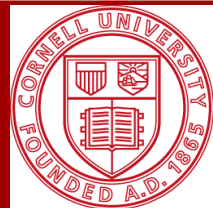




# FRUIT NOTES

## Lake Ontario Fruit Program



Volume 14 Issue 13

May 21, 2014

### Mark Your Calendars for the Petal Fall Thinning Meetings

Thursday, May 29<sup>th</sup>

9 AM Knapp Orchards  
5180 South St.  
Sodus, NY 14551

2:30 PM – Kast Farms  
Zig-Zag Rd.  
Albion, NY 14411

Follow the Cornell Fruit Event signs!

Come and hear updates on insect and disease status. Did we have good pollination conditions, good fruit set conditions, and how aggressively should we thin this year? Terence Robinson and Mario will have updated results from the carbohydrate model, and we will have some information on crop situation around the country. Cornell faculty and the LOF team members will be there to answer questions.

### Last Call to Join the Precision Thinning Group Effort in Western NY in 2014

Terence Robinson, Mario Miranda Sazo, Craig Kahlke, and Liz Tee

Several growers tagged trees and counted flower clusters for Honeycrisp, Gala, and Fuji this past weekend and early this week. Gala king fruitlets measured 3.2 to 3.6 mm in diameter in inland sites and 2.65 to 2.85mm in diameter in lake sites on Monday May 19. There were several Spanish-speaking employees who learned how to measure fruit with an electronic caliper in Orleans and Wayne Counties. We have several grower cooperators who will monitor 1, 2, 3, 4, and even 6 sites for precision thinning of Honeycrisp, Gala, and Fuji (blocks of different ages, soil fertility, and vigor). Please give me a call or email me (315-719-1318, [mrm67@cornell.edu](mailto:mrm67@cornell.edu)) if you would like to train one or two of your farm employees to conduct fruit measurements this year. Do not forget to send your target fruit number and flower cluster counts to Terence Robinson ([tlr1@cornell.edu](mailto:tlr1@cornell.edu)) this week. We will be emailing the 2014 excel spreadsheet for data collection to all cooperators by the end of this week.

The following **Precision Thinning Protocol** is a more refined version prepared by Dr. Robinson early this week:

(1) Select a mature orchard of Gala, Honeycrisp or Fuji.



Cornell University  
Cooperative Extension

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Monroe, and Oswego Counties  
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### *Building Strong and Vibrant New York Communities*

Diversity and Inclusion are a part of Cornell University's heritage. We are a recognized employer and educator valuing AA/EEO, Protected Veterans, and Individuals with Disabilities.

Every effort has been made to provide correct, complete, and up-to-date pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly, and human errors are still possible. These recommendations are not a substitute for pesticide labeling. Please read the label before applying any pesticide.

(2) Count flowering clusters on 5 representative trees at pink or bloom (include in the count lateral bloom) for Gala.  
 (3) Calculate target fruit number per tree based on a high yield for the variety and block.  
 (4) Tag 15 spurs per tree on each of 5 representative trees (75 total spurs) at pink or full bloom.  
 (5) Apply the protocol of thinning sprays as shown below.  
 (6) Use the carbohydrate model to adjust rates up or down based on model recommendations as indicated immediately before applying each spray.

(7) After the petal fall spray but before the first fruit diameter measurement, label each apple in each cluster with a number (1-5) so the fruitlets can be measured in the same order each time.  
 (8) Measure fruit diameters of each fruitlet on the 75 spurs 3 and 8 days after petal fall spray, 3 and 8 days after 12mm spray and 3 and 8 days after 18 mm spray).  
 (9) Send the data within 24 hours after each 8-day measurement to Terence Robinson.  
 (10) Get back an assessment within 24 hours of thinning progress before next spray.

Variety	80-100% Full Bloom	Petal Fall 5-6mm (1 week after full bloom)	10-13mm (2-3 weeks after full bloom)	16-18mm timing (if needed directed only to the top of tree)
Gala	4 oz NAA	3 oz NAA + 1 pt Sevin	48 oz 6-BA + 1 pt Sevin	48 oz 6-BA + 1 pt Sevin + oil 1 pt/100 gal v/v
Honeycrisp	4 oz NAA	4 oz NAA + 1 pt Sevin	3 oz NAA + 2 pt Sevin	1 pt Sevin + oil 1 pt/100 gal v/v
Fuji	4 oz NAA	48 oz 6-BA + 1 pt Sevin	48 oz 6-BA + 1 pt Sevin	48 oz 6-BA + 1 pt Sevin + oil 1 pt/100 gal v/v

Rates are per 100 gal based on full dilute TRV application. Rate per acre = amt/100 gal x 100s of gallons per acre TRV.

