

The Instability of Sport Apple Varieties

G. D. OBERLE*
Blacksburg, Virginia

Horticulturists have generally accepted the opinion that clonal varieties are relatively stable, that variations in their plant and fruit characters occur infrequently, and that such variations have generally been considered stable.

It has also been observed that variations in fruit characters of apple have been much more frequent in some varieties. The more frequent occurrence of variations in Delicious, for example, has been attributed by some to the fact that more Delicious trees are grown than other varieties. The same reasoning has been applied to McIntosh, Stayman, and certain other varieties, which have shown many variations in fruit color.

During the decade beginning in 1920, a number of color sports of Delicious originated, such as Starkings, Richared, Shotwell Delicious, Vance Delicious and others. In the same period, color sports of Stayman, including Staymared, Blaxtayman, and Double Red Stayman, were introduced. During the past ten years another wave of sports of Delicious and Stayman sports have been introduced, most of which mature earlier and develop more intense color. Some have proved to be less desirable than the clones from which they were derived, because of undesirable intensity of color or color pattern. A few have shown indications of color reversion to the type found in the original Delicious and Stayman clones.

The reversions have sometimes been fluctuating or unstable. Fruit color and color pattern is not uni-

form on all branches of a given tree or trees of a clonal variation. This has suggested that the color sports may be chimaeral in nature, consisting of two or more genetically different kinds of tissues. The growing points in the buds of such color variants may have outer layers of cells that have mutated to the more intensely colored type, whereas the inner tissues of the growing points may have the color producing qualities of the original variety. If the mutation in a growing point has its origin in cells other than those constituting the true apical meristem, the mutation may not be a complete one, in so far as its appearance in all new tissues subsequently produced by that growing point is concerned.

A growing point, including both mutated and non-mutated cells, could give rise to incomplete chimeras of a mericinal or sectorial type, as contrasted to the pericinal or "glove on a hand" type of chimera, which has a complete outer layer of one kind of tissue surrounding the inner core of genetically different tissue. The occurrence of "color reversions" in some of the unstable color sports of Delicious, Stayman and McIntosh may well be explained on this basis. Support for this theory was obtained from two commercial orchards in Virginia during the last three or four seasons.

A commercial orchard in Carroll County, Virginia showed evidence of pronounced instability in fruit coloring characteristics. In one block of ten year old trees much variation was observed in fruit color on individual

*Professor, Dept. of Horticulture, Virginia Agr. Exp. Station.

trees of the Vance Delicious and C&O 201 Blaxtayman. These clones are color sports of Starking and of Blaxtayman, respectively, which had previously originated as limb sports of Delicious and Stayman.

A tree-to-tree check of the Vance Delicious showed that about 360 trees or 90 percent had fruit with solid or washed, moderate to dark red color, typical of Vance Delicious. About two dozen trees had fruit color of a solid or washed type, but much lighter in intensity, more of a pinkish type. About a dozen trees had a striped, dark red color pattern and an intensity comparable to that of the standard Delicious originated forty or more years ago. The grower believed that he had received a mixture of trees.

Closer inspection of the trees revealed at least 14 of what appeared to be limb sports on trees of the true

Vance Delicious type. These limb sports ranged in size from a few feet in length, with a few fruits, to major scaffold branches constituting up to a third of the tree. The color pattern and intensity of the fruits had reverted to the striped and less intense color of Starking on three of the sporting branches, to the solid but more pinkish-red on two branches, and to the pale, striped color of standard Delicious on the remainder.

Among the 200 trees of C&O 201 Blaxtayman, eight examples of apparent limb sports were observed which bore fruit having color no better than the original Stayman. Figure 1 shows typical fruits from "reverted" and normal branches of Vance Delicious and C&O 201 Blaxtayman.

Another commercial orchard in Wythe County, Virginia, presented similar evidence of instability in Vance Delicious. Two hundred ten-year old trees of Vance Delicious, purchased from the same nursery that supplied the trees observed in the Carroll County orchard, had been planted as fillers in an established orchard. The grower reported the same general range of variation in fruit color on individual trees as was observed in the Carroll County orchard. Since the trees had been planted as fillers in a 55 acre orchard, it was not possible to check every tree of Vance Delicious for color expression. However, the orchardist did show the author six trees having fruit color and striping typical of Starking, and one tree with color no better than that of standard Delicious. Only one limb sport was found among the trees that were checked. A major scaffold branch on one tree, constituting about one fourth of the bearing area of the tree, had fruit color comparable to the original Delicious or worse, in that the skin was noticeably russeted and rough.

