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## Phase III for GA<sub>3</sub> and Phase II for 2,4-D and AVG for Commercial Use on 'Hass' Avocado

Carol Lovatt  
UC Riverside

Charles and David Vanoni - Somis  
Gus Gunderson, Limoneira - Santa Paula 3  
Craig Colton, Reddick Ranch Trust, O'Hara Ranch - Santa Paula 2

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The goal of the research is to obtain the efficacy data necessary to add a PGR use for avocado to an existing PGR label. Given that avocado orchards alternate bear, the California Department of Pesticide Regulation (DPR) will accept yield benefits that are significant only in an on- or an off-crop year, as 2-year cumulative yield or when averaged across the on- and off-crop year.

*'Hass' Avocado Orchards – Somis and Santa Paula 2.* GA<sub>3</sub> (ProGibb® Valent BioSciences) was applied at 10, 24, 57 and 114 g/acre at the cauliflower stage of inflorescence development. In both orchards, trees treated with GA<sub>3</sub> 25 mg/L, 24 g/acre) retained the greatest number of fruit per tree and produced the greatest number of commercially valuable large size fruit (178-325 g/fruit, packing carton sizes 60+48+40), but the effect was not significantly different from the untreated control trees in both orchards at the 5% confidence level (Figure 1). Negative effects on total yield and yield of large size fruit occurred when trees were treated with GA<sub>3</sub> ≥ 57 g/acre, establishing the upper concentration limit. GA<sub>3</sub> dose effects on 2-year cumulative total yield and yield of commercially valuable large size fruit will be determined when the spring 2010 crop is harvested in 2011.

At harvest, two fruit were selected randomly from each data tree and allowed to ripen. The number of days from harvest that it takes for each fruit to ripen was determined. When ripe, external and internal fruit quality was evaluated for decay and discoloration. Vascularization (presence of vascular bundles and associated fibers) of the flesh and germination of the seed were also determined. No GA<sub>3</sub> concentration had a negative effect on any fruit quality parameter.

*'Hass' avocado Orchards – Santa Paula 1 and Santa Paula 3.* PGR strategies tested in these two orchards included: (i) AVG (250 mg/L, ReTain® Valent BioSciences) applied at full bloom/anthesis; (ii) AVG (250 mg/L) applied when fruit were 17-20 mm in diameter, just prior to exponential increase in fruit size; (iii) 2,4-D (38 g acid equivalents/acre, CitrusFix® AMVAC) applied when fruit were 17-20 mm in diameter; (iv) 6-benzyladenine (25 mg/L, MaxCel® Valent BioSciences) applied at full bloom/anthesis; (v) 6-benzyladenine (25 mg/L) applied when fruit were 17-20 mm in diameter; and (vi) 6-benzyladenine (25 mg/L) applied at full bloom/anthesis and again when fruit were 17-20 mm in diameter. At Santa Paula 1, only 6-benzyladenine when applied at full bloom and again when fruit were 17-20 mm in diameter significantly increased the yield of fruit of packing carton size 60 as both number and lbs of fruit per tree compared to the untreated control (Figure 3, lower left panel). However, this treatment also significantly reduced the number and lbs of fruit of packing carton size 48 per tree compared to the untreated control (Figure 3, lower right panel). Due to the significant increase in yield of fruit of packing carton size 60, the yield of fruit of packing carton sizes 60+48+40 was not significantly different from the

untreated control (Figure 3, upper right panel). All PGR-treated trees produced numerically, but not significantly, more fruit per tree (number and lbs) than the untreated control (Figure 3, upper left panel). The Santa Paula 3 orchard produced approximately 50% fewer fruit at harvest than Santa Paula 1. In Santa Paula 3, no treatment had a significant effect on total yield or yield of commercially valuable large size fruit (Figure 4, upper left and right panels). All PGR-treated trees produced numerically, but not significantly, more fruit per tree (number and lbs) than the untreated control. Results with AVG in both orchards demonstrated that the full bloom application time increases yield by retaining too many fruit of packing carton sizes 84 and 70. Application of AVG when fruit are 17-20 mm in diameter increased the yield of larger fruit.