Please note that the use of Maxcel is not labelled for bloom chemical thinning in New York State this year.

## The Nibble Approach to Chemical Thinning

Philip Schwallier, Michigan State University

The concept of “Nibble Thinning” is to thin a little of the crop at every opportunity until the cropload has been reduced to the desired target level. This means to thin **starting early** and **planning multiple applications**. Start thinning early at full bloom, then at petal fall, the again at 6mm and 10mm and more if needed. Nibble the crop down to the perfect cropload. Often, we let the early thinning windows pass by because we are unsure of bud health or fruit set. A frost event or some other early trauma makes us want to wait and see what fruitset will be before thinning. But

apple trees are resilient; they will set crops almost every year even when conditions look bleak. As time goes on, more information of frost injury, bee activity, pollination, fertilization becomes known and this allows a better judgment of fruitset and thinning needs. However, delaying first thinning action until late in the thinning window may allow only one chance to thin and then results may be unsatisfactory. Start early when over-thinning risk is low.

Initial flower load is the best early indicator of cropload. The initial flower numbers on a tree

follows with corresponding number of fruit on the tree following fruitset. Heavy bloom, “Snowball”, or “White” bloom will set heavy crops. Get started with early thinning during “Snowball” years. The natural background

sensitivity to thinning predicts typical success in thinning. The sensitivity is low at petal fall and greatest at 10mm and then quickly becomes insensitive as 25mm stage is approached.

## **Thinning Apples with More Confidence by Incorporating the Use of the Fruit Growth Rate Model**

Richard Lehnert, Good Fruit Grower (modified by Mario Miranda Sazo)

Over the last few years, apple growers have gained confidence that they can chemically thin their apples and achieve pretty good results. The gains have come through increased understanding of tree fruit physiology—how trees shed excess fruit and why. There have been few breakthroughs in new chemistry (although some are on the horizon). The plant growth regulators now used to thin apples were discovered more than 40 years ago, and the newest, BA (benzyladenine), was introduced as a thinner in the 1990s.

There have been several key players in developing an understanding of how to - effectively use thinners. One is Dr. Duane Greene at the University of Massachusetts. Greene was one of a half-dozen tree fruit physiologists who spoke during the Cornell University In-Depth Fruit School early this spring. The school’s intent was to recognize the contributions of those who have devoted their careers to discovering why fruit trees act the way they do. Greene’s “fruitlet growth rate model” involves accurately measuring the growth of selected fruit. Greene found that apples growing at half the rate, or less, of fruit that persist to harvest will fall off, and that the growth rate of apples that will fall off begins to slow down as soon as three or four days after a thinner has been applied. He measures the diameter of selected fruits three or four days after thinners are applied, and again three or four days later.

Greene collaborated with other researchers, Drs. Terence Robinson and Alan Lakso at Cornell University and Phil Schwallier at Michigan State University, in developing the fruitlet model. They were working together to develop a carbohydrate model for predicting when apples could be thinned most effectively. That model shows that when apple trees are stressed by weather conditions that result in the tree producing less carbohydrate than growing fruit demands, some of that fruit will fall off the tree. Adding more stress, like a chemical thinner, increases thinning. Weather monitoring allows prediction of periods when fruit is most susceptible to thinning, so that timing and rate of chemical application can be determined.

**Thinning windows:** As Greene explained during the fruit school, growers have several “windows” during which to thin apples. The **first opportunity is during bloom**, when caustic materials like lime sulfur and fish oil will damage flowers, reduce pollination, and lower fruit set.

The **second is from petal fall to when fruits are 6 millimeters (mm) in diameter**. Then comes the “**ideal**” window when fruits are **7 to 15 mm in size**. A **fourth window** is when fruits are **18 to 25 mm** (called rescue treatment). When fruits are larger than 25 mm, thinning is very difficult. Hand thinning, and the labor bill that goes with it, are the

final determiners of how effective chemical thinning was.

