

Jewels in the Genome

By Amy Iezzoni, Project Director

What is a “Jewel in the Genome?”

- An individual’s genome is the full complement of genetic information that it inherited from its parents. Within this vast repertoire of genetic information, individual genes are being discovered that control critical production and fruit quality traits. As these valuable rosaceous gene discoveries are made and put into breeding applications, we will describe them in this column as “Jewels in the Genome.”

Peach flavor is influenced by a delicate balance of sugar, acid content, and aromatic volatiles. Developing flavorful peaches is a high priority for breeding programs; however, obtaining the optimum combination of these desirable taste attributes has been challenging as their genetic control is complex. A series of studies have identified a region on peach chromosome 4 that contains genes with genetic variation for sugar and acid levels in peach breeding germplasm. In particular, this region was identified in multiple populations over multiple years based on evaluations of three sugars (fructose, glucose and sorbitol) and three acids (malic, citric and quinic) (Quilot et al. 2004; Dirlewanger et al. 2006).

With genetic knowledge of the functional variants for this chromosome 4 trait locus in their plant material, breeders can begin to predict the fruit taste attributes of their breeding materials resulting in more efficient crosses. Therefore, because knowledge of this chromosome 4 peach flavor region will lead to more efficient breeding of peaches with desirable eating quality, it is chosen as our eighth featured “Jewel in the Genome.”

Dirlewanger E, Cosson P, Renaud C, and Monet R. 2006. New detection of QTLs controlling major fruit quality components in peach. *Acta Hort* 713: 65-72.

Quilot B, Wu BH, Kervella J, Genard M, Foulongne M and Moreau K. 2004. QTL analysis of quality traits in an advanced backcross between *Prunus persica* cultivars and the wild relative species *P. davidiana*. *Theor Appl Genet* 109: 884-897.



Figure 1. South Carolina grower Sam Hall enjoying a flavorful peach.



Figure 2. Terrence Frett (Clemson University) sampling a peach for percent sugar. This peach measured very high!