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(ReTain Special Edition)

Prepared by the University of Massachusetts Amherst Fruit Team

Contents

[Horticulture](#) (ReTain use in 2021 - an update)

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Horticulture

ReTain Use in 2021- An Update

Duane Green

ReTain® (aminoethoxyvinylglycine, AVG) is a plant growth regulator that has been registered for use as a drop control product since 1997. It is used to aid in harvest management, delay ripening and to retard preharvest drop.

Prior to application it is advisable to review the [ReTain label](#). It suggests that an organosilicone (OSI) surfactant at 0.05% to 0.1% v/v (6.4 to 12.8 fluid oz. per 100 gallons) should be included in the spray tank. It also suggests that application should be made when rain is not expected for 8 hours. It has been my experience that if the spray is allowed to completely dry and 0.1 % OSI surfactant (12.8 oz./100 gallons) is included with ReTain, little drop control is lost if rain follows application. There is a 7 day preharvest interval and the amount applied should not exceed 2 pouches of ReTain per acre. Recently Valent Biosciences published a [ReTain Technical Manual that is available online](#). It is a very comprehensive publication that is well worth the effort to look at prior to ReTain application this season.

Retain Response is influenced by:

- Time of Application - ReTain acts by retarding ethylene production by inhibiting the enzyme reaction in the biosynthetic pathway immediately before ethylene. The inhibition process requires between 7 to 10 days. Since ReTain acts by inhibiting ethylene production it must be applied before the fruit starts to generate ethylene in the ripening process. If ReTain is applied after fruit starts to produce ethylene, its effectiveness will be greatly diminished. There are practical implications related to time of application. If ReTain is applied 5-6 weeks before harvest, fruit maturity may be significantly delayed and as a consequence there may be a noticeable reduction in red color development. A follow up application may be necessary before harvest to assure acceptable preharvest drop control.
- Amount of ReTain Applied - All who have used ReTain know that higher rates will result in longer drop control, a greater reduction in red color development and a delay in ripening.
- Variety Treated - Varieties differ, often significantly, in their response to ReTain, especially red color development and the extent of drop control. For this reason, recommendations for the amount and timing of ReTain are often given by variety. Red color development on Honeycrisp, Gala and Macoun are particularly sensitive to the rate of ReTain used and when these applications are made. Below are specific recommendations for use of ReTain on some varieties important in New England.

Specific recommendations for the use of ReTain:

ReTain Use on McIntosh. Generally, the initial application is made 3 to 3.5 weeks before anticipated harvest. Application of 1 pouch per acre can be expected to control drop (under 20% drop) for 34 to 40 days. A supplemental application of 0.5 to 1 pouch will be required to control drop into October. Split applications at lower rates are frequently used to more effectively control drop through the season while having a less deleterious effect on red color. Sometimes it may be desirable to apply ReTain closer to harvest to minimize influence on red color development. In this situation it is advisable to include 10 ppm NAA to help control drop until the drop control effect of ReTain starts, 10-14 days after application. If NAA is applied with ReTain it is advisable to use at least ½ pouch of ReTain to counteract the ripening effect of NAA.

ReTain Use on Honeycrisp. Honeycrisp frequently display significant drop prior to harvest. This problem can be exacerbated by a grower decision to delay harvest to allow for more red color to develop. The rate of ReTain used usually does not exceed 0.5 pouches per acre. If higher amounts are used red color may be retarded to unacceptable levels. One approach to limit the influence of ReTain on red color development on Honeycrisp is to delay application to about 2 weeks before anticipated harvest and apply 10 ppm NAA with the ReTain. NAA has a negligible ripening effect on Honeycrisp and the NAA will provide drop control until the drop control properties of ReTain starts to become effective.

Use of High Rates of ReTain on Honeycrisp. Honeycrisp is probably the most popular and sought after variety in New England. Under most circumstances few Honeycrisp would remain

on the tree for pick-your-own customers who visit an orchard in October. Recent research has shown that an application of two pouches of ReTain applied at the normal McIntosh timing or a split application of one pouch 4 weeks before normal harvest and one 2 weeks later resulted in little drop as late as Columbus Day. Quality of the harvested fruit is excellent, the red color is very good and the fruit are firm. If fruit are not sold at harvest time they can be placed in storage until Thanksgiving without developing significant storage disorders, especially soft scald.

ReTain Use on Cortland. Cortland is a high quality apple that remains popular in New England. Unlike McIntosh and Honeycrisp it is not prone to preharvest drop. However, if the harvest is delayed it can become quite soft. While doing research with higher rates of ReTain on McIntosh we noted that the Cortland in our McIntosh block that received 2 pouches of ReTain had unusually high quality in October. Red color was good, ripening was delayed and firmness was 2 to 3 lb higher than untreated fruit. The taste of these fruits was exceptional and if treated with SmartFresh immediately after harvest firmness was retained in storage. For growers who used multiple applications of SmartFresh, Cortland fruit treated with both PGRs maintained high quality well into the spring. The ReTain was applied at the McIntosh timing. Two pouches could be applied at that McIntosh timing or a split application could be made spaced 2 weeks apart. If you have not tried this approach on Cortland I suggest that you will be very pleased with the results if you do try it this fall.

ReTain Use on Gala. Gala is a variety that does not experience appreciable preharvest drop. However, it does have stem end splitting as fruit near harvest and if trees are exposed to hot weather leading up to harvest, stem end splitting and the development of an undesirable waxy surface can occur rapidly. Application of low rates (e.g. 0.5 pouch per acre) of ReTain can slow down ripening and allow harvest of quality fruit in a more timely manner. I have also had some success by applying 2 pouches per acre of ReTain 3 weeks before harvest to delay ripening to October. The cooler weather in October allowed the red color to develop.

The next Healthy Fruit will be published on or about August 17, 2021. In the meantime, feel free to contact any of the UMass Fruit Team if you have any fruit-related production questions.

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