

Evaluating New Training and Pruning Systems For Increasing Yield of 'Concord' Grapes

By D.L. CAWTHON and J.R. MORRIS

MOST PRUNING AND training methods used by Arkansas grape growers are based on research conducted in other regions where 'Concord' grapes are grown. New training and pruning systems need to be evaluated under Arkansas conditions.

Most grapes in Arkansas are trained to the Umbrella Kniffin system. However, mechanization of the pruning operation would require spur-pruned, cordon-trained vines (see preliminary report on mechanical pruning in Vol. 24, No. 3 of Arkansas Farm Research).

The Geneva Double Curtain (GDC), a spur-pruned cordon training system, has been found superior to the Umbrella Kniffin system under northern conditions. The GDC system consists of a 'T' type trellis with 2 horizontal wires spaced 1.2 meters (4 ft) apart, allowing 4.8 meters (16 ft) of cordon space per vine. The single curtain system also used in this study allows 2.4 meters (8 ft) of cordon per vine.

This study was begun in the Fall of 1973 to determine optimum pruning severity and optimum number of nodes per bearing unit (spur or cane) on two cordon training systems, as well as the need for shoot positioning. Positioning new shoots vertically toward the

vineyard floor has been found beneficial in other grape regions; also it makes use of a mechanical pruner more efficient

Records of vine yields and pruning weights were recorded for each individual vine in 1974 and 1975. Representative fruit samples were collected at harvest (Sept. 4 in 1974 and Sept. 2 in 1975) from each treatment for quality analysis. Quality as affected by these pruning and training methods is reported on the facing page.

Yield increased as the severity of pruning was lessened from the currently recommended 30 + 10 (30 nodes retained for the first 454 g (1 lb) of prunings removed and 10 additional nodes retained for each additional 454 g removed) to 70 + 10 (see table). Neither individual berry weight nor the number of berries/cluster was affected as yields increased. Vine growth was reduced as pruning severity decreased.

Vines pruned to 9 nodes/cane produced 4,400 kg/ha more fruit and 0.6 kg less vegetative growth than vines pruned to 3 nodes/spur. Lower yield and more vegetative growth on vines pruned to

3-node spurs illustrates that the buds on basal nodes of a cane generally are more vegetative and less fruitful than buds on more distal nodes. Berry weight and the number of berries/cluster were not affected by pruning to longer canes.

Vines trained to the GDC system produced 1,000 kg/ha more fruit than vines trained to the single-curtain system, without reducing vine growth. This yield increase with GDC training was due in part to an increase in the number of berries/cluster. Shoot positioning had no effect on the average 2-year yield; however, yield increased with shoot positioning in 1975. Vines pruned to 3-node spurs and shoot positioned showed a yield increase of approximately 5,000 kg/ha over vines not shoot positioned in 1975. In 1974, shoot positioning vines pruned to 3- and 6-node spurs tended to reduce yield; this probably was caused by mechanical damage in the positioning process.

Shoot positioning the vine in 1974 exposed foliage originating from the basal nodes to sunlight at the time the buds on these nodes were differentiating and developing fruit primordia for the 1975 season. This resulted in more fruitful nodes for the 1975 crop, and increased yield.

Shoot positioning seems to be most beneficial under high shading, which is encountered when vines are pruned to a large number of short spurs. Shoot positioning had little or no effect on yield of balanced pruned vines, which had fewer longer 6- or 9- node canes.

The results of this preliminary study indicate that lessening the pruning severity, pruning to longer canes, training grapevines to the Geneva Double Curtain training system, and positioning shoots vertically toward the vineyard floor will increase yields. Lessening the pruning severity, pruning to longer canes, and shoot positioning all decreased vegetative growth. The effect of this decreased vigor on future crops is not certain after only two years, and therefore further observations are continuing.

Yield and Weight of Prunings of 'Concord' Grapes as Affected by Pruning Severity, Nodes per Bearing Unit, Training System, Shoot Positioning, and Year

Main effects ¹	Yield		Berry weight, g	Berries/cluster	Pruning wt, kg/vine
	Kg/ha x10 ³	Tons/Ac			
Pruning severity					
30 + 10	10.3	4.6	3.2	37.7	1.7
50 + 10	12.4	5.5	3.2	36.7	1.6
70 + 10	14.9	6.7	3.2	36.4	1.4
LSD at 5%	1.3	0.6	NS	NS	0.2
Nodes/ bearing unit					
3	11.3	5.0	3.2	37.2	1.9
6	12.6	5.6	3.2	36.4	1.5
9	15.7	7.0	3.2	37.2	1.3
LSD at 5%	1.3	0.6	NS	NS	0.2
Training system					
GDC	13.0	5.8	3.2	38.3	1.6
Single curtain	12.0	5.3	3.2	35.6	1.6
LSD at 5%	1.0	0.4	NS	1.6	NS
Shoot positioning					
Positioned	12.9	5.8	3.2	36.6	1.4
Not positioned	12.2	5.4	3.2	37.2	1.7
LSD at 5%	NS	NS	NS	NS	0.2
Years					
1974	11.1	5.0	3.5	39.9	1.6
1975	14.1	6.3	2.9	34.0	1.5
LSD at 5%	1.0	0.4	0.1	1.6	NS

¹ Means within main effect blocks are pooled over all other variables