



Agriculture & Horticulture
DEVELOPMENT BOARD



Grower Summary

SF 124

Development and validation of
a molecular diagnostic test for
strawberry tarsonemid mite

Annual 2012

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

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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 124
Project Title:	Development and validation of a molecular diagnostic test for strawberry tarsonemid mite
Project Leader:	Professor Jerry Cross
Contractor:	East Malling Research
Industry Representative:	Richard Hamden
Report:	Annual Report 2012
Publication Date:	23/07/2012
Previous report/(s):	None
Start Date:	01 April 2011
End Date:	31 March 2013
Project Cost:	£44,014

Headline

- Good progress is being made towards the development of a molecular diagnostic test for strawberry tarsonemid mite.

Background and expected deliverables

There has been a significant and threatening increase in the frequency and severity of attacks by tarsonemid mite (*Phytonemus (Tarsonemus) pallidus* ssp. *fragariae*) in UK strawberry production in the last few years and the problem has been particularly bad in 2010 and 2011 and threatens to get worse. Tarsonemid mite is usually introduced into plantations on infested planting material. Ensuring that planting material is free from the pest is clearly the best way of controlling strawberry tarsonemid mite. Testing for the presence or absence of the pest currently relies on visual searching of samples of growing points for the presence of mites under a stereo microscope. It is very time consuming and laborious to search large samples in this way and there is a high risk that small numbers of mites will be missed.

There is an opportunity to develop a highly sensitive, rapid DNA-based molecular test for the pest which will enable growers to ensure that planting material is free from tarsonemid mite, or at least to be more aware of the degree of risk. Note that the evidence suggests that tarsonemid mite is not ubiquitous and that it is not present in some propagation crops. The problem is more a question of sample size as of sensitivity of the test. It will only be possible to sample a small sub-sample of the total number of plants in the propagation crop, such as 500-1,000 growing points, each from a separate randomly chosen plant. A highly sensitive test is needed to ensure the pest can be detected in such a sample. A decision will need to be taken as to the tolerance level (risk of the pest being present) in the sampled crop.

Following this project, a rapid, sensitive and reliable diagnostic test for strawberry tarsonemid mite will be made available to the suppliers of planting material to UK growers (and elsewhere if deemed appropriate) through FERA's diagnostic services. Sampling in the propagation field before runners are lifted would be desirable. The test will raise propagators' awareness of the problem and is likely to spur them into taking stronger action to ensure that their stocks are clean. The test could also be used by UK growers of fruiting crops, for early diagnosis of potential problems so effective evasive action can be implemented early.

The objectives of this work are:

1. To develop a molecular test for strawberry tarsonemid mite (Year 1)
2. To validate the test (Years 1 and 2)

3. To investigate specificity, sensitivity, reliability and determine optimum sample size (Years 1 and 2)

The development of a highly sensitive, rapid DNA-based molecular test for tarsonemid mite in strawberry plants is something that hasn't been attempted before and is a case of charting unknown territory, although the scientific team is armed with the methods that will successfully deliver the required result.

Summary of the project and main conclusions

The scientific team quickly established an efficient method of extracting the mites from samples of strawberry plants, based on an existing floatation method and this has provided much of the mite material needed and will be a key part of the final test.

At the same time, work in year 1 commenced to develop a pest specific test based on the COI gene. Previous research has shown the COI gene to be reliable for the identification of most invertebrate species. Thus far, for the mites used in this project, this has not been the case. The team has therefore switched to two other genes, namely 28S rRNA and ITS, that can also be used for species identification. The latest results support this change and encouraging results are being generated.

Financial benefits

Strawberry tarsonemid mite can cause devastating crop losses in highly valuable protected strawberry crops, with losses exceeding £10,000 per ha per season in some instances. A central aim of the project is to develop and validate a rapid, sensitive and reliable diagnostic test for strawberry tarsonemid mite that will be made available to the suppliers of planting material to UK growers (and elsewhere if deemed appropriate) through FERA's diagnostic services. The cost of similar tests is typically £40-60 per sample or less, depending on the numbers of samples being processed so the cost benefit ratio of a test is likely to be very large.

Action points for growers

- There are no action points at this early stage of the project