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EXTENSION

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Enhancing Cropping of Low-Yielding, Heavily Flowering Citrus by Reducing Floral Initiation¹

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Introduction

Many blocks of Florida citrus, most notably some groves of Navel orange, Ambersweet, and Minneola, tend to flower very heavily yet set poor crops. In these blocks, it appears that tree resources are wasted by extravagant flowering, compromising the trees ability to set fruit, support early fruit growth, and carry fruit to harvest. Research indicates that productivity of heavily blooming blocks is often increased by reducing flower formation. This approach has produced very encouraging results in Florida Navel and Ambersweet in two years of trials, and shows potential in Minneola as well. While we only have three years experience with these methods, results have been so positive, that some citrus growers may want to try these methods on low-yielding but heavily-flowering groves on a limited scale. The purpose of this document is to provide an update for citrus growers on this promising technique.

A single winter GA spray to heavy-blooming Ambersweet or Navel has increased boxes / tree by more than 22% in most of our trials.

How Does This Work?

GA (also known as GA₃ or gibberellic acid and sold by Valent, Agtrol, Griffin and others) is a naturally occurring plant growth regulator that has a number of effects on tree and fruit development. GA is known to inhibit flowering in citrus, and when it is applied during the period of bloom induction, it typically reduces the number of flowers and increases the proportion of leafy inflorescences. It appears that GA affects only buds that are receptive to floral induction at the time of application. As a result, timing of application is very important.

When Should GA Be Applied To Reduce Flowering?

The period of flower bud induction in Florida citrus typically occurs from late November through early February in Florida. In 1997-98, we applied GA to Navel in Ft. Pierce on Dec 23, 1997 and Ambersweet in Okeechobee County on Jan 6, 1998. Flowering was reduced by about 40% in each trial and total yield was increased by 22% in Navel and 45% in

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Ambersweet. We have only looked at a range of GA timings for one year, and found that in that year, time of GA application markedly influenced both time of flowering and final crop harvested. Application of GA to Ambersweet on Jan 6, 1999 reduced and delayed flowering but had little effect on yield, however, application on January 23 accelerated flowering, decreased numbers of flowers, and greatly increased cropping, from a very poor 25 fruit / tree in controls to 275 fruit / tree. In Navel, yield increased following application on Dec 17, 1998 (48% increase) while other timings with a single GA application affected bloom intensity without significantly influencing yield. It appears that optimum time of GA treatment will likely depend on variety and time of cool temperature periods that induce flowering, and may vary from year to year. Weekly advisories on flower bud induction status, and the best time to apply sprays that alter flower bud induction are posted on the web. Best results may be achieved by following the 2000-2001 flower induction advisory on this website. Trials are beginning in Minneola, and we suspect that this late-blooming variety may need GA treatment timings similar to Ambersweet, but January applications of GA to this variety are not included on product labels.

Depending on fall and winter temperatures, Navel should be treated in mid to late December, while Ambersweet should be treated with GA in early to late January. See WebSite for recommendations based on observed weather.

Where Can GA Be Legally Used To Reduce Flowering?

The current label permits application to Navel during December to reduce physiological disorders and permit a more orderly harvesting pattern. Therefore, application to reduce the physiological disorder of excessive flowering is permitted by the existing label. HOWEVER, only Pro-Gibb has received a special local needs label permitting application of GA on Ambersweet (but not other varieties) in January. A full label for controlling flowering in citrus should be in place for 2002.

The existing label does not permit GA application to citrus in January, except for use of Pro-Gibb on Ambersweet (a special local needs label).

Where Should You Consider Using GA To Reduce Flowering?

This is still an experimental procedure! However, it is worth trying on limited acreage where trees routinely flower very heavily but produce very light crops, or on a larger scale in blocks with very poor production. It appears that cropping may be lower when bloom is reduced on blocks which do not have excessive bloom. Most test have been conducted on Navel and Ambersweet, but it seems likely to be effective on other bouquet bloomers as well. Trials on more varieties are underway.

This is still an experimental procedure! However, it is worth trying on limited acreage of Navel and Ambersweet in which trees routinely flower very heavily but produce light crops, or on a larger scale in blocks with very poor production. Cropping may be reduced if these treatments are applied to blocks with only moderate to light bloom.

Are There Any Hazards Associated With Winter GA Application?

Some leaves may be knocked off of trees, especially where greasy spot has damaged foliage or temperatures are high at the time of application, however we have seen increased cropping even after some leaf loss. Fruit still present on trees may quickly and dramatically regreen, making these treatments most appropriate in blocks where harvest has already occurred. In some cases, we have seen earlier flushing following GA treatment, and this may indicate some reduction in cold-hardiness. If flowering intensity potential is low due to warm fall and winter weather, previous heavy crop, or other factors, GA sprays may reduce yields by suppressing flowering excessively.

What Rate Should You Use?

All of our trials have been conducted with 20 ounces of Pro-Gibb (4%) per acre applied at 150-175 gallons per acre with 0.05% Silwet L-77. Lower rates, gallons per acre and surfactants may be sufficient, but reduction in flowering is less with lower rates. More complete data will be available by fall 2001.

Our trials have been conducted at 20 ounces of GA / acre plus 0.05% Silwet at 150- 175 gallons/ acre. At 150 gallons/acre, this would be: 13.3 ounces of GA (4%) and 6.3 ounces of Silwet L-77 per 100 gallons