**Carbohydrate demand:** Chemical thinning can be done during about 28 days after petal fall, during which time fruits grow to about 25 mm in diameter, or just under one inch. When fruit is small, from petal fall to 6 mm, some thinning is possible, he said. But since the fruit is small and growth is relatively slow, carbohydrate demand is not great. Fruit is more difficult to thin unless fruit is stressed. Sevin (carbaryl) and NAA (naphthaleneacetic acid) are thinners of choice.

Trees might become extremely stressed if temperatures are high, increasing carbohydrate demand, but light conditions are poor, resulting in lower photosynthesis. Excessive thinning can occur when nights are warm and days are cloudy. The carbohydrate model monitors these conditions and rates the potential for carbohydrate deficiency. "Chemical thinning is most successful when fruits are from 7 to 14 mm," Greene said. "Fruit growth is proceeding rapidly. At high temperatures and/or low light levels, excessive thinning is possible." Growers may need to lower chemical rates to prevent overthinning. Chemicals used at this time include NAA, carbaryl, and BA, usually in combination. Thinning effects are additive, he said.

Greene said of the 18 to 25 mm size, "This is the period when it is very difficult to thin, even when there is a carbohydrate deficit. We have very few thinners that work well and consistently at this fruit size." Fruit is physiologically different at this size, he said. Starch accumulation is going up, and ethylene production is going down. Because it is so hard to thin at this fruit size, Greene has concentrated his attention there, hoping to give growers a workable alternative to hand thinning.

Greene's experiments showed that larger fruits are harder to thin because they have more carbohydrate reserves and are less vulnerable to stresses and because the seeds in the apples produce auxins that prevent abscission. So, he believes, fruit thinning may be possible if auxin movement from the seeds to the stem, where abscission occurs, can be restricted. Alternatively, ethylene increases auxin destruction. Ethephon has been used as a rescue thinner, mixed with carbaryl, because it will knock larger apples off trees, but it carries some risk and uncertainty, he said.

**Fruit growth model:** Greene is best known for his work on the fruit growth model. "To thin effectively, more than one thinner application is generally required," he said. "We have had no way to tell if or how well thinners worked until after the thinning window of opportunity has passed. This model was developed to serve as a tool to assess the effects of previous thinners, usually within seven days of application."

The fruitlet model is based on **two observations**, he said. (1) "The first observation is that fruit that persist will start to grow rapidly a few days after fertilization, and their growth will continue somewhat regularly and without interruption throughout the season." (2) The second observation is that fruit destined to fall off would grow slower well in advance of the time they actually fall off.

"Under most circumstances, measuring the reduction in fruit growth between four and seven days after thinner application has **proved sufficient to determine if a fruit will continue to grow or to abscise**. All fruit that slow to a growth rate of 50 percent or less of the growth rate of the fruit that persist to harvest will ultimately stop growth and abscise."

The following steps briefly summarize the measuring procedure developed by Greene: (1) Select 10 to 20 spurs per tree on 5 to 10 trees (50 to 80 spurs). Mark and identify individual fruits on each tagged spur. Greene uses a permanent marker to write a number on each fruitlet, (2) Using a caliper (digital readout is handy), measure each fruitlet starting no earlier than when it reaches 6 to 7

millimeters diameter and record each fruit's size, (3) After thinner application, measure fruit. As few as two measurements may be enough—one starting four days after application and another three to four days later, (4) Predict which fruitlets will drop off—those failing to grow at least half as fast as the fastest growing.

## **The Promise of Petal Fall**

Art Agnello

Although our brief stretch of warm spring weather was abruptly interrupted by the cool rainy cell moving through our area last week, the temperatures will rebound in a couple of days, and the "old faithful" insect pests we always look out for at petal fall will continue their progress towards the newly formed fruits, so this overview will help take your mind off the current chill in the air and make preparations for when things heat up again.

### **Plum Curculio**

Adults move into orchards from overwintering sites in hedgerows or the edges of woods and adults are active when temperatures exceed 60°F, something that will recur this week. Adult females oviposit in fruit during both day and night but feed mostly at night. Depending on temperature, overwintering adults remain active for 2–6 weeks after petal fall. Because adults are not highly mobile, orchards near overwintering sites, woodlands, and hedgerows are most susceptible to attack. Fruit damage is usually most common in border rows next to sites where adults overwinter. Although initial post-bloom sprays for plum curculio control should begin at petal fall, growers are often unsure how many additional sprays will be necessary to maintain protective chemical residues to prevent subsequent damage

throughout the PC oviposition cycle, which varies according to temperatures and weather patterns after petal fall.

