



Chemical Blossom Thinning in Virginia Apple Orchards

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What is Chemical Apple Blossom Thinning?

- Chemical blossom thinning in apple orchards is the practice of spraying chemicals during the blossom time to thin the crop.
- Chemical blossom thinners are sprayed multiple times during the bloom period in order to reduce or prevent the fertilization of a portion of the blossoms that would cause undesired crop loads if left to set fruits.
- Chemical blossom thinning can be used as a supplemental and/or alternative practice to standard fruit thinning sprays.



Apple Blossoms 24 hours after Treatment with Rex Lime Sulfur Solution and Oil

What are the Benefits of Apple Blossom Thinning?

- Increased fruit size, optimized crop load, improved annual bearing, increased return bloom, and more predictable thinning results are all benefits of chemical blossom thinning in apples.
- Additionally, some blossom thinners can provide partial early season disease suppression and are registered for organic use.

What are the Disadvantages of Apple Blossom Thinning?

- Limited field experience and university research, few registered chemicals, short periods for application and re-application, and the risk of frost damage during bloom are all disadvantages of chemical blossom thinning.

What Chemicals & Rates can be used for Apple Blossom Thinning?

- Currently, the only products registered for use as apple blossom thinners in Virginia are Rex Lime Sulfur Solution (28% Calcium Polysulfide) and NovaSource Lime-Sulfur Solution (29% Calcium Polysulfide). Label rates for these products range from 4% to 12% of formulated product per

volume of spray solution when spray oil is NOT used^{1 & 2}. When spray oil is used, label rates of these products range from 1% to 3% of formulated product per volume of spray solution.^{1 & 2}

- Mineral oils (dormant & summer) and fish oils may be combined with lime sulfur solutions and used as spray adjuvants to increase thinning effectiveness. Label rates for oil range from 0.5% to 2% depending on the type of oil used.^{1 & 2}

When & How Frequently Should Blossom Thinners be Applied?

- Determining when to apply the first blossom thinning spray and how frequently to reapply blossom thinning sprays are the most important decisions to make when using blossom thinning sprays to thin and manage the crop load.
- The first blossom thinning spray should be applied once a sufficient number of blossoms have been fertilized to set the desired crop load. In most instances, this generally coincides around 20% King blossom. Consequently, the first blossom thinning application should occur around this time.
- After the first blossom thinning spray, additional blossom thinning sprays will need to be re-applied approximately every 2-4 days, depending on temperature, to prevent the remaining blossoms from becoming fertilized and setting fruit. No more than three applications of lime sulfur solution can be applied for blossom thinning per year^{1 & 2}.
- It is important to note that blossom thinning sprays applied early in the blossom period will result in less fruit set and smaller crop loads. Likewise, sprays applied later in the blossom period will result in greater fruit set and larger crop loads.

What is the Pollen Tube Growth Model (PTGM)?

- The Pollen Tube Growth Model (PTGM) model, developed by researchers at Virginia Tech, is a useful tool for assisting in deciding when to first apply and re-apply blossom thinner sprays.
- The model collects weather data and uses style length (mm) to predict the time a pollen tube would take to reach an ovule and achieve fertilization.
- Based on inputs provided by weather stations and users (e.g. cultivar, style length and the model start time), the model provides the day/time for the first thinning application and subsequent thinning sprays if required.
- The cultivar-specific model has been generated and tested for seven apple varieties, including Red Delicious, Golden Delicious, Cripps Pink, Honeycrisp, Fuji, Gala and Granny Smith.
- For the 2019 season, the model will be available on the NEWA webpage (<http://newa.cornell.edu/>) which is sponsored and managed by Cornell University.

What is Currently Being Researched?

- Researchers at Virginia Tech are working to evaluate additional chemicals which can be used as blossom thinners and application strategies to optimize application timing & frequency.

References

¹ Label. Rex Lime Sulfur Solution. Or-Cal[®] Inc. 2018.

² Label. NovaSource Lime-Sulfur Solution. Tessengerlo Kerley Inc. 2018.