Red Sports of Delicious Apple

reversion to striped fruit can be minimized by selecting red sports and using scion wood from nonreverted trees

Dillon S. Brown, Claron O. Hesse, and Edward C. Koch

The red sport of the Delicious apple most commonly planted in California is Starking. Richared Delicious has been planted on only a limited acreage since it colors later than Starking. The popularity of Starking has declined, however, because many trees or parts of trees have reverted toward the parent Delicious type and produce fruit less highly colored. Reverted fruit appears distinctly striped. Though lighter red, the stripes are prominent on reverted fruit because of the lack of the characteristic red background of the normal Starking. The reverted Starking is often called Stripes, or Common Delicious, as opposed to Double-red for well-colored fruit.

The reversion may involve isolated spurs, small branch units, scaffold limbs, or entire trees. In the Watsonville area, where the problem is most severe, reverted fruit accounts for more than 20% of the crop in some orchards. It is a problem of serious economic concern to the growers because reverted fruit does not command the premium price received for normal, well-colored Starking. Occasionally the reversion is so extreme that no red color develops even as striping.

The amount of reversion in other districts is nearly as great as in Watsonville orchards, but the problem is less acute in those districts where the climatic conditions favor color development and the reverted fruit colors reasonably well.

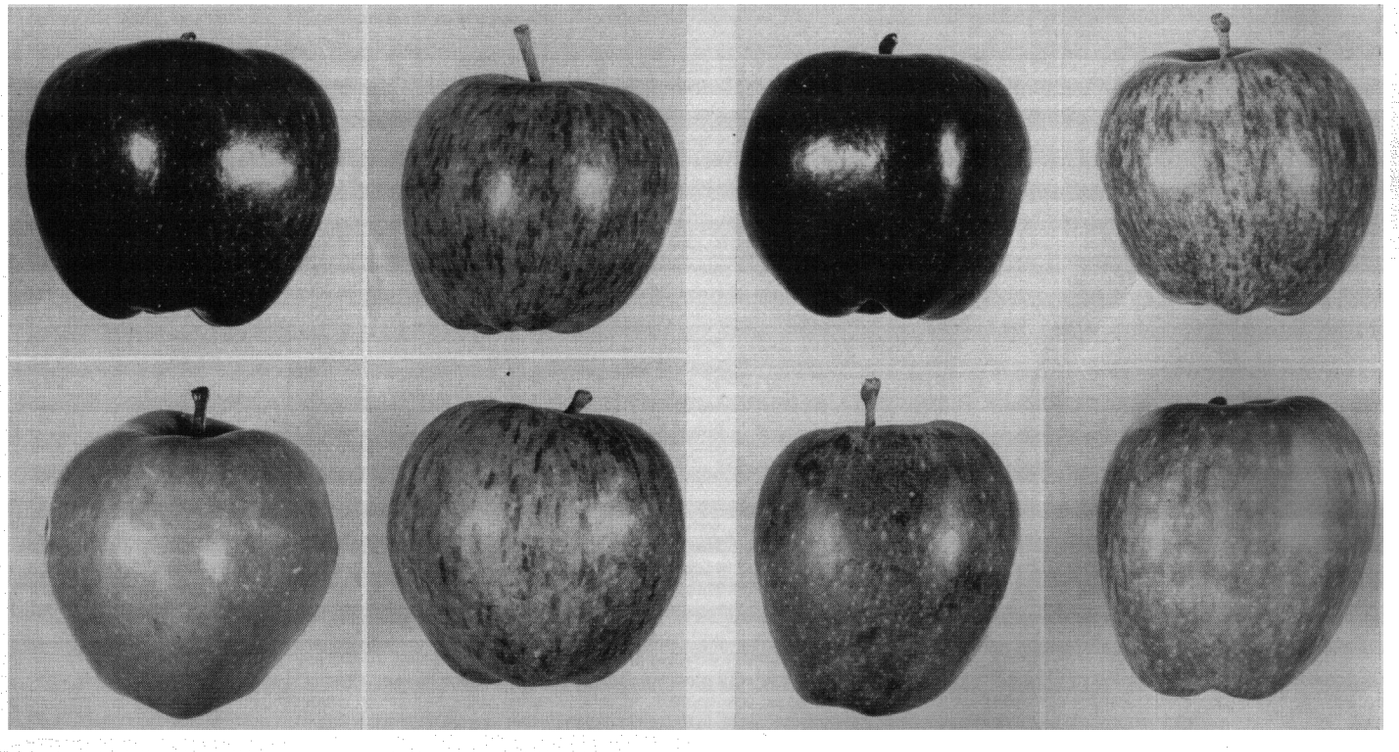
Reversion is relatively rare on Richared Delicious. Because of their dark red striping, reverted Richared Delicious resemble moderately well-colored Starking. Observations of a number of the newer sports of Delicious, both in California and elsewhere, indicate that those which are of a striped type, such as Starking, are more prone to revert than those with a normally uniform or solid red color, such as Richared Delicious. A typical example of the reversion in the newer sports is that for the Red King Delicious apple.

