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."*

Skin and flesh color in apple and cherry fruit varies widely from dark red to almost colorless due to differences in anthocyanin pigmentation**.** This fruit skin and flesh color variation is used to define market types with individual consumers, while food manufacturers frequently have a color preference**.** In apple (and many other fruits), members of an anthocyanin-activating group of genes called MYB transcription factors control this variation for red color. In apple, one particular member of the *MYB* gene family controls both red skin and flesh color.

Certain alleles for this *MYB* gene results in exciting flesh colors that are being selected by breeders. Apple cultivars are in development that have completely red flesh and others have flesh with lesser amounts of red color in interesting patterns. These new fruit types, touted due to reported health benefits of anthocyanins, should be available for consumers in just a few years.

Bing sweet cherry

Because of the shared ancestry of rosaceous crops, it was hypothesized that the same *MYB* gene may control skin and fruit color in cherry. This turned out to be the case and led to the relatively quick discovery that *MYB* gene variation is primarily responsible for major color differences among sweet cherry market classes, such as the dark mahogany flesh and skin of 'Bing' cherries compared with the light yellow-fleshed and slightly red-blush of 'Rainier' cherries. Scientists are exploring the hypothesis that the same gene also influences fruit color in other rosaceous fruit such as peach and strawberry

Rainier sweet cherry

With genetic knowledge of *MYB* variants in their plant material, breeders can harness this wide array of genetic diversity to make desirable parental combinations and select seedlings with superior traits prior to field planting. In some cases, such as red apple flesh color, these new varieties will have exciting new appearances not widely available previously. Therefore, because this *MYB* gene will lead to more efficient breeding of apples and cherries with desirable appearance and higher nutraceutical levels, it is chosen as our fifth featured "Jewel in the Genome."