### Benefits of the research to the industry

All trees treated with 6-benzyladenine, 2,4-D and AVG produced numerically, but not significantly, more fruit per tree (number and lbs) than the untreated control. Only 6-benzyladenine applied at full bloom and again when fruit were 17-20 mm in diameter significantly increased the yield of fruit of packing carton size 60 as both number and lbs of fruit per tree, resulting in a net increase of 3,667 lbs/110 trees/acre above the yield of the untreated control ( $P=0.05$ ). The effect of these PGR strategies on 2-year cumulative total yield or yield of commercially valuable large size fruit will be determined when we harvest the spring 2010 crop in 2011.

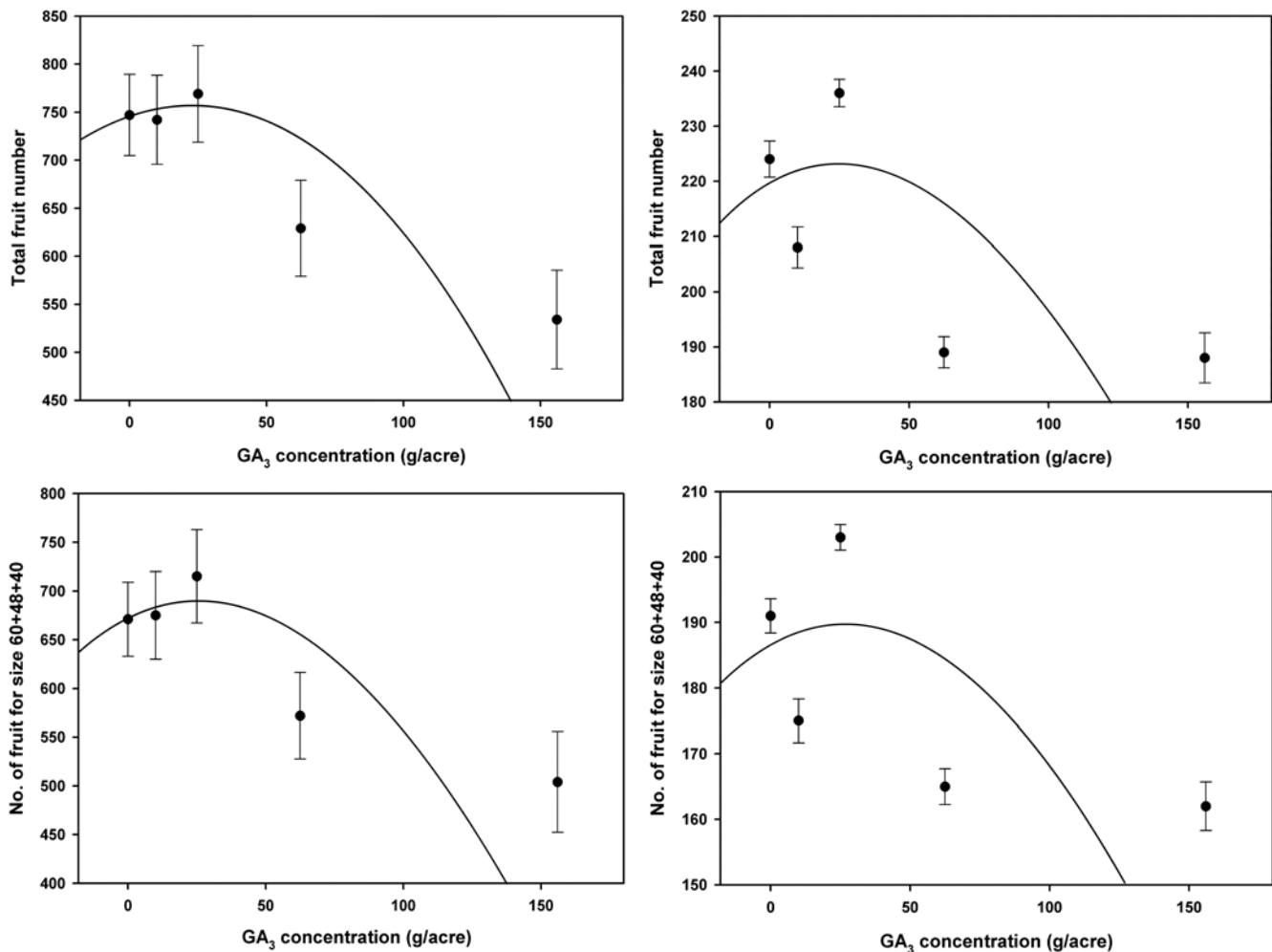


Figure 1. Effect of different concentrations of GA<sub>3</sub> applied at the cauliflower stage of inflorescence development on total fruit number and number of commercially valuable large size fruit of packing carton sizes 60 + 48 + 40 (173-325 g/fruit) of the 'Hass' avocado in two different orchards (Somis, left two slides and Santa Paula 2 right two slides).

