



Healthy Fruit, Vol. 28, No. 10, May 26, 2020

Prepared by the University of Massachusetts Amherst Extension Fruit Team

Contents

[Current degree day accumulations](#)

[Current bud stages](#)

[Upcoming pest events](#)

[Upcoming meetings](#)

[The way I see it](#)

[Insects](#)

[Diseases](#)

[Horticulture](#)

[Small Fruit Update](#)

[Guest article](#)

[Facebook Me](#)

[Useful links](#)



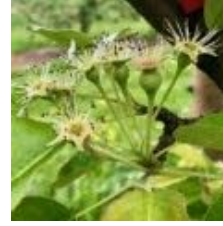
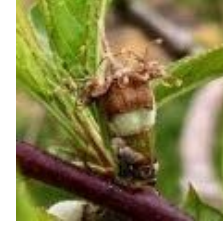

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Current degree day accumulations

UMass Cold Spring Orchard, Belchertown, MA (Since January 1)	25-May
Base 43 BE (NEWA, since January 1)	528
Base 50 BE (NEWA, since January 1)	245

Current bud stages

Current bud stages. 25-May, 2020, UMass Cold Spring Orchard, Belchertown, MA

				
McIntosh apple Petal fall-fruit set	Honeycrisp apple Late bloom-petal fall	Crispie pear Fruit set	Redhaven peach Early shuck split	Regina cherry Late bloom-petal fall

Note: this will be the last Current bud stages update for 2020.

More 2020 bud stages [here...](#)

Upcoming pest events

Adapted from [Scaffolds Fruit Journal](#)

Coming events	Degree days (Base 43 BE)
Codling moth 1st flight peak	562-980
Lesser appleworm 1st catch	276-564
Lesser appleworm 1st flight peak	364-775
Lesser peachtree borer 1st catch	476-666
Pear psylla hardshells present	493-643
Plum curculio oviposition scars presents	485-589
San Jose scale 1st adult catch	443-623
San Jose scale 1st flight peak	560-736

Spotted tentiform LM sapfeeding mines present	343-601
White apple leafhopper nymphs on apple	302-560
McIntosh fruit set	507-593

Upcoming meetings

May 28th, 12:00 - 1:00 pm. WEBINAR - Invasive Insect Series: Overview of Spotted Wing Drosophila Monitoring and Management Options

Speaker: Dr. Jaime Piñero, UMass Stockbridge School of Agriculture and Extension Fruit Program.

Preregistration is required to access the webinar. [Register here.](#) *After registering, you will receive a confirmation email containing information about joining the webinar.*

Credits available for this webinar: 1 Pesticide contact hour for categories 26, 27, 29, 35, 36 and Applicators (core) license; 0.5 MCA, 0.5 MCLP, 1 ISA, and 1 SAF.

UMass Fruit Team Twilight Meeting (via Zoom). Thursday, June 4, 2020. 5:30 PM. One pesticide recertification credit. [Register here.](#)

The way I see it...

Jon Clements

Uncertainty abounds in the last week or so. (But there should be no Abound in your apple orchard!) Although the dry weather does not favor apple scab, fire blight has been and continues to be an issue with orchards still in bloom (although rapidly waning), the heat, and on-and-off wetting (including dew and spraying). I expect streptomycin sales have been brisk. I am noticing more and more powdery mildew at the UMass Orchard, presumably from overwintering inoculum, hopefully spread is under control with the use of effective fungicides (almost anything but Captan mancozeb, and Ziram, see <https://netreefruit.org/apples/spray-table/apple-fungicide-efficacy>)

Apple fruitlets are in the 6 to 7 millimeter size range. Fruitlets will grow nearly one millimeter per day with some heat. Hopefully most of you have applied a petal fall thinning spray, you should expect good activity with that spray. The upcoming heat and carbohydrate deficit are almost going to act like you had put another thinning spray on. Best to wait now until the heat passes and CHO deficit diminishes before assessing which fruits are growing and which are falling off. A reminder to check the Apple CHO Thinning v2019 model on NEWA (<http://newa.cornell.edu/index.php?page=apple-thin-new>) before deciding when to thin and with what rate. (Make sure you use Apple CHO Thinning v2019, not the older Apple Carbohydrate Thinning.) Today, 26-May for example, it says to “Decrease Chemical Thinning Rate by 50%.”

