

THE EFFECTS OF NUMBER & TIMINGS OF GIBBERELLIN BERRY
ENLARGING TREATMENTS ON FRUIT CHARACTERISTICS
OF THOMPSON SEEDLESS GRAPES

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ABSTRACT

Gibberellin was applied in sequential post-bloom, berry-enlarging treatments. Number of sprays varied from two to four with a total of 160 grams of gibberellin per acre for each treatment. Berry weights were lower when two sprays were at FS and FS + 1 (fruit set and fruit set plus one week) or FS and FS + ½, than if three or four sprays were applied. Soluble solids were the highest when two sprays were applied at FS and FS + ½ or FS + 1. The lowest soluble solids were produced when a FS spray was followed by treatments at FS + 2 and FS + 3. Soluble solids were reduced by over two and one-half degrees Brix as compared to FS and FS + 1 treatment.

OBJECTIVE

To determine gibberellin rate and timing treatments that produce both early and late maturing fruit.

PROCEDURE

The trial was conducted at the University of California Kearney Agricultural Center on Thompson Seedless vines, clone 2A. The design was a randomized complete block with eight replications of single vines protected by guard vines. The trellis has a four-foot wide crossarm with five wires, six canes tied to the three center wires. The fruit was thinned to 25 clusters per vine in late April. The vines were bloom sprayed on May 15, at 75% bloom, with 12 grams of gibberellin per acre. They were trunk girdled on June 1, and the clusters tipped in early June.

The gibberellin (GibGro® 4L liquid concentrate) sprays were applied with a hand-held spray gun at a rate of 200 gallons of water per acre. Three ounces of Latron B1956® (an adjuvant) were added per 100 gallons of water. The total amount of gibberellin per acre was 160 grams applied in from two to four sprays for the various treatments. All treatments received an 80 gram spray at FS since this timing has been previously determined to be the most critical in producing large berries. The fruit set spray was

applied on May 28 when the mean berry diameter was 5.4 mm. Berry samples, consisting of 100 berries per replicate, were taken on August 24, September 14 and October 3. They were weighed, liquefied and the filtered juice tested for soluble solids ($^{\circ}$ Brix) and titratable acidity (TA). The data were subjected to analysis of variance with means separated by Duncan's Multiple Range tests, 5%.

RESULTS

The results are reported in Table 1 for the three sampling dates. The same two people sampled on August 24 and September 14. The last sampling was done by two other technicians. The lower berry weights for the last sampling, compared to September 15, are due to the differences in sampling techniques, not dehydration or any other factor.

Berry weights varied among treatments. When the second treatment was applied at FS + $\frac{1}{2}$ or at FS + 1, berry weights were lower than when second and third treatments were applied at FS + 1 and FS + 2 or at FS + 2 and FS + 3.

Soluble solids were the highest for the two treatments applied at FS and FS + $\frac{1}{2}$ or FS + 1 as compared to two treatments applied after FS at FS + 1 and FS + 2 or at FS + 2 and FS + 3. The lowest soluble solids were produced from two applications after FS at FS + 2 and FS + 3. These readings ranged from 2.4 to 2.8 $^{\circ}$ Brix lower than two applications made at FS and FS + 1. Titratable acidity tended to vary inversely with soluble solids for the first sampling date but with little variation among treatments later.

CONCLUSIONS

When using 160 grams of gibberellin, the earliest maturity was obtained by treating at FS and FS + 1, 80 grams of gibberellin each spray. The latest maturity was obtained by spraying at FS with 80 grams followed by sprays at FS + 2 and FS + 3 of 40 grams each. Differences in maturity on each of three sampling dates ranged from 2.4 to 2.3 $^{\circ}$ Brix. Because the relative differences in berry weight and soluble solids remained similar among the three sampling dates in 1993, as they did in 1992, it is unnecessary to sample more than once to determine differences, when conducting future trials.

It may be possible to retard maturity with only one spray after FS if applied at FS + 3 instead of double sprays. Applications of single gibberellin treatments from FS to four weeks later has shown that at FS + 3, maturity is retarded the most in 1993 and similar to FS + 2 or FS + 4 in 1992 (see 1992 Report No. 2 and 1993 Report No. 1).

Table 1. The effects of differential gibberellin treatments on berry weight, soluble solids and titratable acidity of Thompson Seedless on three dates.

	Grams GA per acre, date and stage						August 24		
	5/24	5/28	6/1	6/4	6/11	6/18	Berry wt g	°Brix	TA
	FS	FS ²	FS	FS	FS	FS			
	-1/2 ¹		+1/2	+1	+2	+3			
1	0	80	80	0	0	0	5.76 b	17.5 a	.46 b
2	0	80	0	80	0	0	5.89 b	18.0 a	.49 ab
3	0	80	0	40	40	0	6.26 a	16.5 b	.48 ab
4	0	80	0	0	40	40	6.24 a	15.3 c	.51 a
5	16	80	0	0	32	32	6.42 a	16.2 b	.49 a

	Grams GA per acre, date and stage						September 14		
	5/24	5/28	6/1	6/4	6/11	6/18	Berry wt g	°Brix	TA
	FS	FS ²	FS	FS	FS	FS			
	-1/2 ¹		+1/2	+1	+2	+3			
1	0	80	80	0	0	0	6.00 b	18.8 a	.35 a
2	0	80	0	80	0	0	6.02 b	19.2 a	.35 a
3	0	80	0	40	40	0	6.58 a	18.0 b	.35 a
4	0	80	0	0	40	40	6.70 a	16.4 c	.36 a
5	16	80	0	0	32	32	6.79 a	17.6 b	.36 a

	Grams GA per acre, date and stage						October 5		
	5/24	5/28	6/1	6/4	6/11	6/18	Berry wt g	°Brix	TA
	FS	FS ²	FS	FS	FS	FS			
	-1/2 ¹		+1/2	+1	+2	+3			
1	0	80	80	0	0	0	5.55 b	20.2 a	.37 ab
2	0	80	0	80	0	0	5.71 b	20.3 a	.38 a
3	0	80	0	40	40	0	6.33 a	19.0 b	.36 b
4	0	80	0	0	40	40	6.38 a	17.9 c	.37 ab
5	16	80	0	0	32	32	6.52 a	18.7 b	.37 ab

¹Between bloom spray and FS.

²Fruit set with designation of weeks (-) or after (+) that stage.

T2 - early harvest
T4 - for late