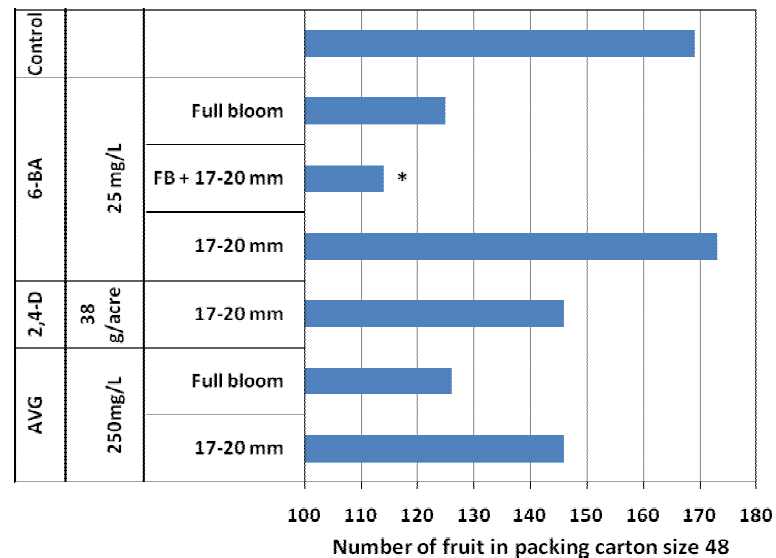
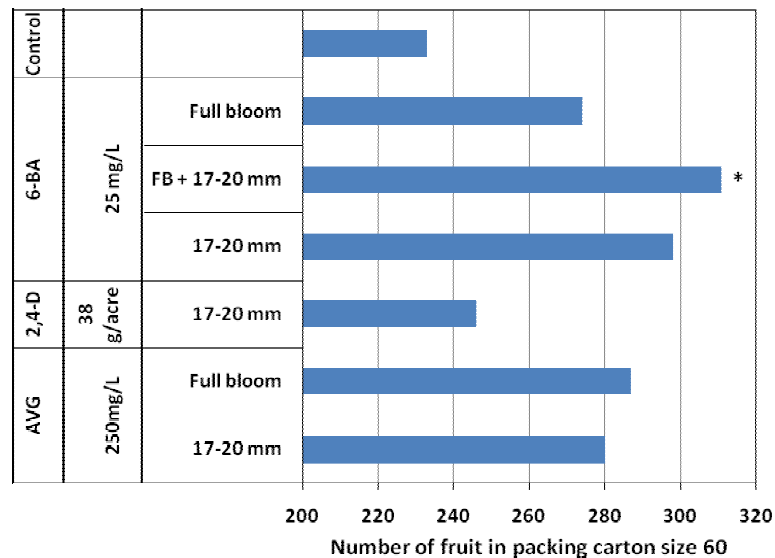
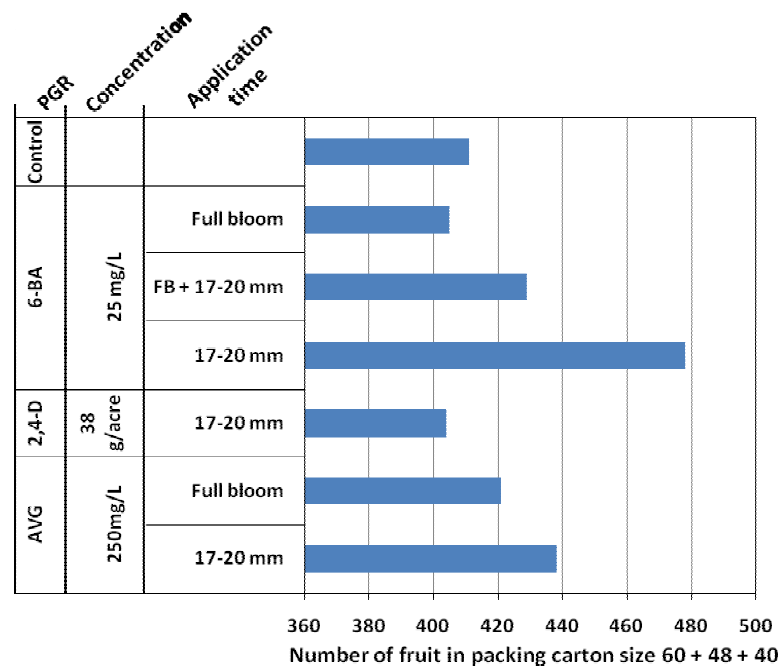
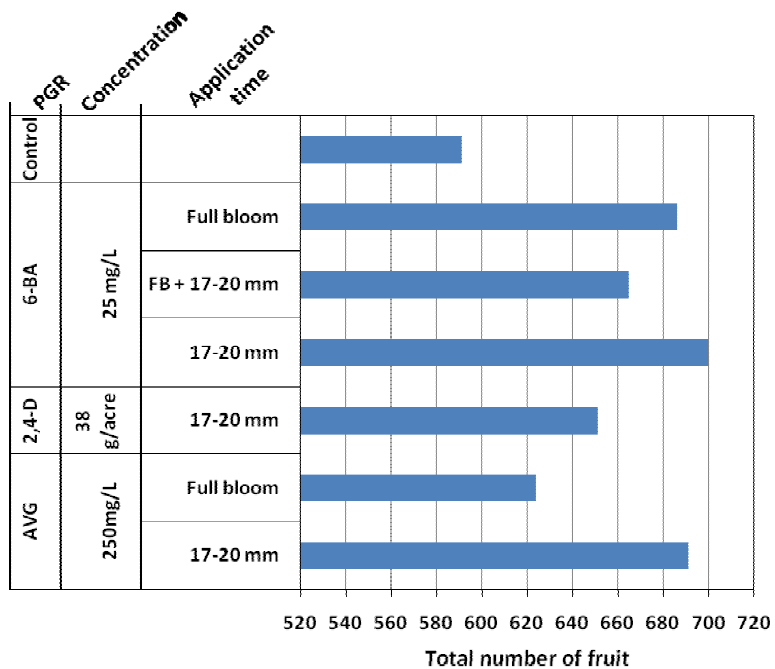