How do you know what fruits are growing and which are not? Easy. Begin measuring them after the petal fall spray. Easier said than done, trust me. BUT, it’s really the only way to quickly know if your petal fall and subsequent chemical thinning applications are working and if you need to apply another thinning spray. How do you do it? Well, a new cookbook approach has been developed for using the fruitlet growth rate model pioneered by our own Dr. Duane Greene. But the new directions and calculation spreadsheet are a modification by Ferri Orchard (Tom and Joe Ferri) up in Ontario, and a nice set of directions for using it has been penned by Phil Schwallier (with help from Amy-Irish Brown and yours truly.) So, you can do it. You have to follow directions and be diligent. Directions and the spreadsheet can be found here: <http://fruitadvisor.info/ferri/> Feel free to drop me any questions, I am using it on three varieties at the UMass Orchard this spring along with the [Malusim app](#). Will keep me busy for a while...

Insects

Jaime Piñero

Weekly report of insect pest captures in monitoring traps at CSO (Belchertown, MA)

Period: 5.19 - 5.25

While plum curculio activity has increased substantially for the last 7 days, no fruit injury has been recorded (except for 1 egg-laying scar found out of 250 fruit sampled at one orchard).

Today (5.26) is a critical day for the application of insecticides against PC, as fruit has reached the size at which it becomes susceptible (5-6 mm in diameter) and warm weather will stimulate PC egg-laying activity.

Insect	Average captures/trap	Notes
RBLR	5	Pheromone-baited trap

OFM	18	Pheromone-baited trap
CM	0	Pheromone-baited trap
Spotted tentiform leafminer	17	Pheromone-baited trap
Tarnished plant bug	0.00	Unbaited white sticky cards
European apple sawfly	0.0	Unbaited white sticky cards
Plum curculio	2.2	Odor-baited black pyramid traps

Spotted wing Drosophila update

In 2019, the first SWD of the season was found on May 17th at the UMass Cold Spring Orchard in a monitoring trap baited with diluted grape juice.

For the past three weeks, we have been monitoring SWD in four locations in Western MA. Each location has four monitoring traps. Three of the traps are baited with commercial lures whereas the fourth trap is baited with grape juice at a 1:3 ratio (50 ml of grape juice in 150 ml of water).

No SWD have been found so far. More information will be provided next week.

Here is an article published recently in Good Fruit Grower. It discusses previous work with SWD and mass trapping of Japanese beetles, and future research goals:

<https://www.goodfruit.com/mass-traps-making-fatal-attractions>.

