

Using ReTain and NAA for Harvest Management

Philip Schwallier, Amy Irish-Brown, Denise Ruwersma, Dr. Randy Beaudry
Michigan State University

RETAIN is an excellent apple harvest management PGR (Plant Growth Regulator) from Valent. It has numerous ways for growers to use the product. It has the following characteristics:

- It is dose dependent (rate dependent).
- It is a time dependent.
- It can be used in split or multiple applications.
- It can be used in combination with other PGR's.

ReTain has many beneficial effects on apples. These include:

- Harvest Management.
- Stop Drop.
- Storage/Shelf Life Maintenance.
- Fruit Quality Enhancement.
- Reduces cracking, watercore, softening, and greasiness.

Rate Dependent (Dose Dependent)

ReTain full rate (333 g/acre) applied 30 DBH (days before harvest) is the ReTain "gold standard" for use on apples. When applied in this fashion, it will provide best stop drop, consistent fruit quality enhancements, fruit size improvement, predictable maturity delay, and good storage quality improvement. It does tend to reduce fruit color but color at maturity will be nearly equal to non-treated fruit.

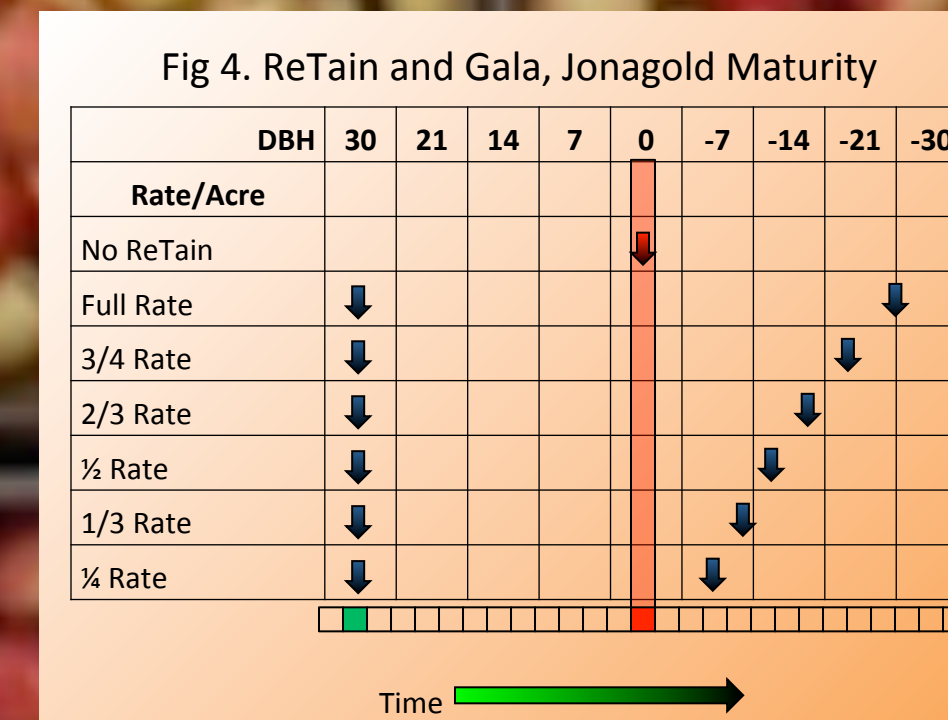
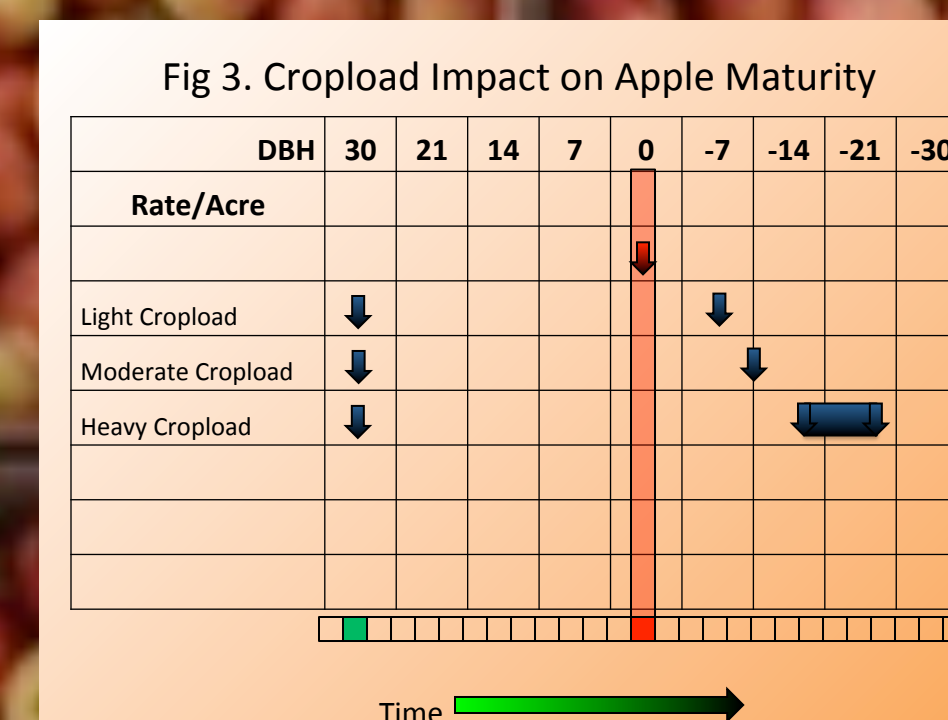
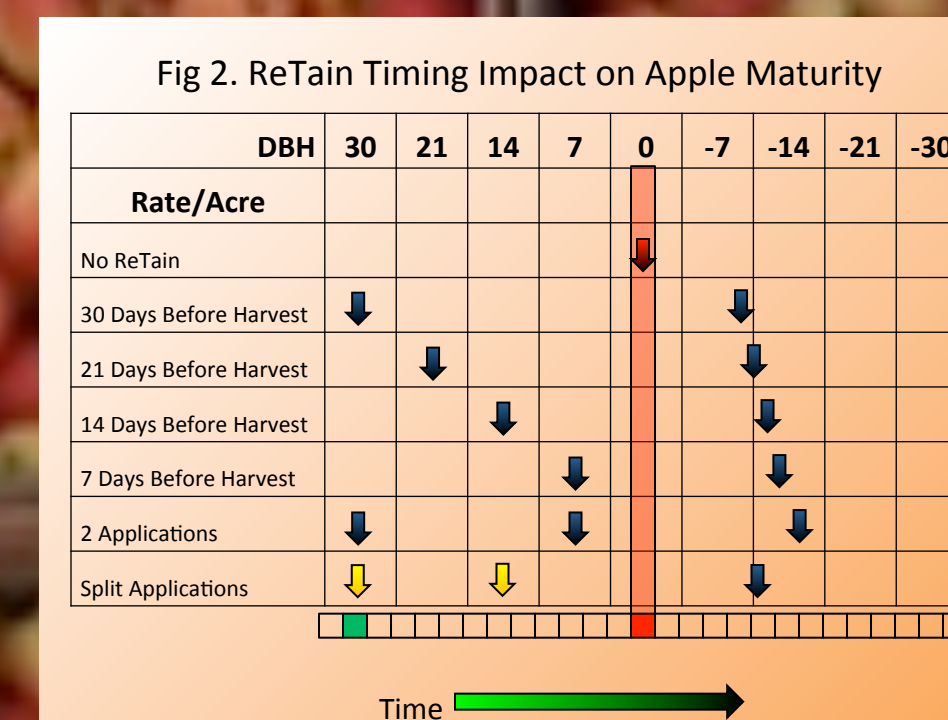
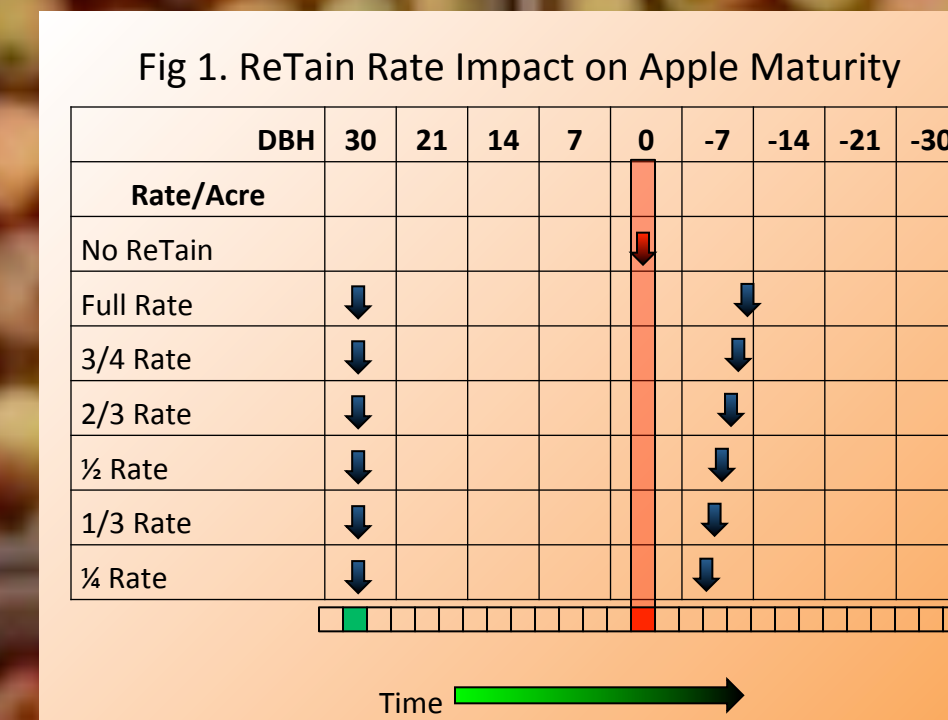
Figure 1 illustrates the effect on maturity of different rates of ReTain at the 30 DBH timing. At lower rates ReTain does not delay maturity as much as high rates. This allows growers to adjust rates to manage their harvest. For example, growers could apply full rate to 1/3 of a block and 1/2 rate to 1/3 of their block and none to the last 1/3, thus provide a smooth transition during harvest. The untreated would be picked 1st and then the 1/2 rate next, followed by the full rate last. All the harvests would be at optimum maturity.

