

Use of Daminozide (Alar) on Concord Grapes

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'Concord' grapes are a major fruit crop in the Ozark region of Arkansas, and most of this production goes to the unfermented juice industry.

Preliminary reports with daminozide on 'Concord' grapes (Ark. Farm Research 19(2):6 and 21(3):9) have shown yield increases when applications were made between first and full bloom at concentrations from 1,000 to 3,000 ppm. Daminozide increased yields as a direct result of increasing the berry set. It is important to the grape juice industry that no yield increase result in loss of juice quality. Therefore, a study was established in 1976 to further test the effects of daminozide on yield and juice quality during a year when fruit set conditions were the poorest in recent history. Two vineyards were selected for this test: a young, productive 9-year-old vineyard that normally has no problems with fruit set, and an older, less productive 19-year-old vineyard that has had fruit set problems.

Daminozide was applied to the vines as a dilute spray solution at concentrations of 0 (control), 1,000 ppm, and 2,000 ppm. The entire vines were wetted to the point of drip. All applications were made between first and peak bloom (50 to 60 percent of the clusters blooming). All treatments were replicated seven times.

At harvest, fruit yields were recorded as Kg/ha x 10³. Representative fruit clusters from each plot were selected and immediately frozen for later quality analysis.

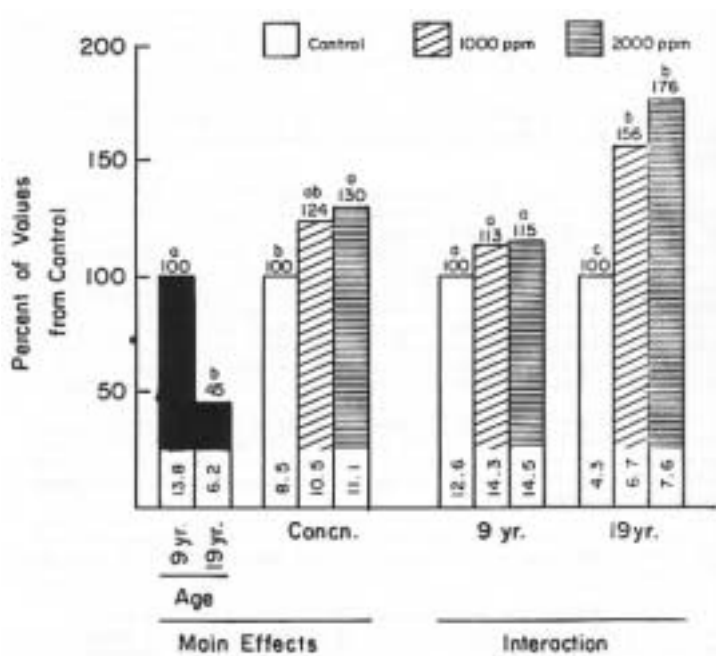
Yield in 1976 of the young vineyard (9 yr.) was 55 percent greater than for the old vineyard and daminozide at 2,000 ppm increased yields above the control by 30 percent. The interaction of vineyard age and daminozide concentration indicated that the greatest percent increase in yields occurred in the older vineyard that had a history of poor set problems (See Figure). In the old vineyard yields were significantly increased by application of 1,000 ppm and 2,000 ppm of daminozide (See Table).

Yield increases due to application of daminozide and the higher yields in the young vineyard were due to the increased number of berries/cluster (See Table), which reflects an improvement in berry set. As yield and the number of berries/cluster increased, berry weight tended to decrease.

Juice quality was not significantly affected by daminozide application within either of the vineyards, although quality tended to be reduced by use of daminozide in the young vineyard as indicated by slightly lower % soluble solids and poorer color (higher Z transmittance). At harvest, (August 27), the old vineyard, even with a lower yield, produced fruit of low soluble solids and higher titratable acidity than the younger vineyard, indicating that it was a later maturing vineyard.

Results of this study indicate that application of daminozide at 1,000 or 2,000 ppm between first and full bloom can increase yields by improving berry set in a vineyard with fruit set problems and during a year in which environmental conditions are detrimental to normal fruit set. Under such conditions the improvement in yield was not associated with appreciable loss in quality.

Tables and Figures follow.



MAIN EFFECTS AND INTERACTION OF VINEYARD AGE AND DAKINOXIDE CONC. ON YIELD (kg/ha x 10³) OF 'CONCORD' GRAPES, 1976. (Actual means shown within bars, percentage differences shown by bar heights.) Yield means followed by the same letter or letters are not significantly different.

Figure 1. Interactive Effects of Irrigation, Nodes/Vine and Sampling Date on Quality of 'Concord' Grapes. 1975-76

