Horticultural and Chemical Practices Influencing Fruit Quality with 'Reliance' and 'Swenson Red' Grape Cultivars-2002

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Fresh table grapes can be grown successfully in the Midwest, and can add a new opportunity for agricultural diversification and local food systems. However, to be competitive, local growers will need to product high quality grapes to compete with out of state supplies. Practices that improved berry size, cluster appearance, or advance fruit maturation would increase the marketability of locally grown grapes. Gibberellic acid (GA_3) has been shown to improve berry size in seedless cultivars and loosen clusters of seeded cultivars when applied at specific times. Practices that regulate crop load, such as cluster thinning and removing a portion of the cluster (tail thinning) have been shown to advance maturity of both seeded and seedless grapes. Tail thinning has also been shown to improve cluster appearance in some cultivars. This study was undertaken to evaluate these various practice to improve quality and advance maturity of seeded and seedless table grapes under Iowa growing conditions.

Two studies were conducted on 12-year-old 'Reliance' (seedless type) and 'Swenson Red' (seeded type) vines located at the ISU Horticulture Station. For each cultivar, vines were selected for uniformity based pruning weights. In the 'Swenson Red', seeded table grape experiment, treatments included all combinations of plus or minus cluster thinning in combination with removing 0, 1/3, and ½ of the tail of the cluster (tail thinning). Treatments were arranged as a split plot with cluster thinning whole plots and tail thinning sub-plots in a randomized complete block design replicated 5 times. In the 'Reliance' seedless table grape experiment, the treatments included all combination of plus or minus cluster thinning; removing 0, 1/3 and 1/2 of the cluster tail; and plus or minus a 50 ppm GA_3 application. Treatments were arranged in a split-split plot with cluster thinning whole plots, tail thinning sub-plots, and GA_3 sub-sub-plots in a randomized complete block design replicated 4 times. Cluster thinning on 'Swenson Red' was done prior to bloom when the florets had distinctly separated, while on 'Reliance' it was done after bloom. For both cultivars, tail thinning was done after shatter. For 'Reliance', the GA_3 treatment was applied when the average berry diameter had reached the 4-5 mm range. For both cultivars, normal cultural practices, including shoot positioning and pest control were carried out during the season.

At harvest, the number of clusters per vine and yield per vine were recorded (Tables 1 and 2). From the clusters harvested from each vine, a sub-sample of 54 berries per vine were randomly selected to determine average berry weight and size, and maturity based upon total soluble solids, pH, and total titratable acids (data not shown).

Table 1. The effect of cluster thinning and tail thinning on the yield and quality of 'Swenson Red' seeded table grapes.

Treatment	Clusters / Vine	Yield / Vine (lbs)	Berry Wt. (g)	Berry Caliper (mm)	pH	Total Soluble Solids (%)
Cluster thin:						
No tail thin	62.40	13.68	3.71	17.90	3.84	20.08
1/3 tail thin	54.00	10.50	3.72	17.76	3.92	19.78
½ tail thin	57.20	10.20	3.85	18.32	3.86	19.84
No cluster thin:						
No tail thin	91.20	16.86	3.26	17.22	3.84	18.22
1/3 tail thin	100.60	20.00	3.82	18.13	4.00	19.66
½ tail thin	103.60	17.88	3.55	17.80	3.78	19.48
LSD p = .05	35.05	8.749	0.45	0.827	0.31	1.193

LSD= Least Significant Difference

Table 2. The effect of cluster thinning, tail thinning, and GA_3 on the yield and quality of 'Reliance' seedless table grapes in 2002.

Treatment		Clusters /Vine	Yield /Vine (lb)	Berry Wt. (g)	Berry Caliper (mm)	pH	Total Soluble Solids (%)
Tail thin	GA appl.						
+ Cluster thin:							
+	-	36.00	2.80	2.30	14.90	2.95	18.65
-	-	42.50	3.93	1.95	14.41	2.90	16.08
+	+	33.50	0.70	2.13	14.69	3.00	16.00
-	+	29.50	0.47	1.32	12.86	2.90	16.05
- Cluster thin:							
+	-	56.00	5.58	2.65	15.70	2.93	18.23
-	-	68.50	11.45	2.70	15.62	2.95	17.13
+	+	68.67	9.68	2.23	13.71	3.10	18.07
-	+	57.50	5.07	2.31	14.92	2.93	16.58
LSD p= .05		20.96	3.026	.0899	2.289	0.130	3.693

LSD= Least Significant Difference