Time Dependent

ReTain can be applied at different timings. Full rate ReTain applied 30, 21, 14, and 7 DBH will also impact maturity and is illustrated in Figure 2. The closer a full rate of ReTain is applied to harvest, the greater the delay in maturity. There are potential disadvantages to delaying a ReTain application to closer to harvest. Late applications of ReTain can some years have less impact on stop drop than desired and perhaps on fruit quality. ReTain stops the production of internal ethylene. Some varieties (high ethylene producing) can start producing ethylene 2 to 3 weeks before harvest and especially during stressful years. ReTain applied too late will not be able to control high ethylene levels that are already in the plant. For example, ReTain applied at 10 DBH may not be able to stop drop already progressing from development of early ethylene within the plant.

Cropload Impact

Full rate ReTain applied at 30 DBH will have a maturity impact on various cropload. Lighter croploads will mature earlier than heavier crops. Very heavy crops may never mature when treated with full rate ReTain.



Sensitive Varieties (Gala, Jonagold)

Jonagold and Gala are very sensitive to ReTain. Use 1/2 rate on these Gala's and Jonagold's to get the same response as a full rate of ReTain on most other varieties.

Combinations with NAA

ReTain can be combined with NAA which most years will equal or improve stop drop. Ethylene is a natural fruit ripener which promotes drop as fruit ripen. ReTain stops the production of ethylene, thus delayed ripening and stop drop. NAA promotes ethylene but inhibits the apple fruit abscission layer. Together NAA inhibits abscission while ReTain controls the ethylene both natural and the NAA promoted ethylene, thus getting the best stop drop while still maintain the ReTain quality enhancements. ReTain and NAA combinations should be applied between 21 and 14 DBH when NAA will perform well. In stressful years (hot and dry summers) Retain should be applied closer to 30 DBH to not allow stressed fruit to starting ripening before the ReTain application can control the maturation process. NAA should not be applied no more than 21 before harvest but this needs more research.

Recommendations

Growers have numerous choices to make when using ReTain w/wo NAA. Most growers want to capture the ReTain power of harvest management, stop drop, fruit quality, and fruit storage shelf life. This requires to plan ahead (30 DBH). ReTain and NAA can be separately or combined. Applying the combination should always work most years.

ReTain Recommendations

Variety	ReTain Sensitivity	Rate	Timing (DBH)	Purpose
---------	--------------------	------	--------------	---------

Standard Recommended Rates

Gala, Jonagold	Very	1/2	30 to 21	Harvest management, stop drop
Honeycrisp	Intermediate	1/2	30 to 21	Harvest management, stop drop
All other major varieties	Normal	1/4 to Full	30 to 14	Harvest management, stop drop

When Combining with ReTain use NAA as follows:

NAA	10 ppm	21 to 14	NAA added to increase ReTain stop drop protection
-----	--------	----------	---

Thanks to those supporting this work:

Michigan State Horticultural Society

Michigan Apple Research Committee

Cooperating Growers

Valent BioSciences

MICHIGAN STATE UNIVERSITY
AgBioResearch

MICHIGAN STATE UNIVERSITY
EXTENSION