Diseases

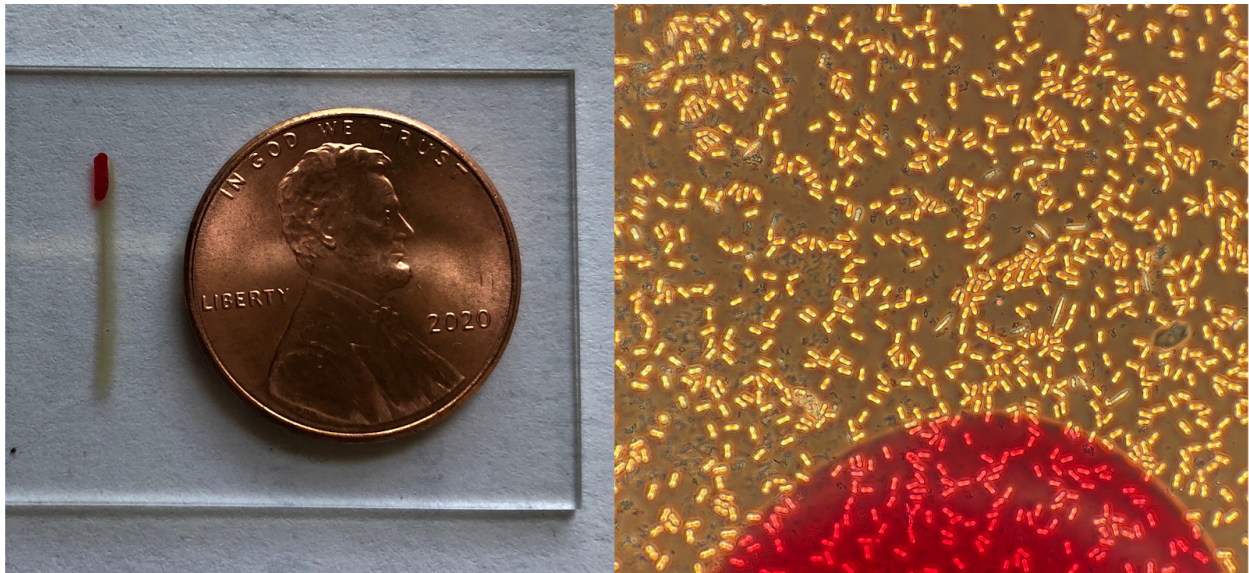
Liz Garofalo and Dan Cooley

Apple Scab Weekly Update - It's not over 'til it's over!

Date	Ascospore Observation Method and Spore Count		
	Petri Plate Assay	Funnel Trap	Total Count
3/31/20	0	0	0
4/7/2020	0	21	21
4/14/2020	1	0	1

4/20/20	162	117	279
4/28/20	95	44	139
5/5/20	89	1421	1510
5/12/20	259	5275	5534
5/18/20	205	Too many to count*	205*
5/26/20	162	1967	2129

Numbers are good to have for the purpose of week to week and season to season comparisons, but a photograph or two can tell a story in the moment. As you see below, there are still plenty spores around to do the dirty work they do!



Left: Slide from the ascospore funnel trap, yellow line shows the density of deposition of ascospores on the slides (visible to the naked eye, lots of spores!). Right, one microscope field at 200X magnification showing the distribution of spores on the slide.

Coming in at a total of 2,129 observed ascospores, I'd say we are still in the swing of apple scab things. Temperatures are ripe for infection and there is rain in the forecast for Thursday/Friday in Deerfield and Belchertown. **NEWA estimates the upcoming rain event will release "essentially" all viable ascospores. But RIMpro estimates the upcoming infection for Belchertown to be severe.** Given the numbers I am still seeing in the lab, I would estimate that there are more infections to come.

RIMpro forecasts the next infection to carry a RIM value of 1754. That's big. An infection with a RIM of 300 is considered to be "high" risk, and a RIM of 600 or more is considered "extreme" risk. Risk depends on the quantity of inoculum estimated to still be available. RIMpro's ascospore maturity model is more in line with what I am seeing in the lab.

Apple Scab Results for Belchertown-2

The Ascospore Maturity degree day model begins at 50% green tip on McIntosh flower buds. To recalculate ascospore maturity for your orchard, enter your green tip date:

Green Tip Date: 3/31/2020 [Click if greentip has not occurred](#)

Ascospore Maturity Summary

	Past	Past	Current	5-Day Forecast			Forecast Details	
Date	5/24	5/25	5/26	5/27	5/28	5/29	5/30	5/31
Ascospore Maturity	99%	99%	99%	100%	100%	100%	100%	100%
Daily Ascospore Discharge	0%	0%	0%	0%	0%	0%	0%	0%
Cumulative Ascospore Discharge	94%	94%	94%	94%	94%	94%	94%	94%

[Ascospore Maturity Graphs](#)

The Ascospore Maturity model predicts that 95% of the ascospores have matured. At this point, essentially all ascospores will be released after a daytime rain of greater than 1/10 inch with average temperature above 50°F.

