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EVALUATION OF NEW TRAINING AND PRUNING SYSTEMS FOR INCREASING YIELD OF 'CONCORD'GRAPES

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Most pruning and training recommendations currently used by Arkansas grape growers are based on research conducted in other 'Concord' grape growing regions. A definite need exists to evaluate new training and pruning systems in relation to a range of pruning severities and resulting fruit loads. The majority of the grapes in Arkansas are trained to the Umbrella Kniffin system; however, prospects of mechanization of the pruning operation would require spur pruned, cordon training vines. (For a preliminary report on mechanical pruning, see 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 used in this study allows 2.4 meters (8 ft.) of cordon per vine.

This study was initiated in the Fall of 1973 to determine the optimum pruning severity and the optimum number of nodes/bearing unit (spur or cane, on two cordon training systems) and to determine the need for shoot positioning. Positioning new shoots vertically toward the vineyard floor has been found beneficial in other grape regions and would make the use of a mechanical pruner more efficient.

Records of vine yields and pruning weights were recorded for each individual vine in both years of this study (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. Raw product quality as affected by these pruning and training methods will be reported later.

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; of prunings removed) to 70 + 10 (see table). Individual berry wt. nor the number of berries/cluster were affected as yields increased. Vine growth was reduced as pruning severity decreased.

Vines pruned to 9 nodes/cane produced 4400 kg/ha more fruit and 0.6 kg less vegetative growth than vines pruned to 3 nodes/spur (see table). Lower yield and more vegetative growth on vines pruned to 3- node spurs illustrates that the buds on basal nodes of a cane are generally more vegetative and less fruitful than buds on more distal nodes. Again, berry wt. and the number of berries/cluster were not affected by higher yields obtained from pruning to longer canes.

Vines which were trained to the GDC system produced 1000 kg/ha more fruit than vines trained to the single curtain system without a reduction vine growth. This yield increase due to GDC training was partially due to an increase in the no. of berries/cluster. Shoot positioning had no effect on yield for the 2-year average; however, there was a yield increase due to shoot positioning in 1975 (see table). This figure shows that shoot positioning vines pruned to 3 and 6- node spurs in 1974 tended to reduce yield. This was probably caused by mechanical damage in the shoot positioning process. However, in 1975, vines which were pruned to 3- node spurs and shoot positioned showed a yield increase of approximately 5000 kg/ha over vines which were not shoot positioned. This 5000 kg/ha yield increase in 1975 was due to shoot positioning the vine in 1974, which 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 exposure resulted in more fruitful nodes which produced the 1975 crop. Shoot positioning seems to be most beneficial under high shading conditions, which is encountered when vines are pruned to a large number of short spurs. Shoot positioning had little or no effect upon yield of balanced pruned vines with a smaller number of longer 6- or 9- node canes.

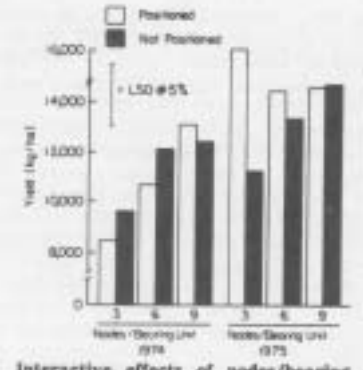
The results of this preliminary study indicate that lessening the pruning severity, pruning to longer canes, training grapevines to the Geneva Double Curtain training system and positioning shoots vertically toward the vineyard floor will increase yields. Lessening the pruning severity (increasing the number of fruiting nodes per vine), pruning to longer canes and shoot positioning decreased vegetative growth. The effect of this decreased vigor upon future crops is not certain from the duration of this study. Further observations are continuing.

Please see Table and graph on next page.

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 Kg/ha x 10^3	Tons/A	Berry weight, g	Berries/ cluster	Pruning wt, kg/vine
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.



Interactive effects of nodes/bearing unit x shoot positioning x years. (Means pooled over pruning severities and training systems.)