

Understanding the factors controlling colour in red raspberry

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Raspberry is a high value horticultural crop, interest in which is expanding due to benefits associated with human health¹.

Consumers purchase with their eyes. Too light a colour is perceived as under ripe, too dark as over ripe. Cultivars of the appropriate colour for consumer acceptance are required to increase purchase. Fruit colour not only affects appearance, desirability and associated freshness but is also important for flavour perception.

Colour in raspberry is a complex trait with anthocyanin content thought to be

the major contributing factor but enzymatic reactions, pH, Vitamin C and organic acid content, may also be important^{2,3}.

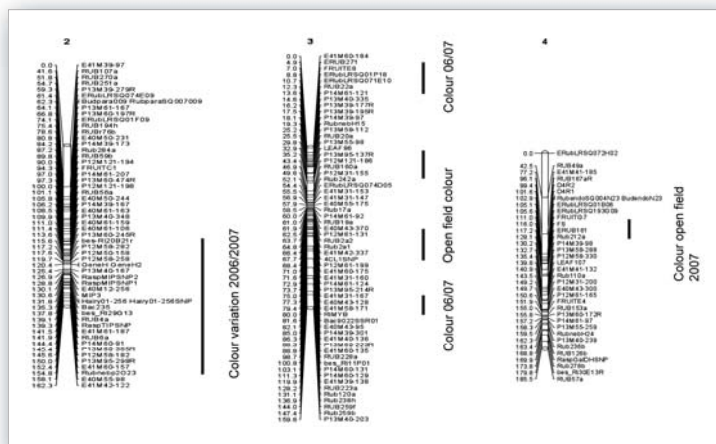
The objectives of this work were to assess colour alongside other factors in a mapping population. Linking the phenotype of individual seedlings from the Glen Moy (large, pale red, moderately sweet) and Latham (small, sweet, dark red) cross to the actual genotype across two fruiting seasons and three environmental locations was done to determine the genetic and environmental controls of flavonoid synthesis. Colour measurements were analysed for marker association on the genetic linkage map to identify regions of quantitative trait loci.

Potential candidate genes related to the structural or functional synthesis of

flavonoid components were also mapped in order to identify gene association.



Project Results



Several linkage groups have been identified as having significant associations with the colour readings and candidate genes identified.

LG2 One major QTL was found across all sites and for two seasons. The mid point of the QTL was raspberry TIP SNP but other transporter genes have also been identified in this region including MIP SNP1 and MIP SNP 2.

LG3 Most markers across this linkage group were found to be significant, but four separate discrete regions have been identified which contain several important transcription factors.

LG 4 Flavonol synthase mid point.

This work will lead to the development of markers which can be screened to improve the accuracy and time scale in breeding programmes.

References

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- 3 Ancos et al., (1999) Differentiation of raspberry varieties according to anthocyanin composition Z Lebensm Unters Forsch A 208:33-38