower Summary

SF 146

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

Annual *2016*

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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:	New bio-control agents for Western Flower Thrips on protected strawberry
Project number:	SF 146
Project leader:	Drs Chantelle Jay and Michelle Fountain
Report:	Annual report, March 2016
Previous report:	Annual report March 2015
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Location of project:	NIAB - EMR, New Road, East Malling, ME19 6BJ
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Date project commenced:	1 April 2014
Date project completed (or expected completion date):	March 2017

GROWER SUMMARY

Headline

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

Background and expected deliverables

Western flower thrips (WFT), *Frankliniella occidentalis*, is a devastating pest of protected strawberries and recent experiences have demonstrated that existing bio-controls are sometimes 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.

The recently completed Defra Horticulture LINK project HL01107 (SF120) identified the benefits of making regular introductions of the predatory mite *Neoseiulus cucumeris* from early in the growing season (just before flowering) to gain control of western flower thrips larvae. Coupled with the use of *Stratiolaelaps scimitus* or *Orius* species duing higher summer temperatures, it was demonstrated that commercially acceptable control of WFT could be achieved. However, the effectiveness can be unreliable, especially if used later in the season. This strategy is also inadequate when high populations of thrips develop early. *N. cucumeris* feeds only on young thrips larvae and cannot always control increasing populations due to large influxes of WFT adults (e.g. from infested growing media held over from the previous season or from adjacent infested crops - Bennison & Fitzgerald, 2007, 2008, 2009).

The overall aim of this project is to identify and evaluate new bio-control agents for western flower thrips (WFT) to replace or supplement *Neoseiulus cucumeris* for control of WFT on strawberry in polytunnels.

Summary of the project and main conclusions

In year 1 of the project, the efficacy of commercially available predators was determined in controlled environment conditions typical of those found under Spanish polythene tunnels. They were applied to the plant to control the larval stages of WFT and applied to the coir substrate for bio-control of the two pupal stages. 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 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 predation by *Atheta coriaria* on pupae did not reduce thrips numbers significantly. Although *Anthocoris nemoralis* was tested as a predator this was no more effective than *Orius spp*.

In year 2 of the project, control of WFT by both *N. cucumeris* and *N. californicus* was explored for three reasons:

1. It is difficult to discriminate between the species in the field using a hand lens.
2. Incorrect identification of *N. californicus* may lead to less *N. cucumeris* being applied which could negatively affect control of WFT.
3. If there is competition between the species, this again could have a negative effect on control of WFT.

In laboratory tests in small Perspex boxes in controlled temperature cabinets, it was found that both species reduced the numbers of thrips to some extent, and there seemed to be little competition between the adult mites (intraguild predation may be seen if immature mites were also present). *N. californicus* is not permitted for use in polytunnels in the UK, but where it is marketed, this is usually for spider mite control.

The use of the substrate mites was further explored in combination with either nematodes or *N. cucumeris*. As in year 1, the mites controlled WFT in a coir substrate in small pot units (8 cm x 8 cm) in controlled temperature cabinets; however, it was difficult to get a sustained effect on either strawberry plants or chrysanthemum due to the variability of these systems. This strand of work will be taken forward to year 3.

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, WFT damage to everbearer fruit has been so severe that total crop loss has occurred for the latter third of the season.

Assuming a typical return for strawberries of £2.30/kg to growers (Defra Basic Horticultural Statistics 2014) and a yield of 20 tonnes/ha, then a typical 50% crop loss would amount to 10 tonnes/ha (£23,000/ha). The development of a reliable integrated pest management programme which does not fail, can prevent any losses from occurring at all, therefore saving £23,000 per hectare.

Action points for growers

- No new action can be recommended for growers until new biocontrol agents become licensed.
- Continue to follow the recommendations for western flower thrips control as described by Sampson (2014) using *Neoseiulus cucumeris* early in the season for polytunnel grown strawberries.
- Follow the guidelines set out in AHDB Factsheet 14/15 '*Western flower thrips control in strawberry*'.