Following from the fact that PC activity and oviposition are largely determined by temperature, we use an oviposition model to determine when control sprays after petal fall are no longer necessary to protect fruit from PC damage. This model is based on the assumption that residues from sprays applied after petal fall need to be maintained on fruit and foliage only until PC adults stop immigrating into orchards, which corresponds to the time when about 40% of the oviposition cycle is complete. This is predicted by the model to occur at 308 DD (base 50°F) after petal fall of McIntosh. Most probably, this strategy works because, after 40% of PC oviposition is complete, adults usually do not move into the orchard from outside sources, or within orchards from tree to tree. Therefore, by this time, adults residing in treated trees have already been killed by insecticide residues and are unable to complete the remainder of their normal oviposition cycle.

In order to use this strategy: (1) Treat the entire orchard at petal fall with a broad spectrum insecticide. (2) Start calculating the accumulation of DD after petal fall of Macs

(base 50°F); this is easily done from the NEWA Apple Insect Models page (<http://newa.cornell.edu/index.php?page=apple-insects>) by entering the petal fall date for your area. (3) No additional sprays are necessary whenever the date of accumulation of 308 DD falls within 10–14 days after a previous spray. We'll attempt to give local updates for the major fruit areas as the post-PF period progresses. In cherries and other stone fruits that are already at shuck fall, sprays should start (or should have started, as appropriate) at the first opportunity. Recall that, in addition to the industry standard broad-spectrum materials, some additional options may be considered: Lorsban 75WG can still be used at petal fall in tart cherries, but obviously is no longer labeled for this use in apples; also, Calypso, Avaunt and Actara are effective for plum curculio in apples and pears, and Avaunt is also labeled in stone fruit as another PC option. Delegate and Altacor both have some activity on this pest, but should not be considered as the first choices in high-pressure blocks.

### **European Apple Sawfly**

This primitive bee and wasp relative shows a preference for early or long-blooming varieties with a heavy set of fruit. This insect is generally a pest mainly in eastern N.Y., although it has been gradually making its presence known in the more western sites, recently progressing as far as Wayne Co. (or beyond). The adult sawfly emerges about the time apple trees come into bloom and lays eggs in the apple blossoms. Young larvae begin feeding just below the skin of the fruits, creating a spiral path usually around the calyx end. This early larval feeding will persist as a scar that is very visible at harvest. Following this feeding, the larva usually begins tunneling toward the seed cavity of the fruit or an adjacent fruit, which usually causes it to abort. As the larva feeds internally, it

enlarges its exit hole, which is made highly conspicuous by a mass of wet, reddish-brown frass. The frass may drip onto adjacent fruits and leaves, giving them an unsightly appearance. The secondary feeding activity of a single sawfly larva can injure all the fruit in a cluster, causing stress on that fruit to abort during the traditional "June drop" period.

Certain insecticides that control this pest also adversely affect bees, which can pose a problem at petal fall because certain apple varieties lose their petals before others. In blocks of trees where petal fall has occurred on one variety but not the others, the variety that has lost its petals is likely to sustain some curculio or sawfly injury until an insecticide is applied. Some newer insecticides with activity against both plum curculio and sawfly -- Calypso, Avaunt and Actara -- may have a slight advantage over conventional OPs in this case. Assail represents another option for controlling sawfly; it's not very active against plum curculio, but will do a good job against rosy apple aphid and spotted tentiform leafminer, as well as sawfly, at this timing. To minimize the hazard to honey bees, apply any pesticide only when no bees are actively foraging on blooming weeds (evening is better than early morning).

### **Obliquebanded Leafroller**

Larvae overwintering as 1st or 2nd stage caterpillars may have had the ability to grow to a noticeable size, although we haven't actually seen any up to this point, so most are likely still relatively small. While you're assessing bud viability, it would be prudent to have a quick look for later-stage larvae in problem blocks to determine whether a treatment against the overwintered brood should be included in your petal fall plans. Scout the blossom clusters or foliar terminals for larvae feeding within both the flowers and rolled leaves; a 3% infestation rate could

justify an application to minimize overwintered fruit damage and help reduce summer populations.

