Maturation Rates of Muscadine Grapes

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FLAVOR in grapes is very dependent on the chemical composition at harvest, and it is imperative that the grapes be harvested at their optimum maturity in order that a high quality product be produced. While much is known of the ripening process for other species of grapes, little attention has been given to the changes undergone by muscadine grapes during ripening.

Using density-sorting techniques developed at the Horticultural Food Science laboratory (Arkansas Farm Research Vol. 17, No. 5), we monitored the maturation rates of two muscadine cultivars.

Commercial vineyards of 'Carlos' and 'Noble' muscadines had been established in Forrest City, Arkansas, in 1972 and 1973, respectively. The vines were trained to a modified Geneva Double Curtain system. Grapes from these vines were once-over harvested in 1976 and 1977.

Sampling was begun 3 weeks before estimated commercial harvest and ceased when fruit losses due to berry abscission became a problem. In both years commercial harvest in the area occurred 1 week before the last sampling date. Sampling dates in 1976 were Sept. 9, 16, 23, 30, and Oct. 7; in 1977 they were Aug. 26 and Sept. 2, 8, 15, and 23.

Fruit harvested at each date were separated in brine solutions on the basis of their density to determine the percentage of ripe fruit. Composite samples were taken and analyzed in the laboratory.

As the seasons progressed, low density (unripe) fruit decreased and fruit in the high density category (ripe) increased until the last two harvest dates for 'Carlos' and the last four harvests for 'Noble.' At that time the majority of the fruit advanced into the ripe category (data not shown). Thus the 'Noble' cultivar matured ahead of 'Carlos' by about 2 weeks.

During both years percent soluble solids and color increased, while titratable acidity (expressed as percent tartaric acid) decreased for both cultivars (Fig. 1 and 2). In 1977 soluble solids for 'Carlos' showed an unexpected decline at Sept. 15; also, soluble solids for 'Noble' did not increase as much as expected. Just before the Sept. 15 harvest, approximately 6 cm of rain fell on the vineyard. The unusual behavior for soluble solids during this period may have been due to a diluting effect from the rainfall.

In both years 'Noble' reached a higher level of soluble solids than 'Carlos' by the final sampling date. This difference may be because 'Carlos' forms a dry stem scar, and translocation of solids into the berry may be stopped at a certain point. On the other hand, 'Noble' does not form as distinct a scar and translocation into the berry may continue longer than in 'Carlos'.

Because of the unusually warm weather in 1977, the percent soluble solids was about 2 weeks ahead of that the previous year. Also, titratable acidity for both cultivars was lower in 1977, probably due to the hot nights during the growing season.

Average berry weight did not change much over the sampling periods in either year. This is to be expected since sampling was begun only 4 weeks before optimum ripeness, and berry growth would have been mostly completed. However, berries tended to be larger in 1977, probably because of the greater rainfall during the growing season.

Results of this study indicate that maturation of 'Carlos' and 'Noble' muscadine grapes is marked by an increase in soluble solids, a decrease in titratable acidity, a disappearance of green color (higher tan-1 a/b) in 'Carlos', and an increase in color (higher O.D. values) in 'Noble'. By the final harvest date, 'Carlos' grapes had attained soluble solids of 15.8 percent in 1976 and 14.9 percent in 1977. 'Noble' reached 18.6 percent and 17.0 percent soluble solids in 1976 and 1977. Apparently 'Noble' has the potential to produce a higher level of soluble solids for once-over harvest than 'Carlos'.

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