Figure 3. Effect of foliar-applied 6-benzyladenine (6-BA), 2,4-dichlorophenoxyacetic acid (2,4-D) and aminoethoxyvinylglycine (AVG) on yield (number of fruit per tree) of the 'Hass' avocado (Santa Paula 1; harvested April 2010); \* indicates a significant difference from the control.

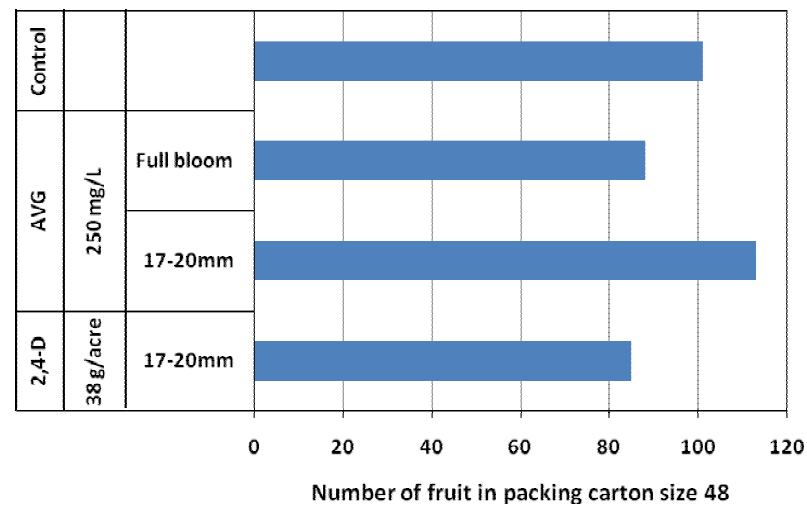
