etc.), prevailing winds, humidity, light intensity, minimum temperatures, and water quality. Thus, within a valley or any climatic zone, numerous variations are possible. At Davis, plant performance was judged under harsh conditions; the beds were flat, in full sun, and completely unprotected from relatively high-velocity northerly and southerly winds. Regardless of the species, short-stemmed, dwarf varieties (6 to 8 inches tall) were preferable to their tall counterparts, because they are much less susceptible to wind damage. Data on plant species and performance, including flowering dates (greatest display period), height at flowering, and optimal plant spacing are available in a mimeographed listing by writing the Department of Landscape Horticulture, University of California, Davis. Wind and transplant damage were also noted. Many species not tested at Davis are particularly well suited for cooler and more humid climates; conversely, many plants that performed well in these tests will do poorly on the coastal plains.

Maintenance

Approximately 600 hours of maintenance were required annually for 15,000 sq ft of mixed flower beds at Davis; irrigation required 40 hours; transplanting, 250; and weeding, 310. March and November placed the heaviest demands on the maintenance staff, but there was surprisingly equal distribution of labor throughout the year. Seedlings of the species used may be purchased from local nurserymen. When large orders are to be placed, contact the nursery several months in advance so that plants of the desired varieties will be available on the desired date.

Location

To be appreciated, flower beds must be properly placed—always removed from play areas. They must be cleaned of dead or unsightly plant materials or other debris, and they must be irrigated at relatively frequent intervals. Although there is greater leeway in color selection than is popularly imagined, greatest effect is achieved by planting to a single color or to sizable blocks of compatible colors.

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Bloom Spraying with Gibberellin Loosens Clusters of Thompson Seedless Grapes

Applications of gibberellin to Thompson Seedless grapes during bloom produce a very loose cluster. Loose clusters may be less subject to summer bunch rot and are easier to pack than the more compact cluster often produced by the commercially accepted practice of spraying following bloom.

R. J. WEAVER · R. M. POOL

THOMPSON SEEDLESS VINES sprayed with gibberellin at the shatter stage (in the usual practice) produce greatly enlarged berries. This stage occurs about 10 days after bloom—when the impotent flowers or berries have fallen. This is also the proper time for girdling. By 1962, only five years after the first testing was done at Davis, nearly all Thompson Seedless for table fruit in California were being sprayed with gibberellin. However, these large-berried clusters had to be heavily berry-thinned to reduce compactness. Even then, the clusters were often quite compact, encouraging the development of summer bunch rot and making packing more difficult.

Recent experiments have shown that loose clusters with large berries may be obtained by spraying at bloom stage. Mature Thompson Seedless grapes in an irrigated vineyard at the University of California, Davis, were used for these tests. The vines were pruned to four canes, and were cluster-thinned to 20 per vine. The retained clusters were berry-thinned by removing the apical half. In one experiment, vines were sprayed at bloom stage on May 5, 1965 (40% of the calyptras had fallen) at 0, 10, 20, 40 and 80 ppm of gibberellin. Another series of vines were sprayed at the same concentrations at the shatter stage on June 4. The potassium salt of gibberellic acid (GA_3) was used and "Tween-20" was added as a wetting agent. The clusters and all foliage in the cluster area were thoroughly wetted. There were four vines per treatment. All vines were trunk girdled on June 6 to produce large and uniform berries.

Cluster rating

At harvest on September 1, three clusters were removed from each vine. The degree of looseness was estimated for each cluster. If the clusters were very loose and easily bent with spaces between the berries it was given a rating of "one." A rating of "three" meant the clusters were very compact and could not be bent without crushing the berries. A rating of "two" was intermediate. These clusters were slightly loose and flexible, but there

was little space between the berries. The range of commercially desirable fruit would include classes one and two. The average weight per berry from each plot was determined by weighing 200 berries on 10 clusters sprayed at 40 ppm.

DATA AT HARVEST FOR THOMPSON SEEDLESS GRAPES SPRAYED WITH GIBBERELLIN AT BLOOM OR SHATTER STAGE

TIME OF TREATMENT	Gibberellin (ppm) 0	10	20	40	80	L. S. D. among concentrations at 5%
			Looseness			
Bloom	3.0	1.7	1.4	1.4	1.3	0.5
Shatter	2.5	2.7	2.8	2.7	2.7	N.S.
	Clusters treated at bloom are significantly looser than those treated at shatter at 5% level.					
			Weight per Berry (gm)			
Bloom	2.80	3.53	3.74	3.86	3.59	0.41
Shatter	2.79	3.42	3.34	3.37	4.08	0.29
	Berries treated at bloom or shatter are not significantly different at 5% level.					

The bloom sprays resulted in significantly looser clusters than those sprayed at shatter. Clusters sprayed at shatter had large oval elongated berries, and the clusters were quite compact. Clusters sprayed at bloom were quite loose and had greatly elongated berries. During the early stages of berry growth there was a dimple or a depression at the apex of some of the berries in the bloom treatment. However, by harvest time most of these depressions had flattened or rounded out. Clusters sprayed during bloom at 10 or 20 ppm were loosened and had few or no shot berries (small seedless berries that fail to enlarge). At the higher concentrations there were a few shot berries.

