

Increasing Yield, Fruit Size and Quality with Properly Timed GA₃ Canopy Sprays

Ending Project; Year 2 of 2

*Samuel Salazar-Garcia and Carol J. Lovatt
Department of Botany and Plant Sciences,
UC Riverside*

Benefit to the Industry

The results of this research results will provide basic information on the effect of time of application and concentration of canopy GA₃ sprays on inflorescence development, floral intensity, fruit set and fruit size of the 'Hass' avocado. This information will be used to design and test field management strategies to increase 'Hass' avocado yield, including fruit size and quality, and to even out alternate bearing.

Objectives

The overall objectives are to determine the effects of GA₃ sprays, including the effects of concentration and time of application, on (1) the development of determinate and indeterminate inflorescences, and (2) to quantify cumulative effects of GA₃ treatments on yield, fruit size and fruit quality, and on the biennial bearing habit of the 'Hass' avocado.

Summary

In the 'Hass' avocado, as in other avocado cultivars, flowering is intense but fruit set is low. Significant competition for water, nutrients and photosynthate occurs during flowering and fruit set which is exacerbated by low root activity, reduced transpiration, low rates of photosynthesis and low temperatures. Through numerous experiments conducted with young trees in growth chambers and branches of mature trees in commercial orchards over the past several years, our laboratory has discovered that canopy sprays of GA₃ can alter inflorescence phenology and morphology in different but predictable ways when applied at different times from September through March. Using the results of our previous studies, we selected two concentrations of GA₃ (25 and 100

mg/liter) and four application times (Sept., Nov., Jan. or March) which might have a favorable impact on improving yield of the 'Hass' avocado, including fruit size and quality, and for evening out alternate bearing.

This research was initiated by selecting trees that had an average yield of 56.1 kg fruit/tree and were not significantly different at the 5% level before the application of any treatments. The yield data for the first year of the field experiment (an 'off crop year') showed that a concentration as low as 25 mg GA₃/liter had a large (approx. 50-90% net increase) but non-significant effect on yield when applied in November, January or March. The increase in yield obtained with 25 mg GA₃/liter applied in November, January, or March was not obtained at the expense of fruit size. The March application resulted in a 2-fold increase in the number of fruit of size 48 (fruit weighing 213-269 g/fruit) compared to the untreated control trees (P <0.05). In addition, there was some benefit from the GA₃ applications in increasing the number of fruit with green skin and reducing the number with black skin for fruit harvested in May. We observed no significant effect on internal quality or maturity level of the fruit treated with GA₃ even at 100 mg/liter, compared to fruit from control trees. A second year of yield data (an 'on' crop year) will be obtained during the spring 1997.