Enhancing Return Bloom of Apple

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Apple flower buds are formed in June and July for most varieties. Roughly 25-30 days after full bloom is the rule of thumb for the end of the thinning window and the beginning of the flower bud development stage. Though this is a rough guideline, actual physiological responses are a result of degree-day accumulations.

In addition to utilizing the hormonal type chemical thinners (NAA, NAD, 6-Ba, ethephon) during the normal thinning windows, research has shown that both NAA and ethephon can be also be applied in supplemental applications to enhance flower bud formation for the following season.

Beginning when king fruit are 30-35mm in diameter (roughly 4-6 weeks after bloom, depending on temperature), growers can begin using ethephon or NAA applications to stimulate return bloom.

However, if the crop load is not reduced to the correct levels with chemical thinning in the normal thinning window, no amount of supplemental NAA and ethephon applied will ensure return bloom!

Research has shown that beginning thinning at bloom with PGR's increases return bloom.

Ethephon

Ethephon is a synthetic compound that is broken down in plant tissue to form ethylene. When applied during flower bud development on apples (June-early Jul), ethephon can be highly effective at influencing return bloom. We suggest using ethephon at 150 ppm (0.5pints/100 gallons).

Ethephon treatments should begin when fruit are 35 mm (1.2-1.4 inches) in diameter (about 6 weeks after full bloom). See Table 1 for the number of weekly applications recommended per variety.

Ethephon on non-bearing apples can be used at 300-450 ppm (1-1.5 pts/100 gallons) beginning 2-4 weeks after full bloom. However, these trees should have filled their space and be ready to bear the following year. This might be a 3 year old tall spindle planting or a new 3-4 year old semi dwarf orchard. Note that ethephon will reduce tree growth and before Apogee, was used for that purpose.

NAA

NAA can also be used for return bloom. One approach to is to use NAA when fruit reach 30-35mm in

Table 1. Varietal recommendations for ethephon applications to enhance return bloom.

Variety	Number of weekly, 150ppm ethephon applications starting at 30-35 mm (1.2-1.4 in)
Paulared	1
Gingergold	1-2
Honeycrisp	4
Gala	2
Macoun	2
Empire	2-3
Jonagold	2-3
Golden Delicious	2-3
Mutsu	2-3
Fuji	4
Suncrisp	4
Goldrush	4

diameter (about 4-6 weeks after bloom, depending on temperature) at 5 ppm and make repeat applications at 7-day intervals. There is very little risk of late thinning with NAA as compared to ethephon. One approach is to make the first application of NAA at 30mm and then switch to ethephon for subsequent applications.

The various NAA product labels call for applications every 7-14 days. Growers have experimented with up to 5 applications. If these applications extend through August, they may also reduce pre-harvest fruit drop in certain varieties of apples (see the label for additional information).

Maximum annual application for apples and pears is 150 grams of NAA (161 fl oz of Fruitone L or 0.33 lbs NAA equivalent) per acre per year or per crop cycle.

Concentration- the concentration rates listed in this article are based on spraying tree row volume dilute. If you apply less than the dilute rate of water per acre, concentrate the PGR appropriately.

Cautions

Ethephon applications at high temperatures and high rates can defruit trees, make sure you are past June drop and observe the temperature for the day of application + 2 days. NAA applied for return bloom can reduce fruit quality of certain early ripening varieties (see the label for details).

Conclusion

There are no silver bullets! Crop load must be adjusted during the normal chemical thinning windows for summer PGR applications to be effective. Growers considering the use of PGR's for return bloom need to be in tune with their orchard conditions before making any application. Application of summer PGR's can be very beneficial to a grower's operation by breaking a biennial cycle, but their use requires a careful understanding of all the parameters that their application can influence. *Begin slowly and follow all label rates, guidelines and precautions. The label is the law.*

Note: The above information was developed from research and observations in New Jersey, other portions of the Mid Atlantic and Massachusetts fruit growing regions.

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