

**Title** The genetic dissection of fruit texture traits in the apple cultivar honeycrisp.

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### **Abstract**

The commercially successful cultivar Honeycrisp, released by the University of Minnesota in 1991, is known for its high degrees of crispness and juiciness. This cultivar has been incorporated into numerous breeding programs in an effort to duplicate its desirable texture traits in conjunction with such other traits as disease resistance and improved tree vigor. This study characterizes several apple fruit texture traits within a large breeding population over several years, combining the established protocols of incomplete block design, sensory evaluation panels, and best linear unbiased prediction. Five full-sib families, all of which share 'Honeycrisp' as a common parent, were assayed using a variety of molecular markers, and genetic maps were constructed for each of the five families. The five genetic maps were aligned to produce a consensus genetic map for 'Honeycrisp'. Predicted genotype values from each of the five families were coupled with the corresponding molecular data and the genetic maps to identify quantitative trait loci (QTLs) for each family-by-year combination, which were compared relative to the consensus genetic map. Several intervals were identified within the map over which QTLs for multiple families and multiple years were collocated, reflecting consistent and robust QTLs. Results are largely in accordance with previous studies of other apple cultivars with notable exceptions, which are discussed in the context of the recently published apple genome sequence.