

Maturation and Quality of 'Concord' Grapes As Influenced by the Pre-Harvest Complex

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SEASONAL variation, fruit load, and cultural practices have an effect on the maturation of 'Concord' grapes. Excessive soil moisture and low pruning severity may reduce juice quality at harvest (Vol. 27, No. 1 of Arkansas Farm Research), while response to nitrogen will vary with vineyard.

A study was initiated in 1974 in an 8-year-old 'Concord' vineyard to determine the interactive effects of 2 irrigation levels, 2 pruning severities, and 2 nitrogen levels on 'Concord'. Effects of these variables on yield and juice quality at harvest were reported in the article referred to above. This report discusses their effects on fruit maturation.

The two irrigation levels used were no irrigation and supplemental irrigation to maintain field capacity at a depth of 60 cm. Pruning severities were 30+10 and 60+10 nodes/vine with 6 node canes retained. The two nitrogen levels were low (0 kg N/ha for the two years) and high (158 and 228 kg N/ha in 1975 and 1976, respectively).

Samples of 3 basal clusters were

obtained at about 2-week intervals, beginning at the onset of color development of fruit on the 30 + 10 nonirrigated vines and ending during the time of commercial harvest in the area. Percent soluble solids, % tartaric acid, and color (absorbance at 520 nm) of the juice were analyzed to study fruit maturation.

Figure 1 shows the environmental conditions during the sampling seasons of 1975 and 1976. Degree-day accumulation and rainfall were greater in 1975 than in 1976. Rainfall was 46 cm (18 in) for the 1975 growing season and 37 cm (15 in) during 1976.

As maturity progressed, % soluble solids and color increased, while acidity decreased. Despite the smaller crop load, fruit maturity was not as advanced on the initial sampling date in 1976 as in 1975. This may have been due to the lower degree-day accumulations in 1976. However, the final sample in 1976 had higher soluble solids and lower acidity than the corresponding sample in 1975.

Fruit maturity was delayed by irrigation and at the reduced pruning

severity, as indicated by a reduction in % soluble solids and color. Acidity was greater in juice from irrigated plots on the initial sample date, but differences in acidity at harvest were not significant. Nitrogen had no significant effect on fruit maturity other than a slight, but significant, reduction of 0.03% tartaric acid at harvest at the high nitrogen level.

For the two-year average, nonirrigated 30+10 fruit produced juice of higher soluble solids and better color than any other treatment on a given sampling date (Figure 2). Percent tartaric acid was not affected by the interaction of irrigation x pruning severity x sampling date, although there were differences in acidity early in the season due to irrigation. Attainment of 15% soluble solids in fruit from the highest yielding treatment (60+10 irrigated) was delayed 10 to 14 days compared with the lowest yielding treatment (30+10 not irrigated).

Although fruit maturity was delayed when vines were irrigated and/or pruned to 60+10 nodes/vine, these treatments may be feasible for Arkansas since weather conditions after harvest would not be prohibitive of a delay in harvest. However, the long-term effects of these treatments on 'Concord' juice quality need to be determined.

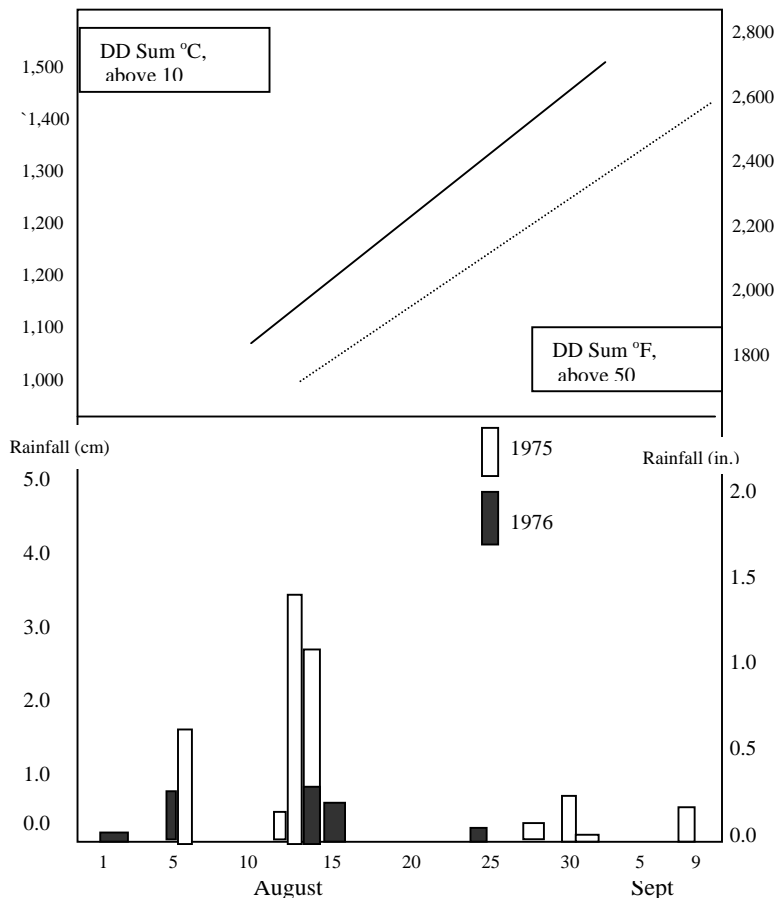


Figure 1. Degree-day accumulation and rainfall during 1975 and 1976 maturation periods.

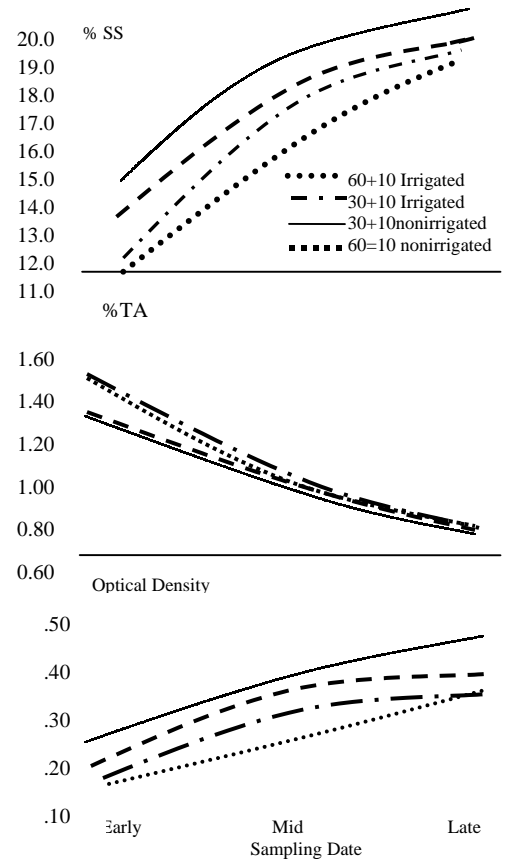


Fig. 2. Effects of irrigation and pruning severity on maturation (pooled over 2 N levels and 2 years).