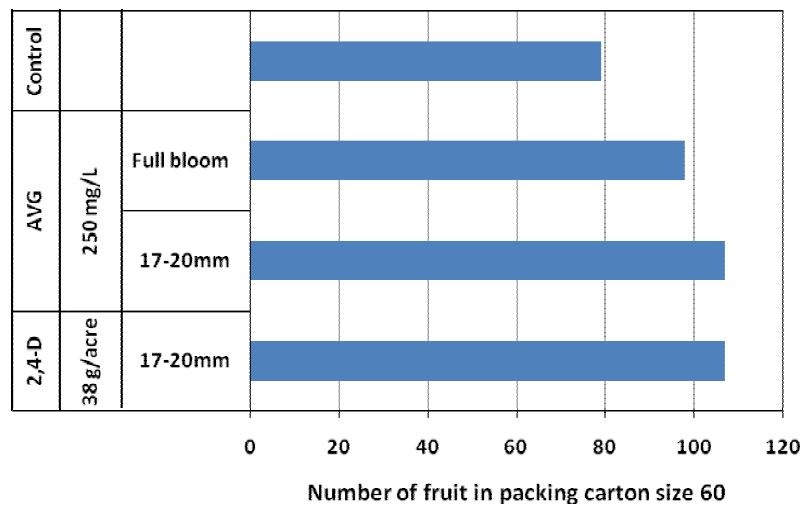
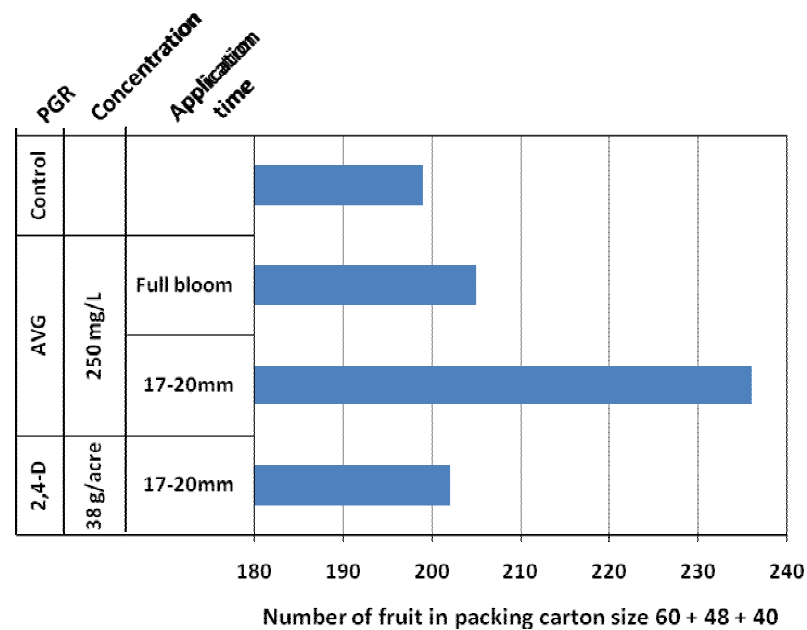
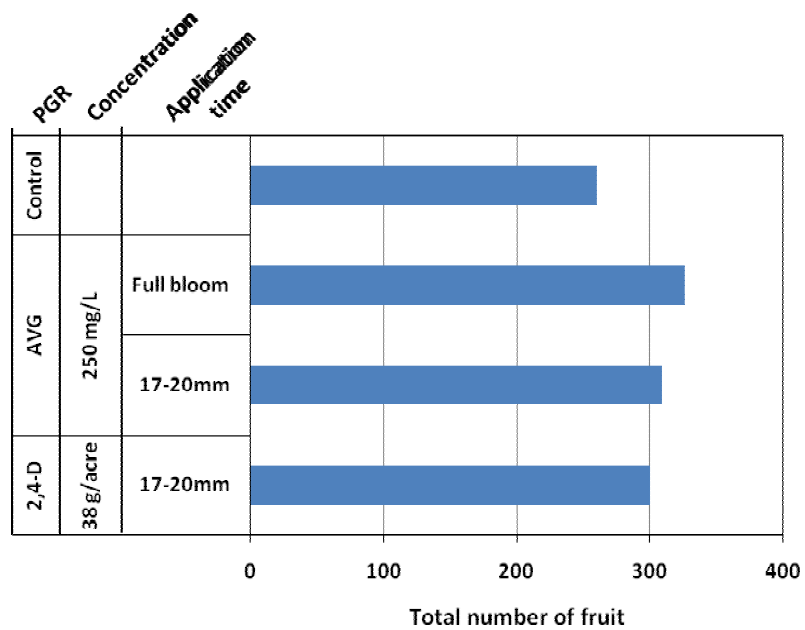


Figure 4. Effect of foliar-applied 2,4-dichlorophenoxyacetic acid (2,4-D) and aminoethoxyvinylglycine (AVG) on yield (number of fruit per tree) of the 'Hass' avocado (Santa Paula 3; harvested April 2010).