

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.”

Strawberry flavor is influenced by fruit acidity in combination with sugars and aroma compounds. Improving strawberry flavor is a high priority for breeding programs; however, obtaining the optimum combination of these desirable taste attributes has been challenging as little was known about their inheritance. Recently, a locus that affects acidity in octoploid strawberry fruits was identified near the top of linkage group V (Zorrilla-Fontanesi et al. 2011). Phenotypic measurements of titratable acidity and pH were used to identify this acidity locus, named *TaV-M.2*. This trait locus is of particular interest as it was identified in all three years of evaluation and it clusters with genes controlling variation for fruit color. Interestingly, the orthologous region in peach, i.e. the top of *Prunus* linkage group 5, also contains a major trait locus (*D*) that controls acidity in peach fruit (Boudehri et al. 2009).

TaV-M.2 was identified in progeny from a cross between two diverse octoploid strawberry selections; therefore, the task still remains to identify the functional variations of this locus in strawberry breeding germplasm. The RosBREED strawberry crop team, including its international partners, is preparing to do this experiment using Pedigree-Based Analysis of genotypic and phenotypic data collected on the strawberry Crop Reference Set (see pictures right).

With genetic knowledge of performance-enhancing *TaV-M.2* variants in their plant material, strawberry breeders will begin to predict fruit taste, resulting in more efficient parental selections. Therefore, because knowledge of the *TaV-M.2* region will lead to more efficient breeding of strawberries with desirable eating quality, it is chosen as our seventh featured “Jewel in the Genome.”

Boudehri K, Bendahmane A, Cardinet G, Trodec C, Moing A, Dirlwanger E. 2009. Phenotypic and fine genetic characterization of the *D* locus controlling fruit acidity in peach. *BMC Plant Biol* 9:59

Zorrilla-Fontanesi Y, Cabeza A, Dominguez P, Medina JJ, Valpuesta V, Denoyes-Rothan B, Sanchez-Sevilla JF, and Amaya I. 2011. Quantitative trait loci and underlying candidate genes controlling agronomical and fruit quality traits in octoploid strawberry (*Fragaria × ananassa*). *Theor Appl Genet* [DOI 10.1007/s00122-011-1624-6](https://doi.org/10.1007/s00122-011-1624-6)



Figure 1. Fruit color variation in octoploid strawberry

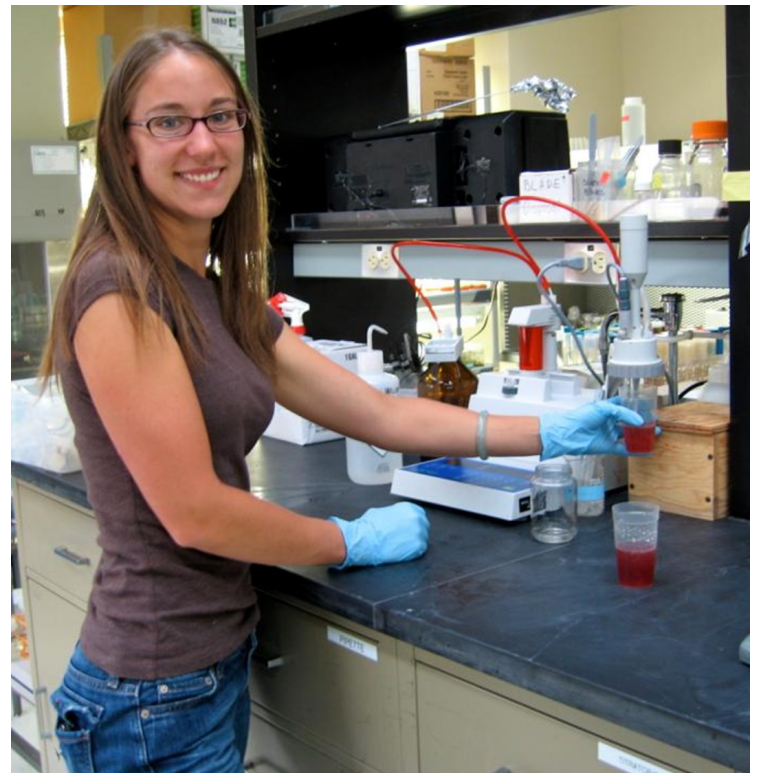


Figure 2. Megan Mathey, Oregon State University, measuring titratable acidity in strawberry