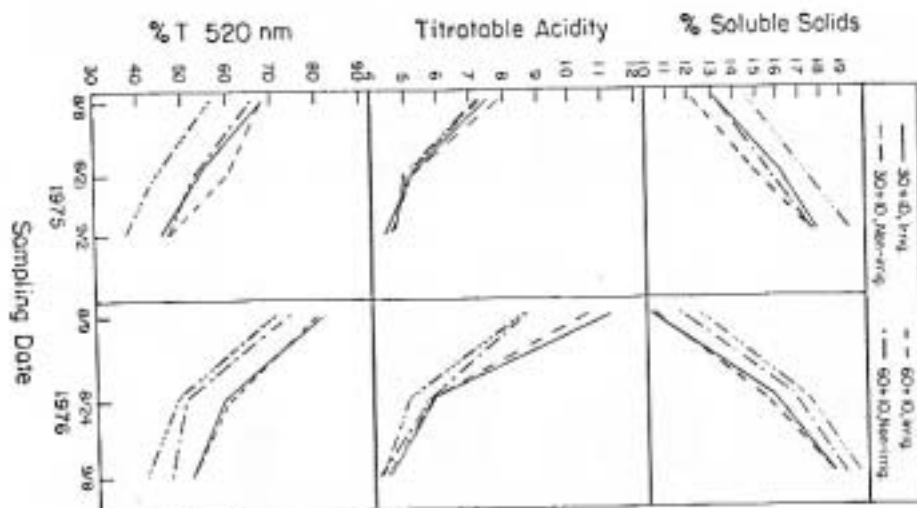


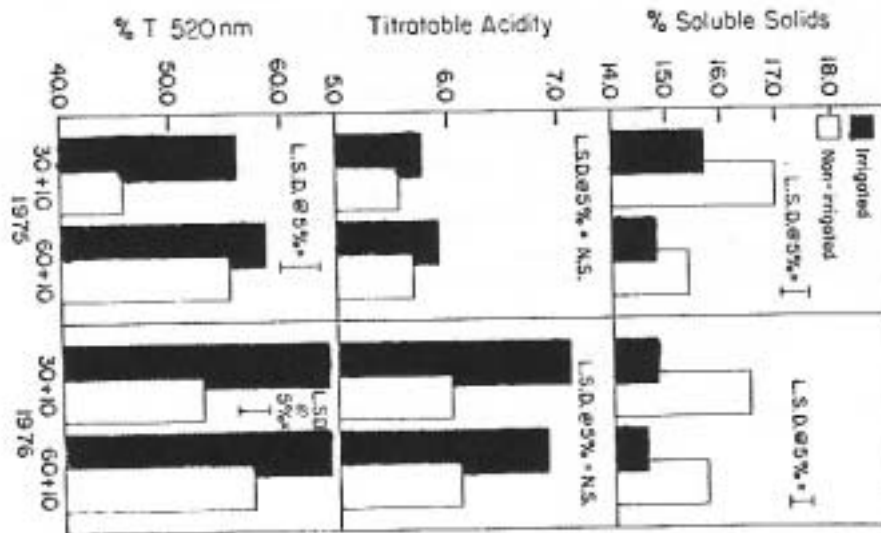
Table 1. Yield, quality and pruning weights of 'Concord' grapes as affected by irrigation, nodes/vine, nitrogen, sampling date and year. 1975-1976.

Treatment	Yield (T/A)	Sol. Sol. ^z	Tit. Acid. T.y	% T 520nm ^y	Pruning wts. (lbs/vine)
Irrigation					
Irrigated	5.3	15.0	6.5	61	2.7
Not Irrigated	4.3	16.2	5.9	53	1.8
L.S.D. @ 5%	0.6	0.2	0.2	2	0.3
Nodes/Vine					
30+10	3.7	16.0	6.2	55	2.4
60+10	5.9	15.1	6.2	59	2.2
L.S.D. @ 5%	0.6	0.2	N.S.	2	N.S.
Nitrogen					
Low	4.5	15.5	6.3	56	2.2
High	5.0	15.6	6.0	57	2.3
L.S.D. @ 5%	N.S.	N.S.	0.2	N.S.	N.S.
Sampling date					
Early	--	12.2	8.6	71	--
Mid	--	16.1	5.4	54	--
Late	--	18.5	4.5	46	--
L.S.D. @ 5%	--	0.3	0.2	2	--
Year					
1975	5.3	15.7	5.8	54	2.6
1976	4.3	15.4	6.6	60	2.0
L.S.D. @ 5%	0.6	0.2	0.2	2	0.3

z/ Average of three sampling dates.

y/ Reported as ml of 0.1N NaOH required to titrate to pH 7.

Figure 2. Interactive Effects of Irrigation and Nodes/Vine on Quality of 'Concord' Grapes. 1975-76.



EFFECT OF VINEYARD AND CONCENTRATION OF DAMINOZIDE ON YIELD, BERRIES/CLUSTER, BERRY WEIGHTS, AND JUICE QUALITY OF 'CONCORD' GRAPES, 1976.

Treatment	Yield (kg/ha x 10 ³)	Berries/ Cluster	Berry Weight (g)	Juice Quality		
				Soluble Solids (%)	Tit. Acidity ¹ (ml)	Trans- mittance ² (%)
<u>Young Vineyard</u>						
Control	12.6a ³	36b	3.22ab	15.6a	5.5a	66a
1000 ppm	14.3a	57a	2.98bcd	14.9ab	6.1a	70ab
2000 ppm	14.5a	52a	2.90d	14.8abc	5.8a	72ab
<u>Old Vineyard</u>						
Control	4.3c	23c	3.36a	13.6c	7.2b	73ab
1000 ppm	6.7b	35b	3.19abc	13.9bc	6.8b	74b
2000 ppm	7.6b	36b	2.93cd	13.6c	7.1b	77b

1/ Determined by titrating 5 ml juice to pH 7 with 0.1N NaOH.

2/ Samples prepared by diluting 5 ml juice to 100 ml with distilled water and centrifuging for 30 min. at 4000 rpm, then reading % transmittance to 520nm.

3/ Means within columns followed by the same letter or letters are not significantly different at the 5% level by Duncan's Multiple Range Test.