

Use of GA₃ to Reduce Alternate Bearing and Increase Annual Yield, Fruit Size and Quality

Continuing Project; Year 2 of 4

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Benefits to the Industry

This project addresses canopy management using GA₃, which is an innovative cultural technique, designed to increase annual crop production. In addition, it addresses the priority that seeks to understand avocado phenology and thus manipulate the annual vegetative and flower growth cycles to reduce alternate bearing and increase cumulative yield. This project also contributes to improving fruit quality by the use of strategies that result in precocious vegetative shoot growth to thus protect young developing fruit from sunburn and by the use of strategies that keep late hanging fruit from turning black. The treatments being tested contribute to prevention of preharvest drop. The treatments being tested also increase fruit size of the existing and newly developing crops. When completed, we will be able to provide a set of guidelines for the use of GA₃ to achieve these results. In addition, we are working closely with Abbott Laboratories to have avocado added to the label for GA₃ so it can be used in commercial avocado production in California.

Objectives

The project objectives are: (1) to use foliar applied GA₃ (25 mg/l) to even out alternate bearing and to increase yield such that the combined yield for the "on" and "off crop years is greater for the GA₃ treated trees than the control trees; and (2) to demonstrate that a higher annual yield can be maintained through the use of properly timed foliar applications of GA₃. As part of these objectives, we are meeting the additional objectives of increasing fruit size and improving fruit quality.

Experimental Plan and Design

GAS at 25 mg/l is applied to the canopy of mature 'Hass'¹ avocado trees under commercial production. The orchard is owned by Baylor Citrus and is located in Carpinteria, CA. The orchard is 10 years old. The trees are widely spaced so that there are no overlapping branches and the trees will remain this way without pruning during duration of the research. GA₃ applications are made in Jan., Mar., April or late June-early July in years when trees are carrying "on" or "off crop (four separate treatments for each year) to determine the effect of starting the treatments in "on" vs. "off years. Applications are be made in late August or Nov. when trees are carrying a light "off crop. Including a non-treated control, this is 11 treatments for which there are 20 individual tree replicates per treatment in a randomized complete block design.

Harvest data will include total pounds of fruit/tree and the weight of 100 randomly selected individual fruit/tree which will be used to calculate fruit size and packout/tree, evaluation of external and internal fruit quality, and a cost benefit analysis of each treatment. Harvested fruit will be analyzed for GA₃ residue. Leaves will be collected for nutrient analysis by Albion Laboratories. All data will be subjected to analysis of variance and repeated measure analysis at P(0.05 using SAS.

Summary

We do not have any data from the leaf analyses yet and have no yield data yet. The project is on schedule.