

# Tree Fruit

**Tuesday morning 9:00 am**

**Where:** Ballroom D

**MI Recertification credits:** 2 (1C, COMM CORE, PRIV CORE)

**OH Recertification credits:** 1 (presentations as marked)

**CCA Credits:** PM(1.0) CM(1.0)

**Moderator:** David Smeltzer, MSHS Board, Bear Lake, MI

- 9:00 am      Applying New Technologies to Develop Innovative, High-Density Pear Orchards for Fresh Markets
- Todd Einhorn, Horticulture Dept., MSU
- 9:30 am      Models and Materials to Make Bloom Thinning More Reliable in the Eastern US
- Greg Peck, Sustainable Fruit Production, Cornell Univ.
- 10:00 am     Invasive Species Trends and Outlook for 2017 (OH: 2B, 0.5 hr)
- Larry Gut, Entomology Dept., MSU
- 10:30 am     Crop-Adapted Spraying -- Doing More with Less (OH: CORE, 0.5 hr)
- Jason Deveau, Application Technology Specialist, OMAFRA, Ontario, Canada
- 11:00 am     Session Ends

# Models and Materials to Make Bloom Thinning More Reliable in the Eastern US

Greg Peck

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Well-managed apple trees can produce up to ten times more blossoms than are necessary to produce a full crop of marketable fruit. To minimize tree damage from over-cropping, improve fruit size, and ensure that trees produce an adequate number of fruiting buds for the following year, the flower and/or fruit load must be reduced or “thinned”. Crop thinning during bloom often maximizes these benefits by preventing fruits from ever setting. However, the recommended application timing for bloom thinning sprays has been somewhat subjective, usually based upon the percent of full bloom open (e.g., 20 and 80% full bloom), which has resulted in inconsistent results. To increase the reliability of bloom thinning, researchers at Virginia Tech have determined the apple pollen tube growth rates for several commercially important apple cultivars. These growth rates can be used to predict the ideal application timing of bloom thinning chemicals.

The model begins when the desired number of king bloom flowers are in full bloom (that is, when the petals no longer cover the reproductive organs thus allowing for cross pollination). The desired number of open king bloom flowers is equal to the desired crop load and can be determined by counting the number of open king bloom flowers per tree or by visually assessing the full bloom density in the orchard. Average style length is measured with a ruler or caliper and is used to calculate the length the pollen tubes need to travel to reach the ovule. Hourly temperatures recorded in or near the orchard are used with the cultivar-specific pollen tube growth rate equations to calculate cumulative pollen tube length. Chemical bloom thinning chemicals are applied when the pollen tube lengths are equivalent to average style length. The assumption is that fertilization has occurred at this point. The model is reset after the first bloom thinning application is made and additional bloom thinning applications occur before pollen tubes grow to the end of the style, thus preventing additional fertilization. Chemical thinning applications cease at the end of anthesis. Typically, two to three applications are necessary in commercial orchards.

Growers in arid climates, such as Washington State, have successfully used this model in their orchards for several years. However, because of concerns that spring frosts may damage blossoms and result in too few apples to harvest, it has only been in the last couple years that growers in more humid climates, such as those in the mid-Atlantic, have shown an interest in bloom thinning. Over the last several years, we have shown that flower thinning is both a reliable and desirable technique for apple producers in Virginia and we are starting to test the model in New York.

Additionally, the conventional practice of fruitlet thinning uses chemicals that are not allowed in certified organic production. Our research has shown that combinations of several organically approved materials used for bloom thinning, namely liquid lime sulfur, JMS Stylet-Oil, and Regalia (a knotweed extract) can provide early season disease control of apple scab (*Venturia inaequalis*), cedar-apple rust (*Gymnosporangium juniperi-virginianae*), quince rust (*Gymnosporangium clavipes*), and powdery mildew (*Podosphaera leucotricha*). Among the many fungal diseases that need to be managed in Virginia, these are among the most formidable barriers to organic apple producers.

Using precision apple flower thinning, apple growers will be able to increase their production and be more competitive in the regional, national, and international marketplaces. I will discuss studies that use the pollen tube growth model to evaluate potential bloom thinning products, the disease control potential of flower thinning materials, and flower thinning in the Eastern US.

# Crop-Adapted Spraying - Doing More with Less

Dr. Jason Deveau  
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Crop-adapted spraying (CAS) is a method for apple orchardists to match their airblast spray application to the size, shape and density of their orchard block(s). When achieved with sufficient accuracy, pesticide efficacy is maintained and waste is greatly reduced.

Based on international models for dose adjustment, and intended to be simple and intuitive, the CAS method was tested in three Ontario orchards for three years, and independently in a Nova Scotia orchard for two. Once complete, the model proposes an airblast nozzling solution that dictates spray volume per hectare (or acre). The operator must still conduct a few qualitative tests to ensure the air settings, travel speed and resultant spray coverage are appropriate for the weather conditions.

The results of our work indicate that a sprayer calibrated using the CAS method provides the same control as one calibrated using conventional methods, but CAS can save an average 20% of the season's spray. The pesticide savings is an appealing benefit, but the primary objective of CAS is to account for variability in orchard blocks and achieve consistent coverage throughout an orchard operation.

The theory, assumptions, results of testing, and the method itself can be found here:  
<http://sprayers101.com/cas/>

The method is also accessible through a new smartphone app called OrchardMAX, freely available for Apple and Android systems. OrchardMAX can be downloaded here: <http://sprayers101.com/orchardmax/>