



Agriculture & Horticulture
DEVELOPMENT BOARD



Grower Summary

TF 202

Monitoring scab population for
fungicide insensitivities and
races

Annual 2013

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Use of pesticides

Only officially approved pesticides may be used in the UK. Approvals are normally granted only in relation to individual products and for specified uses. It is an offence to use non-approved products or to use approved products in a manner that does not comply with the statutory conditions of use, except where the crop or situation is the subject of an off-label extension of use.

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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HDC is a division of the Agriculture and Horticulture Development Board.

Project Number:	TF 202
Project Title:	Monitoring scab population for fungicide insensitivities and races
Project Leader:	Professor Xiangming Xu
Contractor:	East Malling Research
Industry Representative:	Nigel Kitney, HL Hutchinson Ltd
Report:	Annual Report 2013
Publication Date:	03 July 2013
Previous report/(s):	None
Start Date:	01 April 2012
End Date:	31 March 2014
Project Cost:	£11,000

Headline

- Fungal isolates were obtained from orchards experiencing difficulties in controlling scab and these are being tested for their sensitivities to three fungicides.

Background and expected deliverables

One consequence of fungicide use is the selection of fungal strains less sensitive to the fungicide used and so disease management strategies have been developed in order to reduce the risk of emergence and spread of these insensitive fungal strains. Overuse of DMI fungicides has led to the emergence of scab strains less sensitive to DMI fungicides in the USA and Canada. In the long-term this may lead to loss of disease control. There is some anecdotal evidence that isolates from DMI-sprayed orchards in the UK appear to have an overall reduced sensitivity to myclobutanil (Systhane), which is commonly observed in other regions. However, failure in scab control is often due to poor spray timing and/or cover, rather than other factors such as reduced sensitivity.

A few recent studies showed that cross-resistance of the scab fungus to fungicides may or may not exist, depending on the particular fungal populations concerned. If reduced sensitivity to one fungicide exists, then care is needed to select alternative products without jeopardising disease control and resistance management. However, necessary knowledge on cross-resistance that is required to make such rational selection decisions is not yet available.

Recent Canadian research suggests independent resistance mechanisms to myclobutanil (Systhane) and kresoxim-methyl (Stroby) but a positive correlation in resistance to myclobutanil (Systhane) and flusilazole (various products not approved on tree fruit). This result does not agree with results obtained in New York State. More recent research on other pathogens also suggests that the presence and the extent of cross-resistance depends on the particular fungal populations and fungicides concerned. It is therefore necessary to carry out research for each particular fungal population to understand the potential of cross-resistance to particular fungicides. In any anti-resistance strategy, information on cross-resistance is critical to devising control strategies in cases where reduced sensitivities to one fungicide have been observed. There has been no published information on the baseline sensitivity and the current status of sensitivity to common scab fungicides in the UK scab population.

Recently, HDC-funded EMR to conduct a preliminary investigation on the cross-resistance of apple scab (with a limited number of isolates) to all scab fungicides registered in the UK (HDC project TF 190). Most of the observed cross-resistance to fungicides is expected on the basis of the chemistry. However, the strong correlation in the sensitivity to dithianon (a multi-site action fungicide) with DMI fungicides (e.g., myclobutanil and fenbuconazole) was unexpected, and is also worrying since dithianon and DMI fungicides are often used in the same spray programmes.

Understanding scab population structure with particular reference to its virulence (race) is critically important for a breeding programme and effective deployment of current varieties with different resistance genes. Recently, the nomenclature of scab races and the corresponding resistance genes has undergone extensive revision, culminating in the proposition of a new nomenclature system in 2011. Consequently, a new set of indicator genotypes is proposed to differentiate scab races.

Scientists plan to establish a plot at EMR with 19 proposed indicator genotypes for future monitoring of scab race structure, joining a world-wide monitoring programme. This monitoring will generate valuable information, not only for growers in terms of cultivar deployment but also for breeders in terms of breeding for resistance and for pathologists in terms of predicting the spread of new virulence.

Expected deliverables and benefits

- We will establish a plot at EMR with 16-19 indicator genotypes for monitoring of scab race structure, joining a world-wide monitoring programme.
- Monitoring of the scab race structure will generate valuable information not only for growers in terms of cultivar deployment but also for breeders in terms of breeding for resistance and for pathologists in terms of predicting spread of new virulence.
- This project will generate information to confirm whether there is significant correlation in the scab response (sensitivity) to dithianon and myclobutanil.
- This correlation, if confirmed, will have significant impact on our current scab control programme.

Summary of the project and main conclusions

EMR scientists have collected 30 single spore isolates from several orchards where scab control was problematic in recent years. These isolates are currently being tested for their

sensitivities to myclobutanil, fenbuconazole and dithianon. It is too early to report any substantiated conclusions or results.

The scientific team has obtained graft wood of all indicator genotypes for testing scab races from Switzerland and has successfully grafted them to rootstocks. There are four or five plants per indicator genotype. They have been re-potted and will be planted out in an orchard at East Malling Research. These plants will be regularly monitored to assess the race profile of the scab fungus which will contribute to global research on understanding the scab race structure over time.

Financial benefits

Growers will benefit from the project results in the following ways:

- 1) Use of correct products as alternations to control scab and minimise the establishment and subsequent spread of scab strains that are insensitive to fungicides.
- 2) Maintaining a good range of effective fungicides against scab to achieve effective control.
- 3) Planting apple cultivars with an appropriate resistance background, selected partially on the basis of scab monitoring results on the indicator genotypes in the future.

Action points for growers

There are insufficient results yet to list any actions points for growers.