

'CONCORD' GRAPE JUICE QUALITY AS AFFECTED BY CULTURAL METHODS

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Grapes are the most important small fruit crop in Arkansas. Most of the production is centered in northwest Arkansas and is comprised primarily of 'Concord', which is utilized by the nonfermented juice industry. Quality of 'Concord' grapes grown in Arkansas can often be a problem. Due to warm temperatures during maturation, characteristic of southern growing areas, fruit have low acids and poor color when compared to northern grown 'Concord'. Soluble solids content can also be a limiting factor in years of unfavorable climatic conditions or when vines are placed under too high fruit loads.

A study was designed in 1973 to investigate the interrelationship between pruning severities, nodes/bearing unit (spur or cane), 2 cordon training systems and shoot positioning on yield and quality of 'Concord' grapes. An explanation of the pruning and training variables used and their effect upon yield have been reported previously in the paper by Cawthon and Morris.

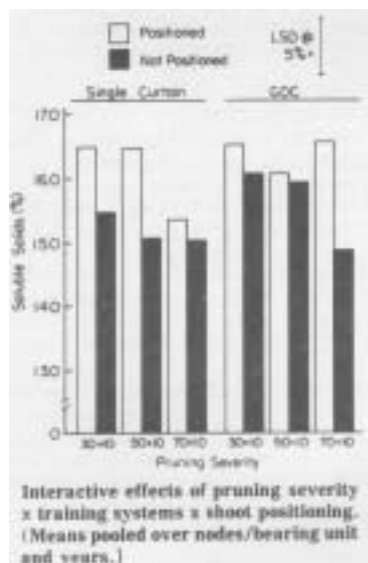
Fruit samples were collected for quality analysis at harvest each year (Sept. 4 in 1974 and Sept. 2, 1975) and immediately frozen in polyethylene bags. At time of analysis, samples were thawed, blended for 15 seconds and soluble solids was determined. Samples were then cooked for 1 hr. at 85°C, cooled, and pulp was removed by straining samples through 2 layers of coarse cheesecloth. A 5 ml aliquot of juice was diluted to 100 ml using distilled water and centrifuged for 30 min. at 4000 rpm. Optical density was read on the centrifuged samples at 520 nm. Another 5 ml aliquot of juice was diluted to 125 ml using distilled water and titrated to pH7 with N/10 NaOH. Acidity is reported as % tartaric acid.

Percent soluble solids decreased as the pruning severity decreased (see table). Acidity was not affected by pruning severity, but color was poorer as indicated by lower O.D. values with light pruning. The % green fruit/ cluster was slightly lower at 30 + 10 and 50 + 10 than at the 70 + 10 severity.

The number of nodes/bearing unit had no effect on soluble solids, acidity, color, or % green fruit/cluster, even though there was a considerable yield increase when vines were pruned to longer canes (see previous article). Geneva Double Curtain (GDC) training increased % soluble solids by 0.4%, but did not affect acids, color, or % green fruit. Soluble solids were 0.8% higher, color was better and a smaller percentage of the fruit was green vines were shoot positioned.

The interaction of pruning severity x training systems x shoot positioning on % soluble solids (see figure) shows that shoot positioning significantly increased % soluble solids on the single curtain training system at both the 30 + 10 and 50 + 10 severities. However, using a 70 + 10 pruning severity on a vine trained to the single curtain trellis which has only 2.4 meters of cordon produces such a mass of foliage that shoot positioning cannot alleviate the shading problem. Percent soluble solids of fruit from vines trained to the GDC training system, which has nearly 5 meters of total cordon space, was not improved by shoot positioning until the light pruning severity was used. Fruit from shoot positioned, GDC trained vines pruned at a 70 + 10 severity was as high in soluble solids as fruit from vines pruned at a 30 + 10 severity on a single curtain trellis without shoot positioning.

The GDC training system and shoot positioning, both of which are new systems to the Ozark region, will improve fruit quality. These new training techniques may allow the use of a pruning level which is lighter than the currently recommended 30 + 10 level to increase yields without a sacrifice in juice quality. Further evaluations are continuing.



Main effects of pruning severity, nodes/bearing unit, training system, shoot positioning, and year on quality of 'Concord' grapes at harvest.

Main effects ^Z	Soluble Solids (%)	Tartaric acid (%)	O.D.@ 520nm ^y	Green by count ^x (%)
<u>Pruning Severity</u>				
30 + 10	16.1	.74	.40	1.2
50 + 10	15.9	.72	.27	0.8
70 + 10	15.5	.73	.24	2.3

LSD @ 5%	0.5	NS	0.3	0.8
<u>Nodes/bearing unit</u>				
3	15.8	.74	.27	1.8
6	15.8	.73	.27	1.4
9	15.9	.73	.27	1.2

LSD @ 5%	NS	NS	NS	NS
<u>Training System</u>				
GDC	16.0	.73	.28	1.5
Single Curtain	15.6	.73	.26	1.4

LSD @ 50	0.4	NS	NS	NS
<u>Shoot Positioning</u>				
Positioned	16.2	.73	.28	0.8
Not Positioned	15.4	.74	.26	2.1

LSD @ 5%	0.4	NS	.02	0.7
<u>Years</u>				
1974	15.5	.76	.27	1.3
1975	16.1	.71	.27	1.6

LSD @ 5%	0.4	.02	NS	NS

^Z Means within main effect blocks are pooled over all other variables in table.

^yOptical density at 520nm based on 5ml juice diluted to 100 ml with distilled water and centrifuged.

^x % of berries/cluster which are totally green.