

Effects of Gibberellic Acid on Berry and Seed Development in 'Orlando Seedless' Grape

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Increased berry size in response to GA₃ applications occurs in most seedless grape cultivars. GA₃ applications made between bloom and fruit set are generally most effective; however, the specific developmental stage at which optimum response occurs is different for each cultivar (4). Inhibition of seed development has been associated with prebloom applications of GA₃ on a few cultivars of normally seeded *Vitis vinifera* L., but the response can be variable (2). Thus, extensive research on use of GA₃ may be required for each new cultivar.

A new family of bunch grapes with resistance to Pierce's disease has been developed by the Univ. of Florida, one cultivar of which, 'Orlando Seedless' (*Vitis aestivalis* Michaux ssp. *simpsoni* Munson and ssp. *smalliana* Bailey; *labrusca* L.; *vinifera* L.) (1), may require the use of horticulture treatments to enhance fruit quality (3). The objective of this preliminary study was to determine response of 'Orlando Seedless' to a range of GA₃ application times and rates. Of specific interest was the potential for overcoming small berry size and occasional gritty seed traces.

Six-year-old vines of 'Orlando Seedless' grafted on 'Tampa' (*Vitis aestivalis* ssp. *smalliana*; *labrusca*; *vinifera*) rootstock were grown in a drip-irrigated vineyard. Vines were

head-trained on a single-wire and pruned to four to six canes of 10 buds each. Individual treatments consisted of an application of GA₃ at one of four concentrations (38, 75, 150, or 300 ppm) made at one of three times after flowering (7, 14, or 21 days after capfall). Treatment combinations (12 total) were assigned in a completely randomized design among individual canes of a single plant. One additional random cane on each plant was a control. Each cane was thinned to two clusters. Fourteen vines were used as replicates.

GA₃ was applied by hand-spraying isolated canes. Capfall occurred between 17–24 Apr. in 1985 and was defined as 50% to 70% open blooms on 50% of the clusters on the vine. Fruit were harvested on 23 June and 10 random berries were taken from each cluster to determine fresh weight of berries and seed traces. Analysis of variance was performed on the 12 treatment combinations. Controls were averaged over all 14 replicates.

There were significant effects of application date ($P < 0.05$) and concentration ($P < 0.01$) on berry weight. Application date and concentration had highly significant effects

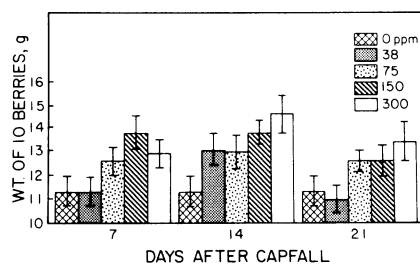


Fig. 1. Effect of GA₃ concentration and application date on weight of 10 berries of 'Orlando Seedless' grapes. Bars = 1 SE.

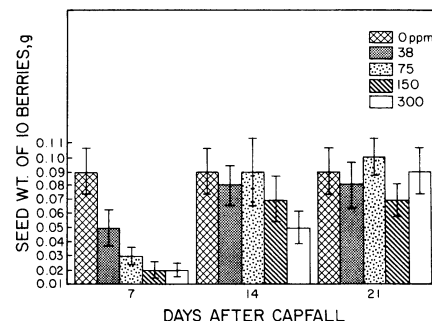


Fig. 2. Effect of GA₃ concentration and application date on seed weight of 10 berries of 'Orlando Seedless' grapes. Bars = 1 SE.

on seed weight ($P < 0.01$). There were no significant interactions. Increases in berry weight were greatest with GA₃ applications at 7 or 14 days after capfall (Fig. 1). Greatest berry weight was associated with GA₃ applications of 75, 150, or 300 ppm at 7 days after capfall and 150 or 300 ppm at 14 days after capfall. Maximum berry weight obtained in this study was 1.48 g, representing a 32% increase over untreated clusters with individual berry weights of 1.12 g. Inhibition of seed development by GA₃ was most effective with 75, 150, or 300 ppm applications made at 7 days after capfall (Fig. 2). Seed weight of treated fruit was 75% lower than untreated clusters. These results suggest good potential for improvement of market acceptability of 'Orlando Seedless'. Most seedless grapes on the market have berry weights in the range of 2 to 6 g. Research on use of GA₃ in combination with other management practices (i.e., girdling, thinning, tipping) will be needed to determine maximum obtainable berry weight in this cultivar.

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