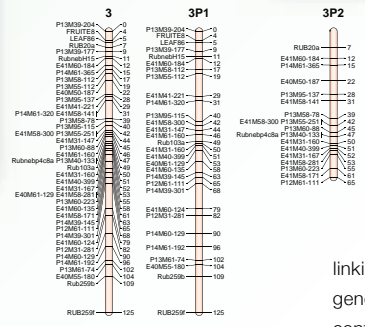
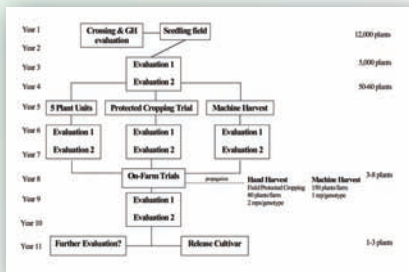


Developing a marker assisted breeding toolkit for premium sensory characteristics in raspberry.

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Raspberry production for fresh consumption has been revitalized by new horticultural strategies, specifically protected cultivation, and new cultivars are required to build upon this advance. The development of new high quality raspberry cultivars, adapted to their environment, is essential for the future expansion of the raspberry industry.



Breeding in raspberry, a highly heterozygous perennial fruit crop with relatively long periods of juvenility is a long process. The speed and precision of breeding can be improved by the utilization of genetic linkage maps. A genetic linkage map is a representation of a plant's chromosomes with signposts placed along the chromosome in the form of molecular markers, to which phenotypic traits can be associated. Such maps can facilitate the development of diagnostic markers for polygenic traits and the identification of genes controlling complex phenotypes. The availability of a map provides the basis to locate and hence manipulate quantitative traits in breeding programmes.

Marker-assisted breeding is the attractive future for plant breeding and projects linking phenotype to genotype, will greatly contribute to our understanding of the genetic control of commercially important traits and therefore our ability to combine desirable traits in the same cultivar.

Sales of soft fruit have shown significant increases in recent years, and retailers believe there is still unsatisfied demand for UK raspberries and other soft fruit, requiring growers to produce berries of premium quality for fresh consumption. Current factors that lead to consumer disappointment are poor or lack of flavour, unattractive fruit, short availability and quality compromise that given the high price of fresh fruit discourage repeat purchases. Traits of fundamental interest across the season to supply chain stakeholders are: sweetness (or a suitable balance of sweet/acid) and flavour intensity followed by berry size and colouration.

Project Aims

This project will concentrate on understanding the genetic basis of sweetness and acidity and the balance between these as well as fruit colour. This will be achieved using a cross between Glen Moy and Latham which differ in a number of key traits.

Replica populations have been developed at an experimental field, experimental protected and protected commercial sites.

The data from these can be correlated and used to identify map regions with markers linked to these traits.

Commercial success in conjunction with environmental sustainability will ultimately depend on an understanding of the resources we have in terms of genes controlling phenotypes and the ability to combine desirable phenotypes in the same plant in a reduced time-frame.

Characteristics of Latham and Glen Moy	
Latham	Glen Moy
North American 1930s	British 1980s
Small fruit	Large fruit
Mid-dark red fruit	Pale-mid red fruit
Round glossy fruit	Conical dullish fruit
Slightly sweet	Sweet
Sour	Slightly sour
aromatic	Slightly aromatic
Firm berry	Fleshy berry
Good shelf life	Short shelf life
Late ripening	Early ripening

Ranking of a selection of named varieties from sensory panel 2006.

Ranking of Sweetness	Ranking of Sourness	Ranking of Intensity
Glen Moy	Glen Rosa	Glen Ample
Joan J.	Latham	Tulameen
Malling Leo	Tulameen	Joan J.
Glen Ample	Glen Ample	Malling Leo
Tulameen	Glen Moy	Latham
Latham	Malling Leo	Glen Moy
Glen Rosa	Joan J.	Glen Rosa

Mean sensory analysis across 3 sites 2007

	Field 2007	Polytunnel 2007	Commercial 2007
Sweetness	2.5 *	3.24	3.30
Sourness	3.98*	3.65	3.85
Flavour Intensity	3.70*	4.06	4.28
Brix	6.08*	7.52	7.84
Weight	18.85*	34.74	29.35
Colour	14.32	14.22	14.30

*Significantly different p<0.001