Once a spur, branch, or tree has reverted it will continue to produce reverted fruit. Therefore, care must be exercised in selecting scion wood for budding or grafting, particularly from trees of the striped types with which reversion is most apt to occur. Fruit produced in test plots in Santa Cruz County on trees grafted with scion wood selected from reverted and nonreverted Starking trees clearly demonstrate the need for careful scion-wood selection. Grafts with scions from nonreverted trees have produced only well-colored fruit in the first years of fruiting after grafting. With the strong tendency for reversion in the Watsonville area, it is probable that some reversion will gradually develop on trees worked with scions from nonreverted sources, as spurs here and there revert as the trees become older.

The most promising solution to the reversion problem lies in the initial choice of the particular sport to be

Concluded on page 10

The apple in the *upper left* corner of the first group is a normally colored Starking. The others show various degrees of reversion. At the *upper left* in the second group is a normally colored Red King Delicious apple; at the *upper right*, a reverted Red King Delicious apple; at the *lower left*, a normally colored Richared Delicious apple; and at the *lower right*, a reverted Richared Delicious apple.



SWINE

Continued from preceding page

At the end of each replicate, TDN—total digestible nutrients—were determined. The results are summarized in the table in the second column on this page. Stage of maturity and method of preparation had no effect. Since alfalfa was added to the two higher levels at the expense of barley, the relative TDN of barley and alfalfa can be estimated by difference under the conditions of this experiment. In this experiment the average TDN of all alfalfa meals was 34 pounds less per hundred pounds than barley. This would be expected due to the low utilization of holocellulose by simple-stomached animals.

Average Daily Feed Consumption Pounds[a]

Level Alfalfa	Preparation	Stage of alfalfa maturity 16% bud	3% bloom	34% bloom
	Suncured	6.28	6.53	6.60
5%	Dehydrated	6.88	6.03	6.36
	Pelleted*	6.12	6.40	6.06
	Suncured	5.35	5.43	5.60
20%	Dehydrated	6.03	4.93	5.56
	Pelleted*	6.13	5.51	5.80
	Suncured	4.11	4.18	4.37
40%	Dehydrated	4.06	2.52	3.93[b]
	Pelleted*	3.68	3.71	3.64

	Summated means	Actual
	5% alfalfa	6.36
Level	20% alfalfa	5.59[c]
	40% alfalfa	3.80[c]
	16% bud	5.40
Stage	3% bloom	5.03
	34% bloom	5.32
	Suncured	5.38
Preparation	Dehydrated	5.15
	Pelleted*	5.23

*Pelleted, dehydrated, reground.

[a] Averages for 3 animals, one for each replicate.

[b] Animal missing first replicate. Missing value calculated.

[c] Difference from other levels highly significant.

Total Digestible Nutrients of Various Rations[a] Dry matter basis, percent

Level Alfalfa	Preparation	Stage of alfalfa maturity 16% bud	3% bloom	34% bloom
	Suncured	70	76	73
5%	Dehydrated	71	75	73
	Pelleted*	75	76	75
	Suncured	65	69	70
20%	Dehydrated	71	65	66
	Pelleted*	68	66	67
	Suncured	59	63	60
40%	Dehydrated	71	61	60
	Pelleted*	61	61	60

	Summated means	Actual
	5% alfalfa	74
Level	20% alfalfa	67[b]
	40% alfalfa	62[b]
	16% bud	68
Stage	3% bloom	68
	34% bloom	68
	Suncured	67
Preparation	Dehydrated	68
	Pelleted*	68

* Pelleted, dehydrated, reground.