Among the selective insecticides available, Intrepid has been successful at this timing, and B.t. products, which can be used while blossoms are still present, include Dipel, Deliver, Agree, Biobit and Javelin. More recently, Proclaim has been shown to be very effective at the petal fall timing, and also provides activity against early season mite populations. Delegate, Altacor, and Belt all offer very good efficacy against not only OBLR, but also the internal leps. Pyrethroids such as Asana, Baythroid, Danitol, Warrior, Proaxis or Leverage may also be effective, depending on past use history, but be aware of their broad-spectrum effects, which can work both for and against you, according to your approach to conserving beneficial mites and insects.

### **Oriental Fruit Moth**

Biofix is spread out across NY again this year, ranging from April 28 in the Hudson Valley to May 8-9 in Geneva and Wayne Co., and other sites yet to record any moth captures; moderate temperatures forecast for this week will likely continue the indistinct pattern of emergence in most sites. Use the NEWA Apple Insect Models page to chart current degree day (base 45°F) progress towards the recommended totals of 170 (in peaches) and 350 (in apples) as the timing at which to apply a protective spray. To maximize the efficacy of 1st brood control, peach growers should use one of the suggested options from the Recommends starting at petal fall, backed up 10–14 days later. In apples, in addition to Delegate, Altacor, and Belt, a number of the petal fall selection of insecticides will do an acceptable job of controlling this generation, including

the OPs, pyrethroids, Intrepid, Assail, Avaunt, and Calypso.

**Codling moth:** Trap networks are still not catching moths, but stay tuned.

### **Chem News:**

#### Asana XL 2(ee) Registration

The New York State Department of Environmental Conservation has approved a 2(ee) recommendation for the use of DuPont Asana XL Insecticide (EPA Reg. No. 352-515) on apple, pear, and stone fruits against the unlabeled pest spotted wing drosophila. A copy of the approved 2(ee) has been posted to the PMEP website at: [http://pmep.cce.cornell.edu/regulation/2ee/unlabeled\\_pest/index.html](http://pmep.cce.cornell.edu/regulation/2ee/unlabeled_pest/index.html) under apple, pear, and stone fruits, and is also available on PIMS at: [http://pmep.cce.cornell.edu/profiles/insect-mite/ddt-famphur/esfenvalerate/asana\\_2ee\\_0414.pdf](http://pmep.cce.cornell.edu/profiles/insect-mite/ddt-famphur/esfenvalerate/asana_2ee_0414.pdf) Users must have a copy of the 2(ee) and the primary product label in their possession at the time of application.

#### Madex HP Labeled In NYS

The New York State Department of Environmental Conservation has approved the labeling of Madex HP (EPA Reg. No. 69553-1) from Certis USA, for use in controlling codling moth and oriental fruit moth in NYS pome and stone fruit crops. The active ingredient, *Cydia pomonella* granulosus virus isolate V22, has activity against both of these tortricid pest species, is OMRI approved for use in organic production, and is harmless to natural enemies and other non-target organisms. Application should target the 5% egg hatch point of each generation of OFM and CM, and can be applied on a 7-day interval. It has a 4-hr REI and no PHI.

**Lake Ontario Fruit Program  
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**Contents:**

- Mark Your Calendars for the Petal Fall Thinning Meetings
- Last Call to Join the Precision Thinning Group Effort in Western NY in 2014
- The Nibble Approach to Chemical Thinning
- Thinning Apples with More Confidence by Incorporating the Use of the Fruit Growth Rate Model
- The Promise of Petal Fall
- Next Future Fruit Growers Meeting is May 28<sup>th</sup>
- Save The Dates

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## **Next Future Fruit Growers Meeting is May 28**

The meeting will be May 28<sup>th</sup> (Wednesday) starting at 5:30. DeFisher Farm and Distillery will be our hosts. We will be given a farm and Distillery tour and a talk about on farm value-added products. The meeting spot is at 3274 Eddy Rd. in Williamson.

## **Save The Dates**

**May 29<sup>th</sup> - Petal Fall Thinning Meetings**, 9 AM Knapp Farms, Sodus, 2:30 PM Kast Farms Albion – see page 1 for more info.

**June 23-24** - Premier Apple Forum, Syracuse, NY.  
See flyer in issue 9.

**July 24** - LOF Summer Fruit Tour, Niagara & Orleans counties-  
stay tuned here for details.