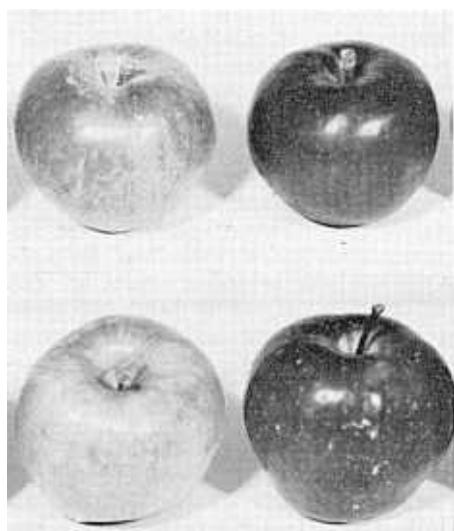


Fig. 1. Vance Delicious (bottom) and C. & O. Blaxtayman (top) fruits, showing reverions on the left and normal coloring on the right.

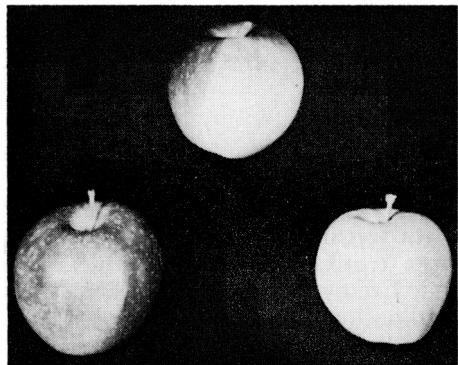


Fig. 2. Color variations in fruits from a small branch of the original limb sport which was named Vance Delicious.

A careful study of the original sporting branch of Starking in an orchard in Albemarle County, Virginia, which later was propagated as Vance Delicious, revealed one small branch bearing three fruits. One of those had apparently typical Vance color. Another had a pronounced chimaera color stripe. The third fruit had color and striping comparable to that of the original Delicious type. Figure 2 shows the color variations of these fruits.

These apparently sporting branches have not been propagated for further testing. Their performance in the Patrick County orchard had been observed for several seasons, so there is reason to believe that the color pattern of their fruits is fixed. If this is true, it appears that color sports of Delicious and Stayman may be less stable than has generally been believed to be true of apple color sports. This emphasizes the need for testing new color sports over a period of years to determine whether their changed color condition is truly fixed and permanent. The need for selecting scionwood from trees of known fruiting performance is also obvious.

Aurora, An Early Blackberry For Western Oregon

Aurora is an early blackberry just introduced jointly by the U.S.D.A. and the Oregon Agricultural Experiment Station. This blackberry originated as a seedling from the cross U.S.-Oreg. 616 \times U.S.-Oreg. 73, made in 1946. It was selected during the fruiting season of 1949 and since that time has been tested in many parts of western Oregon as well as in Washington and California as U.S.-Oreg. 966.

Aurora ripens before any other blackberry grown in western Oregon, between June 21 and July 15. The berries are medium large, firm, and excellent flavor. The canes are medium vigorous and very pliable, making training easy. Most of the fruit is borne on the basal 4 to 5 feet of the canes. This fruit production habit makes close planting necessary for high yields since yields are about 50 percent lower than for Boysen or Marion when the conventional system of planting is used. Canes are winter hardy under western Oregon conditions.

Its firmness and size, along with excellent flavor quality, make it desirable as an early fresh market variety. Aurora also has very good processing qualities.

Neither the U.S.D.A. nor the Oregon Agricultural Experiment Station has plants for distribution.



Evaluation of Carpathian walnuts by the Michigan Nut Growers Assn., and directed by William Fischer, showed that the Hansen variety was tops in Michigan for the 1960-61 season.