

EFFECTIVENESS OF RETAIN® ON PISTILLATE FLOWER ABORTION AND ETHYLENE PRODUCTION OF WALNUT FLOWERS

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ABSTRACT

Pistillate flower abortion (PFA) is the loss of female flowers shortly after bloom, prior to fruit set. PFA is associated with high pollen loads, and an increase in ethylene production. Some cultivars are more susceptible to PFA than others, and there is also variation in the magnitude of PFA between years, and in different growing areas. The cultivar Serr has been virtually completely removed from northern California orchards. In central California growers have been removing pollenizers and/or shaking trees during the staminate bloom to reduce pollen. These efforts have been inconsistent in effectiveness; therefore other methods to reduce PFA are desirable. Although Serr tends to be the most severely affected, other cultivars can have significant PFA, depending on conditions during bloom. Aminoethoxyvinylglycine (AVG, the active ingredient in Retain™) inhibits ethylene by inhibiting ACC synthase.

Retain® was evaluated for effectiveness in reducing ethylene production of flowers on three cultivars, Serr (high PFA), 67-13 (an unreleased variety with high PFA), and Chandler (very popular cultivar with mid PFA). This was done on detached flowers in the lab. Different concentrations of Retain® were also evaluated. In addition, in the field, different concentrations and timings of Retain® sprays were evaluated for effectiveness in reducing PFA. Flowers were tagged throughout bloom as they reached receptivity to evaluate the relationship between the timing of spray and the stage of the flower (data not shown).

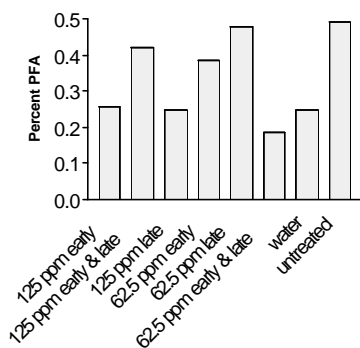


Figure 1: Percent PFA in the field for different Retain treatments (cv. Serr).

Retain® sprays in the field reduced PFA, below that of an untreated control (figure 1). Early sprays showed a greater decrease than later sprays. Water sprays also had lower PFA than the untreated control, although this result has not been seen in other experiments. This year was a low PFA year, so perhaps in years with more PFA the results will be more consistent.

A peak in ethylene production, associated with pollination, occurred approximately 18-24 hours after pollination in excised flowers (figure 2), with pollinated flowers producing more ethylene than non pollinated ones. The decrease was correlated to the concentration applied.

In the lab, Retain™ decreased ethylene production in both pollinated and non pollinated flowers. Higher concentrations of Retain® reduced ethylene to a greater extent. Late applications of Retain® had less effect. PFA can greatly reduce yield in an orchard, but ethylene inhibitors may help alleviate the problem.

Future research will focus on determining the best concentration of Retain® to apply, as well as further investigation of the best timing of the application.

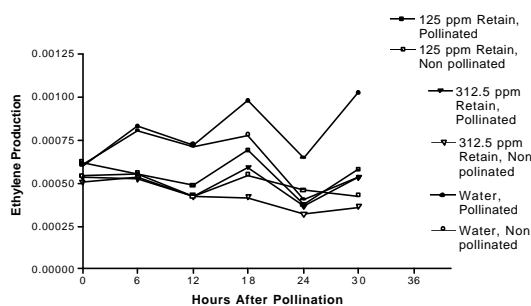


Figure 2: Ethylene production of detached flowers in the lab, as measured by gas chromatography (variety 67-13).

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