Grower Summary

CP 094

Genetic mapping and phenotyping of fruit quality and disease resistance traits in octoploid strawberry (*Fragaria* × *ananassa*)

Annual 2014

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Project Number:	CP 094
Project Title:	Genetic mapping and phenotyping of fruit quality and disease resistance traits in octoploid strawberry (*Fragaria* × *ananassa*)
Project Leader:	R.J. Harrison, East Malling Research, New Rd, East Malling, ME19 6BJ
Contractor/(s):	East Malling Research
Industry Representative:	Marion Regan, Hugh Lowe Farms
Report:	Annual, September 2013
Publication Date:	5 August 2014
Previous report/(s):	None
Start Date:	1 October 2012
End Date:	1 March 2015
HDC Cost (Total cost):	£67,650

Further information

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GROWER SUMMARY

Headline

Phenotypic information can be used for quantitative trait loci (QTL) mapping approaches and enhance breeding efficiency through marker-assisted selection (MAS).

Background and expected deliverables

Strawberry is one of the most economically important fruit crops and it is essential to maintain the profitability and sustainability of this crop. Today, strawberry growers face increased production challenges, such as maintaining yield, fruit size and high fruit quality. These traits rely on good plant architecture and high levels of pest and disease resistance. To remain competitive and financially viable, it is essential that growers extend the cropping season and adapt their production systems to the particular growing environment.

The objective of this project is to provide both phenotyping and genetic techniques to improve high-throughput trait identification in industry-funded breeding programmes. Very little is currently known about how different plant traits are correlated at the molecular level in strawberry, or which traits are the easiest to measure in field and glasshouse scenarios.

The primary aim of the study is to investigate correlations between different physical traits in cultivated strawberry (*Fragaria* × *ananassa*), in addition to the development of novel methods of linking phenotype to genotype. A second aim is to identify and map novel traits linked to fruit quality and disease resistance in cultivated strawberry.

Once molecular markers are identified, a pre-screening process of seedlings for the presence of desired alleles can be done through MAS. This study will also illustrate the usefulness of high resolution phenotyping and genomic-assisted selection techniques for rapid, inexpensive and accurate pre-selection of superior seedlings in economically important crops such as cultivated strawberry.

Summary of the project and main conclusions

This project aims to cut the cost of breeding by developing novel phenotyping methods and identifying the most important traits to measure both linked to fruit quality and disease resistance in cultivated strawberry. Two different mapping populations were raised and used/will be used for phenotyping different traits. A total of 22 different traits were recorded of 'Redgauntlet' × 'Hapil' population. The preliminary data analysis suggests that there are both expected and unexpected correlations between traits. This information can be used for the identification and phenotyping only of the most important traits leading to significant cost and time savings.

The parental genotypes ('Redgauntlet' and 'Hapil') were screened for root architecture. Clear differences between genotypes have already been observed, but it is not known if this trait is correlated to Verticillium wilt resistance and/or drought tolerance. Further analysis will be carried out in 2014 to evaluate this hypothesis.

'Sonata' × 'SDBL123' mapping population will mainly be used for fruit quality phenotyping, QTL identification and the development of novel molecular markers that can be later used in MAS.

Financial benefits

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

Action points for growers

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