Grower Summary

SF 133

Optimising tarsonemid control on strawberry using predatory mites

Annual 2013

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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 HDC office (hdc@hdc.ahdb.org.uk), quoting your HDC number, alternatively contact the HDC at the address below.

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Project Number:	SF 133
Project Title:	Optimising tarsonemid control on strawberry using predatory mites
Project Leader:	Dr Michelle Fountain
Contractor:	East Malling Research
Industry Representative:	Harriet Duncalfe
Report:	Annual Report 2012
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Previous report/(s):	N/A
Start Date:	01 April 2012
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Project Cost:	£51,700

Headline

- Predatory mite species shown to reduce tarsonemid mites in heavily infested glasshouse and polytunnel strawberry crops

Background and expected deliverables

The strawberry tarsonemid mite, *Phytonemus (Tarsonemus) pallidus* ssp. *fragariae*, sometimes called the strawberry mite, is a serious pest of strawberry. It feeds mainly on the upper surfaces of the young folded leaves of strawberry, making their surfaces rough and crinkled as they expand. Sometimes the leaves turn brown and die and the whole plant usually becomes stunted. Mites also feed in the flowers and fruits, seriously affecting yield and quality, which can halt berry production.

There has been a significant and threatening increase in the frequency and severity of attacks in UK strawberry production in the last few years, the pest was particularly bad in 2010 and 2011 and continues to be a problem in some crops. Strawberry tarsonemid mite can be particularly difficult to control with conventional crop protection products, because most acaricides are contact acting with no or, at best, limited translaminar activity. The mites are readily controlled when directly intercepted by an acaricide, but penetration into the young folded leaves, where the tarsonemid mites live and breed, is limited; spray penetration being the chief factor limiting efficacy. Furthermore, strawberry leaves are waxy and covered in hairs, and many products are not specifically formulated for the crop and have insufficient wetting properties.

The overall aim of this project is to identify effective predatory mites for prevention and control of strawberry tarsonemid mite in outdoor and glasshouse crops and improve application timing and treatment methods.

Summary of the project and main conclusions

The project objectives for 2012 were to evaluate six species of predatory phytoseiid mite for their effectiveness at controlling strawberry tarsonemid mite at low and high temperatures, for use in polytunnel and glasshouse conditions. We aimed to find the most effective predatory mite species in polytunnel and glasshouse crops, the most effective temperature for each predatory species to operate and the optimum distribution of the predatory mites on the strawberry plants.

Potted strawberry plants were inoculated with tarsonemid mites and placed in fleece open top cages with a barrier of grease to prevent the escape of predatory mites. There were four treatments for the glasshouse and polytunnel trial (including an untreated control) and six replicates of each treatment in a randomised block design. Three species of predatory mite were tested for the glasshouse and three for the polytunnel in both the summer and the autumn. Populations of tarsonemid and predatory mite (including motiles and eggs), were assessed on young folded, unfurled and old leaves on each plant after treatment of 30 predatory mites per plant.

The summer glasshouse trial was hampered by low numbers of tarsonemid mites in the untreated control compared to the predatory mite treated plots, even after repeated introductions of the pest. There were also significant differences between the treatments before the predatory mites were applied. An assessment was made of the numbers of aphids on each treatment to see if there was an interaction between the numbers of aphids and the numbers of tarsonemid mites found on the strawberry plants. Although higher in number on the untreated control, this was not significant. Significantly more tarsonemid mite eggs were found in the *A. swirskii* and *A. montdorensis* treatments compared to the *N. californicus* and untreated control. Indeed the untreated control had fewer eggs than the plants treated with predatory mites. There were more motiles in the plants treated with *A. swirskii* and *A. montdorensis* than either *N. californicus* or the untreated control. More predatory mites were found on the plants treated with *A. swirskii* and *A. montdorensis* compared to *N. californicus* and the untreated control.

The summer polytunnel experiment gave more promising results with fewer tarsonemid mites in the plots treated with *A. barkeri* and *N. cucumeris* compared to *A. andersonni* and the untreated control.

Identification of predatory mites from the cages of both the glasshouse and polytunnel trials showed virtually no cross contamination of predatory mite species between treatments. Only *N. cucumeris* was found across all treatments, but at low levels, but more *N. cucumeris* were recovered from the *N. cucumeris* treated plots. Very few *N. californicus* were recovered from the *N. californicus* treated plots, despite the lower numbers of tarsonemid mites compared to the other predatory mite treatments in the summer glasshouse trial. Encouragingly, all of the predatory mite species identified had individuals which contained eggs and eggs were laid on strawberry leaves showing that the mites could reproduce on strawberry plants. Predatory mites, where found, were distributed over the whole plant compared to tarsonemid mites which were found predominantly in the young folded leaves. In both the autumn trials

(glasshouse and polytunnel), numbers of tarsonemids had dropped and remaining predatory mites may have been entering diapause.

Financial benefits

Strawberry tarsonemid mite can cause devastating crop losses in highly valuable protected strawberry crops, with losses exceeding £10,000 per ha per annum in some instances. New effective predatory mite species, and more accurate timing of predators using the most effective species for the time of year, will reduce populations of tarsonemid mites in strawberry crops, reducing the need for chemical applications.

Action points for growers

- Results from this study suggest that *Neoseiulus californicus* is to be recommended as an effective treatment for tarsonemid mites in glasshouse strawberry and *Amblyseius barkeri* and *Neosiulus cucumeris* in polytunnel crops.

- For preventive treatments, it is essential that predatory mites are applied early in the season before tarsonemid mite populations can build up.