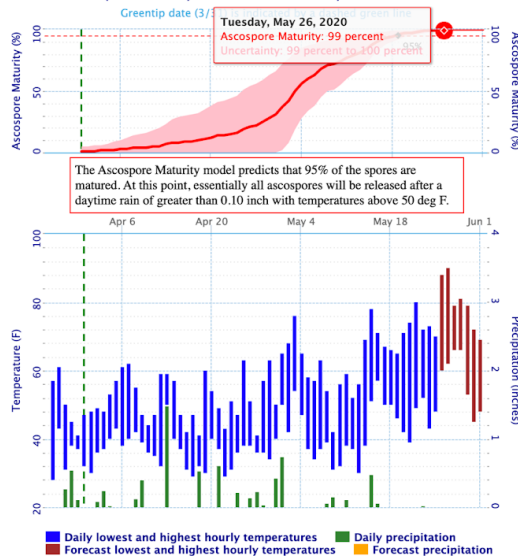
Infection Events Summary

	Past	Past	Current	5-Day Forecast			Forecast Details	
Date	5/24	5/25	5/26	5/27	5/28	5/29	5/30	5/31
Infection Events	No	No	No	No	No	No	No	No
Average Temp (F) for wet hours	-	-	79	65	68	69	63	61
Leaf Wetness (hours)	0	0	1	8	6	8	9	2
Hours ≥90% RH	0	9	11	6	4	6	8	0
Rain Amount	0.00	0.00	0.00	0.00	0.00	Night 57% Day 57%	Night 40% Day 18%	Night 9% Day 9%

Download Time: 5/26/2020 13:00

Infection events, shown in red above, are based on the [Revised Mills Table](#) and are calculated beginning with 0.01 inch of rain. The word "Combined" means the wetting event on this day is being combined with another wetting event using the following rule: two successive wetting periods, the first started by rain, should be considered a single, uninterrupted wet period if the intervening dry period is less than 24 hours. **When an infection event is in the 5-day forecast, the actual weather data logged may or may not translate into an actual infection event. Therefore, the table output may change once actual weather data are logged.**

Ascospore Maturity and Weather Summary for Belchertown-2

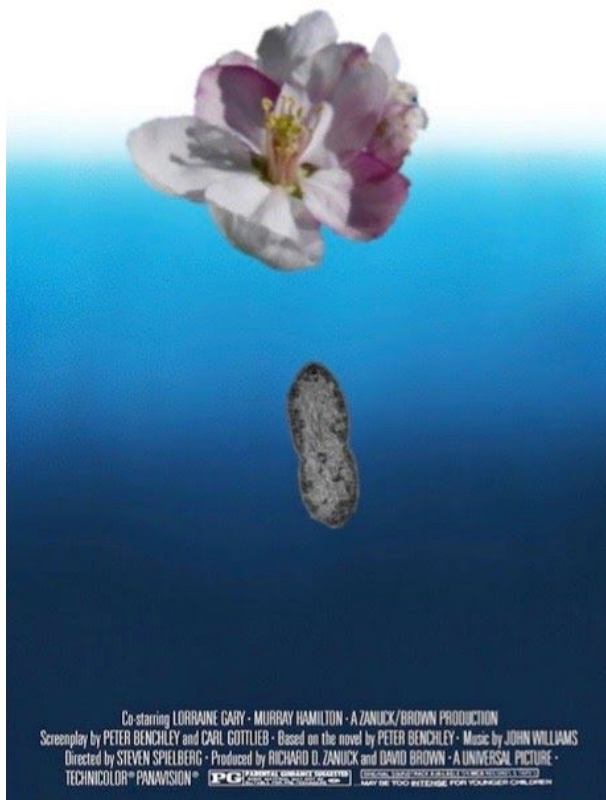


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Left: NEWA scab risk model for Belchertown estimates ascospore maturity to have reached 99% prior to 5/26/20. Currently, there is no infection event forecast for Belchertown. Right: NEWA's scab risk model ascospore maturity graph shows, with high statistical certainty, that 99% ascospore maturity has been reached and that "essentially" all ascospores will be released during the next rain event of one tenth of an inch or more. The bottom graph shows the weather that has been recorded and the forecast through June 1.

