

DETECTION OF QUANTITATIVE TRAIT LOCI FOR FLESH TEXTURE IN APPLE

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Apple fruit texture comprises a whole set of traits that guides consumer preference. Texture is defined by complex sensory factors, for example, firmness, crispness, mealiness and juiciness. This complex set of sensory attributes is linked with-to physical and biochemical properties of the fruit cell wall. This study focused on identifying quantitative traits loci (QTLs) related to apple texture. The study was based on the analysis of an apple progeny segregating for texture traits and issued from a cross between two genitors of the INRA breeding program. This progeny has already been genotyped and phenotyped in 2007. The aim of the current study was to replicate the phenotyping. Fruits were collected between August 17th and November 03rd of 2011 at optimum maturity and evaluated at harvest. Instrumental measurements of penetrometry and compression resistance were performed using a texture analyser (TA.XT.PLUS, Stable Micro System). A molecular genetic map was constructed using SSR and SNPs markers. QTL analysis was performed using MApQTL[®] 5.0. A total of twenty QTLs associated with texture were identified based on the integrated map and located on linkage groups 01, 02, 11, 12, 16 and 17. This study confirmed the QTL regions reported in 2007 and in the literature. The percentages of phenotypic variation (R^2) explained by associations between the marker locus and QTL ranged from 4.1% to 47.3%. These results contribute for a better understanding of the QTLs of flesh texture in apple fruit and open new perspectives for improving the quality of apple by molecular marker-assisted breeding.

Keywords: *Malus domestica*, QTL, apple quality, penetrometry, compression.