



Agriculture & Horticulture
DEVELOPMENT BOARD



Grower Summary

SF 135

Genetics of resistance to
Verticillium wilt in strawberry

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

Project Number:	SF 135
Project Title:	Genetics of resistance to Verticillium wilt in strawberry
Project Leader:	Dr David Simpson
Contractor:	East Malling Research
Industry Representative:	Richard Stanley
Report:	Annual Report 2013
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Previous report/(s):	None
Start Date:	01 April 2012
End Date:	31 March 2014
Project Cost:	£69,111

Headline

DNA markers for resistance to *Verticillium* wilt have been found to be present in a wide range of varieties and other accessions available to UK strawberry breeders.

Background

Genes responsible for resistance to *Verticillium* wilt had been identified in an earlier project funded by the Biotechnology and Biological Sciences Research Council (BBSRC). The primary aim of this project is to validate markers for these resistance genes by looking for their presence or absence in a wide range of unrelated strawberry varieties and correlating this with the field resistance of those varieties to *Verticillium dahliae*. A second aim is to investigate the genetic differences between resistance and tolerance to *V. dahliae*. Once validated, the resistance gene markers will enable plant breeders to undertake marker-assisted breeding in strawberry, which will benefit the industry through the development of varieties with strong and durable resistance to wilt.

Summary

In an earlier project, a gene coding for hydroxyproline-rich glycoprotein (HRGP) had been found to be associated with resistance to *Verticillium* wilt in a progeny of 188 seedlings from the cross Redgauntlet x Hapil. HGRP proteins are known to be associated with plant defence. We tested for the presence of the HGRP gene in 46 varieties and breeding lines that had all previously been characterised for resistance to wilt on multiple occasions, using a highly infested field plot maintained at EMR. The majority of these lines were either unrelated or only distantly related to Redgauntlet, which was the source of resistance in the original cross. The HGRP marker gene was found to have six alternative forms (alleles) of which three were associated with resistance in the 46 lines that formed the validation set. One of these alleles (232) was common and was present in 62% of the resistant lines. Following the validation of the marker, a further 122 strawberry lines were tested for presence of the resistance marker alleles. These lines included modern varieties, old varieties and breeding lines from the EMR collection, and selections and parental lines being evaluated by the East Malling Strawberry Breeding Club (EMSBC). In this wider collection allele 232 was again the most common but it was noticeable that the varieties with strongest field resistance to wilt typically had two different resistance alleles present.

The HGRP marker has been used for the first time in designing the 2013 crossing programme for the EMSBC. All parental lines were screened for presence of the marker so

that crosses could be designed that will increase the probability of resistant individuals being present in the seedling population that will be evaluated in 2014.

Financial Benefits

For this interim report it is not appropriate to undertake a cost/benefit analysis

Action Points

There are no action points for growers at this stage of the project