Large berries

Both bloom sprays and shatter sprays produced very large berries. There was an average of 174 berries on clusters sprayed with 40 ppm of GA_3 at bloom, and an average of 213 on those sprayed at shatter with the same concentration. Although these figures were not significantly different in this experiment, it is believed that bloom sprays will cut down the number of berries and thus result in a loose cluster. Further research is required to determine the causes for the loosening of clusters—and before bloom sprays can be recommended for commercial use.

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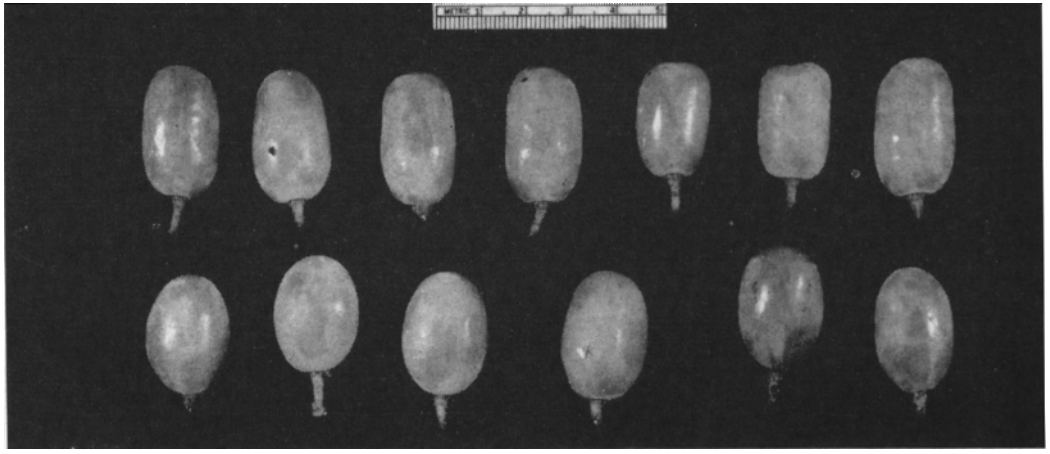
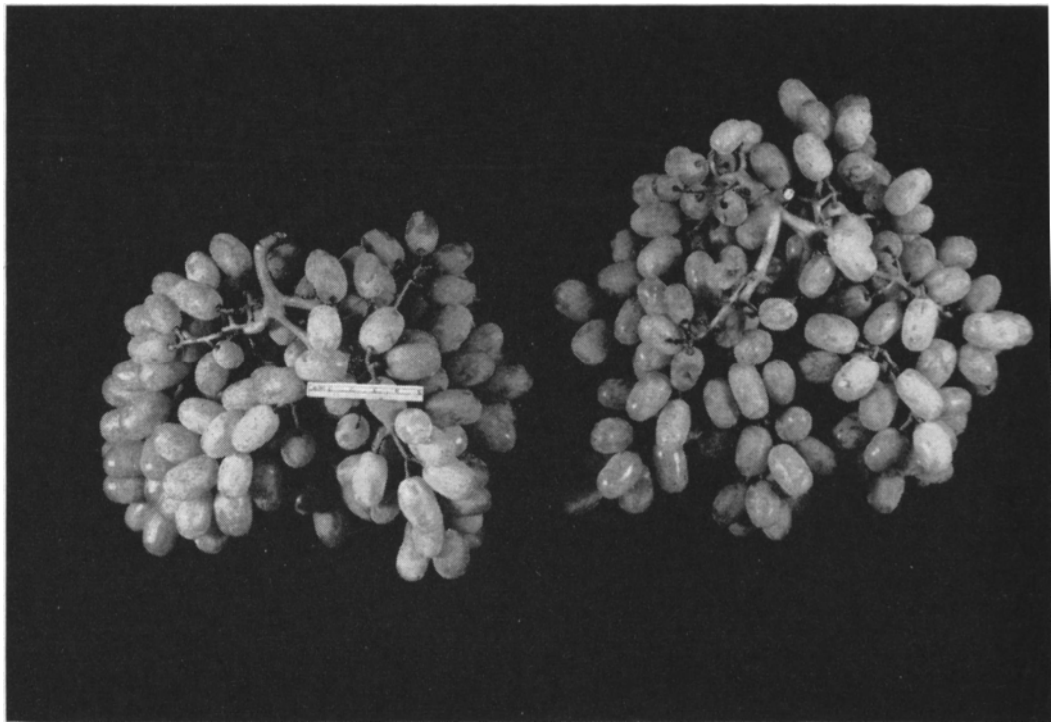


Berries above sprayed at bloom (upper row) or at shatter stage (lower row) with GA_3 at 40 ppm. Note that berries sprayed at bloom (upper) are very elongated. The second berry from the right shows a slight dimple or depressed area at the apical end. Berries sprayed at shatter (lower) are oval and somewhat elongated.



Thompson Seedless at harvest, after spraying with 40 ppm of GA_3 at bloom stage (above), or at shatter stage (below). Note that clusters sprayed at bloom are very loose while those sprayed at shatter are compact. Both treatments result in large berries.