

GRAPE producers have expressed concern over the decreasing availability of qualified labor for pruning and tying, and feel that this may necessitate abandoning some vineyards in Arkansas if pruning is not mechanized. Mechanization of pruning would require a trellis system that provides for cordon training, such as a single wire cordon or the Geneva Double Curtain training system.

A mechanical pruning aid for 'Concord' was developed by Paisley Machine Shop in Grandview, WA. Preliminary work using this pruner in 1971 to 1974 has been reported (Ark. Farm Res. 24(3):12). The purpose of this study was to determine the long-term effects of mechanized vine pruning in conjunction with manual cane selection and node limitation on 'Concord' production and juice quality.

The study was conducted for 5 years (1974 to 1978) in a 'Concord' vineyard established in 1957 at the Main Experiment Station, Fayetteville. Adjacent rows of single wire cordon (SC) and Geneva Double Curtain (GDC) trained vines were either 1) mechanically pruned using the Washington pruner each year to leave 4-to 6-node canes, or 2) balanced pruned on 5-node canes to a 30+10 schedule (30 nodes retained for the first 4548 of cane prunings removed and 10 additional nodes retained for each additional 454g of prunings).

Vines mechanically pruned were either left untouched or were followed by hand pruning for cane selectivity and node adjustment to 60 or 90 per vine. All canes originating from the upper half of the cordons were removed manually each year at pruning time to establish all fruiting canes on the lower 180° sector of the cordon, and all vines were shoot positioned.

The experiment was designed as a randomized block with 6 replications of 2-vine plots. All treatments were imposed on the same vines each year.

Fruit samples were collected at harvest and immediately frozen for later juice analysis. Quality determinations consisted of percent green fruit, percent soluble solids, acidity, and color.

Training and pruning effects on yield (see table) indicated that the Geneva Double Curtain (GDC) was generally more productive than the Single Curtain (SC) system. Mechanically pruned vines with no node adjustment (no touch-up) yielded more than vines balanced pruned to a 30+10 schedule for the first year on GDC training and for the first 2 years on SC training. Low yields in 1976 were due to poor fruit

Mechanical Pruning of Cordon-Trained 'Concord' Grapevines

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set conditions. After this low yielding year and within a given training system, vines on which 90 or more nodes were retained following mechanical pruning did not produce significantly higher yields than 30+10 balanced pruned vines or vines limited to 60 nodes following mechanical pruning.

The 1974 quality results, not reported here but published previously (Ark. Farm Res. 24(3):12), indicated little difference between treatments. The results in 1975 thru 1978 show that GDC-trained vines pruned on a 30+10 schedule or to 60 nodes following mechanical pruning consistently developed at least 15 percent soluble solids each year (see table). Vines trained to the SC system responded similarly, but fruit from 60-node vines developed only 14.8 percent soluble solids by harvest time in 1978.

'Concord' fruits produced in southern growing regions can ripen unevenly, possibly as a result of stress induced by environmental conditions and fruit load. In this study vines that were balanced pruned or limited to 60 nodes did not develop severe uneven ripening problems (data not shown). Juice color was superior from vines that were balanced pruned or limited to 60 nodes, and no differences

in acidity were detected between any of the treatments (data not shown).

In summary, regardless of the number of nodes retained within a given training system, yields were comparable during the final 2 years. But the vines with 90 or more nodes were reduced in size and would be considered overcropped. Raw product quality of the juice from vines with 90 or more nodes was often unacceptable, indicating a response to the overcropping. Mechanical pruning followed by cane selection and node adjustment to 60 per vine consistently produced fruit yields and juice quality comparable to vines balanced pruned to a 30+10 schedule.

Mechanical pruning may be feasible in relatively uniform vineyards that have been shoot positioned when followed by cane selection and node limitation based on the general vigor of the vineyard. The possibility of using a pruning cycle consisting of 1 year of completely mechanized pruning followed by a year of balanced pruning to a 30+10 schedule needs investigation.

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Effects of Training System and Pruning Treatment on Yield and Percent Soluble Solids of

Treatment	Year					Mean
	1974	1975	1976	1977	1978	
	Yield (MT/ha)					
GDC						
30+10	7.2	15.6	3.2	20.2	19.4	13.1
60	8.9	14.2	2.3	19.7	16.9	12.4
90	12.8	13.5	6.2	18.9	20.9	14.5
No touch-up	16.1	18.3	7.5	23.7	22.3	17.6
SC						
30+10	5.4	10.8	4.3	14.1	15.6	10.0
60	8.0	11.4	4.6	18.8	17.5	12.1
90	11.1	13.0	6.2	14.6	15.2	12.0
No touch-up	10.3	21.2	6.7	16.1	13.4	13.5
LSD @ 5%	3.7	6.5	3.8	5.7	4.9	2.2
	Soluble solids (%)					
GDC						
30+10	---	15.8	16.5	16.4	15.5	16.1
60	---	15.2	16.4	15.1	15.3	15.5
90	---	14.5	16.1	14.8	14.0	14.9
No touch-up	---	12.4	14.8	15.1	13.4	13.9
SC						
30+10	---	15.8	16.3	16.0	16.1	16.1
60	---	15.7	17.0	15.6	14.8	15.8
90	---	14.6	16.1	14.0	14.2	14.7
No touch-up	---	13.9	15.3	14.9	14.7	14.7
LSD @ 5%	---	1.3	1.2	NS	1.6	0.7

'Data previously reported (Ark. Farm Res. 24(3):12) and not used in the statistical analysis for overall means.