[a] Averages for 3 animals, one for each replicate.

[b] Difference from other levels highly significant. F value for level = 36.02.

The replacement value of alfalfa meal as used in this experiment was calculated using average daily gain figures adjusted to an average daily feed consumption of 5.25 pounds by partial regression. Adjusted data were used because it reduces variation due to differences in feed consumption and presumably would reduce differences due to composition of gain. Using feed utilization comparisons between the 5% and 20%, 5% and 40%, and 20% and 40% alfalfa meal levels, the replacement values were 0.24, 0.28, and 0.31 pound of concentrate per pound of alfalfa meal. This averages 0.28 pound of concentrate being replaced by one pound of alfalfa meal. This low replacement value is considerably less than would be predicted from commonly accepted TDN or net energy values of the ration ingredients involved and alfalfa meal.

Poor performance and a low TDN generally would be expected on a high roughage ration for swine. No reason can be advanced for the relatively good performance in some experiments. Quality of hay probably is important even though the quality of alfalfa used in these trials appeared excellent. Quality of hay as indicated by stage of maturity and method of preparation under the conditions of this experiment was of little or no effect. It has been suggested that breed and selection may play a part in utilization of higher levels of alfalfa meal.

Hubert Heitman, Jr., is Associate Professor of Animal Husbandry, University of California, Davis.

J. H. Meyer is Associate Professor of Animal Husbandry, University of California, Davis.

This study was financed in part by support from the American Dehydrators Association.

L. G. Jones, Specialist in Agronomy, University of California, Davis, assisted in the identification and selection of the various stages of alfalfa maturity.

APPLE

Continued from page 3

grown. In view of the distinctly greater tendency for reversion in the striped types—as compared to the solid red types—sports with the solid red color are preferred for districts, such as Watsonville, where conditions for good red color development are not usually optimum. Even with these sports, however, the scion wood should be selected with care, since—as shown with Richared Delicious—reversion may occur in these types.

A large number of sports of Delicious have been discovered in recent years and are being propagated. Most of those which are available to growers through nurseries are being tested in the several apple districts of California where Delicious is grown. Among these sports, Royal Red Delicious, Starkrimson Delicious, Wellspur Delicious, Redspur, Ryan Red, Houser Red Delicious, and Imperial Delicious have a solid red color. Red King Delicious, Hi-Early, Earlired Red Delicious, Hi-Red, Topred Delicious, and Clarkrich are striped types. The trees of Starkrimson Delicious, Wellspur Delicious, and Redspur are also heavy spur producers and tend to be somewhat smaller than those of the other sports.

Dillon S. Brown is Professor of Pomology, University of California, Davis.

Claron O. Hesse is Professor of Pomology, University of California, Davis.

Edward C. Koch is Farm Advisor, Santa Cruz County, University of California.

The above progress report is based on Research Project No. 1697.

OLIVE

Continued from page 5

that the characteristics of larger fruit size, increased flesh-pit ratio, and an optimum processed fruit texture should far offset the single advantage of early harvest to produce a black rather than a brown olive, especially since the better quality characteristics are more likely to be associated with brown olives than with black olives.

The present study does not entirely support the belief that olive fruits with a high oil content have a better flavor than fruits low in oil. In Manzanillo and Sevillano, the more highly colored fruit at harvest had a greater oil content, but no greater olive flavor in the processed fruit. Flavor ratings were essentially the same for Manzanillo fruits, with an oil content average of 11.6% and for Sevillano fruits, with an oil content average of 8.4%.

H. T. Hartmann is Associate Professor of Pomology, University of California, Davis.

Marion Simone is Associate Specialist in Food Science and Technology, University of California, Davis.

R. H. Vaughn is Professor of Food Science and Technology, University of California, Davis.

E. C. Maxie is Assistant Pomologist, University of California, Davis.

The above progress report is based on Research Project No. 1301.