

Gibberellic Acid Sizing Trial on Table Grapes, 1988

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Introduction

The acreage of table grapes in Western Arizona has increased to 2,500 acres, with an estimated annual gross income near \$5 million. Early maturity is imperative to desert grape growers since the price can fall dramatically during the first few weeks of the season. To meet the early market, growers must have grapes with adequate size and sugar. Gibberellic acid (Gibb) is a growth regulator which is used to increase the size of the berries, as well as to thin and elongate the bunches. Grape growers in the desert southwest have found that increasing the rates of Gibb above those commonly used in the industry has been effective in promoting the desired early maturity. Recent label changes have also reflected this move to higher rates. The bottom line to growers, however, is the cost effectiveness of an additional increase in the rates.

The objective of this research is to determine if higher rates than commonly used in desert grape production continue to increase early maturity, and if they are cost effective. With growers currently spending nearly \$40 per acre on Gibb applications, the result of this study could have a significant economic impact on the Arizona grape industry.

Methods and Materials

The research project included sizing trials on Perlettes, Flame Seedless, and Thompson Seedless varieties. The unreplicated plots, which were between 3 and 4 acres in size, varied from 32 to 39 rows of approximately 57 vines spaced 12 feet apart.

Gibb applications were made with an over-the-row high pressure sprayer at a rate of 300 gallons of water per acre. Two ounces of wetting agent (Triton B-1956) were used per 100 gallons of water. The six treatments made to the Perlettes and Thompson Seedless contained the following number of applications and grams per acre: three 48 gram, two 64 gram, two 64 and a 48 gram, three 64 gram, two 80 gram and three 80 gram applications. The following seven applications were made to Flame Seedless: two 32-gram, two 48-gram, three 48-gram, two 64-gram, three 64-gram, two 80-gram and three 80-gram applications. The first application for all treatments was made when 70 percent of the berries were 8mm in diameter. The second of the double applications was made seven days after the first, while the second and third of the triple applications were 4-5 days apart.

Prior to harvest eight samples were collected from both the west and east half of four rows equally spaced through the plots. Each sample contained 16 laterals from the shoulder of bunches randomly located on the vines. Visual comments concerning berry size and bunch tightness were made for each sample. The following information was then taken: total sample weight, total berry count, number of normal and shot berries, length of laterals, and stem weight. A 1,000-gram sample of combined berries (normal and shot) were homogenized in a blender for 10-15 seconds and poured into a container. After separation of the debris, a sample of juice was removed using a straw. Three readings of percent soluble solids were made using a refractometer.

During harvest the following yield information was collected from each plot: The number of boxes graded as #1's, #2's, #3's, as well as the total number of boxes harvested.

Results and Discussion

A summary of the results are contained in Tables 1-3. The lowest Gibb treatment on the Perlette grapes, three applications of 48 grams each, produced the highest Brix count, yield of #1 grade boxes, and #1 boxes for the first pick. In addition this treatment maintained high berry weight, total yield and first pick yield. The two 80-gram applications produced the highest total yield and yield for the first pick, and maintained good berry weight and Brix count, but had low quality as indicated by the small number of #1 grade boxes. As might be expected, the highest Gibb treatment, three applications of 80 grams, produced the largest berry weight, but lowest Brix count.

Results of the sizing spray applied to Flame Seedless grapes showed the three applications of 64 grams with the highest total yield, first pick yield, and berry weight. Three applications of 48 grams produced the highest total yield of #1 grade boxes and a high first pick yield. The two 48 gram applications had the highest berry weight and Brix count but poor yield data. Two applications of 64 grams produced the poorest harvest data with the lowest total yield, fruit pick yield, and #1 grade boxes for the first pick.

The treatment on the Thompson Seedless grapes which produced the highest quality and good yields was 2 applications of 64 grams and a 48 gram application. It had the highest yield of #1 and #2 grade boxes, first pick #1 and #2 grade boxes, with high total yield and first pick yield. Three applications of 64 grams had the highest total yield and yield first pick, but fell down in quality with low numbers of #1 and #2 grade boxes. There appears to be a general increase in berry weight with increased Gibb applications. The harvest data indicate a drop in yield and quality with two and three applications of 80 grams. It is noteworthy that the high performing treatments across all three varieties of grapes were those with 3 applications, the possible exception being the two applications of 80 grams on the Perlettes.

Since the quality characteristics were evaluated some time before harvest, the Brix count does not reflect the soluble solids at the time of harvest. Unusually warm weather during the three week period from May 8 to 28 averaged 5 to 6°F above normal, and may have reduced differences between treatments by pushing maturity dates together.

Table 1. Evaluation Results of Gibb Sizing Applications on Perlette Grapes, 1988.

Applications & Rates (grams/acre)	Total Grams Applied	Berry Weight (grams)	Brix Count	Total Yield (boxes)	Yield #1's (boxes)	Yield First Pick (boxes)	1st Pick Yield #1's (boxes)
48 x 48 x 48	144	3.26	15.3	1699	293	609	179
64 x 64	128	3.05	14.8	1571	67	333	16
64 x 64 x 48	176	3.16	14.8	1476	97	356	36
64 x 64 x 64	192	2.98	14.8	1701	53	530	19
80 x 80	160	3.26	15.0	1849	42	680	40
80 x 80 x 80	240	3.31	14.6	1590	64	660	44

Table 2. Evaluation Results of Gibb Sizing Applications on Flame Seedless Grapes, 1988.

Applications & Rates (grams/acre)	Total Grams Applied	Berry Weight (grams)	Brix Count	Total Yield (boxes)	Yield #1's (boxes)	Yield First Pick (boxes)	1st Pick Yield #1's (boxes)
32 x 32	64	3.32	15.8	1348	9	1135	9
48 x 48	96	3.61	16.5	1204	53	1178	53
48 x 48 x 48	144	3.40	15.7	1374	148	1260	148
64 x 64	128	3.44	16.0	1197	48	988	48
64 x 64 x 64	198	3.46	15.7	1802	65	1364	65
80 x 80	160	3.37	15.8	1665	61	1165	61
80 x 80 x 80	240	3.41	15.5	1698	81	1220	81

Table 3. Evaluation Results of Gibb Sizing Applications on Thompson Seedless Grapes, 1988.

Applications & Rates (grams/acre)	Total Grams Applied	Berry Weight (grams)	Brix Count	Total Yield (boxes)	Yield #1's & 2's (boxes)	Yield First Pick (boxes)	1st Pick Yield #1's & 2's (boxes)
48 x 48 x 48	144	2.92	14.2	2088	1471	1486	1442
64 x 64	128	2.82	14.7	2015	1429	1566	1425
64 x 64 x 48	176	2.85	14.0	2323	1806	1800	1730
64 x 64 x 64	192	3.08	14.6	2357	1198	1944	1194
80 x 80	160	3.10	15.4	2095	965	1760	964
80 x 80 x 80	240	3.29	14.7	2035	739	1658	739