Bottom line, we are not out of the woods yet for primary apple scab season. Maintain coverage and when using systemic fungicides, and you should be using them now, remember to rotate FRACs, and combine with mancozeb or captan to avoid resistance development.

Fireblight Wasn't it just last week we were saying not much to worry about on the fireblight front? With rat tail bloom and late blooming varieties, fireblight risk is suddenly back on the table. Using RIMpro and pushing the final bloom date in Belchertown out to June 1 (the model requires open flowers be present to estimate risk), the fireblight model estimates an infection event will occur with the rain event forecast for 5/28-5/29.



A fireblight bacteria swims up from the deep to infect an apple blossom. What pathologist can resist a good fireblight Jaws joke?? Not me.

Horticulture

Thoughts on thinning post- Memorial Day

Duane Greene

Temperature for the next three days is forecast to be extremely warm and fruit are approaching the stage where they are quite vulnerable to chemical thinners. It is logical and prudent for all orchardists to approach this period of time with caution while keeping in mind that this period provides an opportunity to thin. The 2019 Carbohydrate Model for today suggests, if thinning, reduce the rate applied by 50%. Under most circumstances this is quite a deviation from what we normally do and the suggestion seems a bit too drastic. We feel that a more moderate approach should be considered. The stage of fruit development and the difficulty in thinning a variety should be factor considered in determining what you thin, how much you put in the tank and when you apply it. If fruit size is 7 mm. or less we would suggest making an application particularly on difficult to thin varieties. A slight reduction in rate may be appropriate. For

example, for NAA you may choose to apply 3 oz rather than 4 oz. On your most difficult to thin varieties, that have been difficult in the past you may want to apply close to the normal amounts. While this is an unsettling situation, if stress is insufficient thinning may be more difficult later. If you applied thinners recently, within the last 3 days, it probably would be appropriate to see the response before applying another.

Small Fruit Update

[Sonia Schloemann](#)

Crop Conditions: Field conditions have gone from relatively wet to relatively dry, depending on location. Some growers are irrigating, especially in new plantings. As mentioned last week, now is a good time to fertilize blueberries, raspberries and grapes. Hold off fertilizing June-bearing strawberries until renovation. New June bearers and day neutral strawberries can be fertilized with 2lbs actual N per week for a few weeks to help them establish well.

Strawberries: June-bearing fields are generally in bloom with many varieties blooming at once rather than spread out by a few days to a week as they normally would be. This will likely lead to a 'compressed' harvest season so growers should be prepared for that. Frost damage doesn't appear to be extensive in most areas. Even where king blossoms were lost, the later fruit will likely size up well and make up the difference. Scouting should continue for [Strawberry Bud Weevil](#), [Tarnished Plant Bug](#) and [Two-spotted Spider Mite](#). All are showing up in at least low numbers at this time. Bloom is the most important time to protect against [Botrytis Gray Mold](#) and [Leather Rot](#). [Bacterial Angular Leaf Spot](#) is showing up in some fields following the frequent wetting periods from frost protection. Avoid further wetting of the canopy if at all possible between now and harvest and consider hydrogen peroxide/peroxyacetic acid products or Double Nickel® rather than copper for a spray material during bloom (Copper may damage blossom tissue). Pull blossoms off newly planted June bearing varieties as well as day neutrals (for about 4 weeks on the DN varieties).

Raspberries: Summer bearing varieties continue to show good lateral growth with flower clusters expanding. Some early bloom may be present in early varieties. Blackberries on rotating trellis should be horizontal now to force flowers/fruit to be concentrated on one side of the trellis (East is best). This will facilitate picking and also keep fruit on the shade side of the row in the heat of the summer and avoid sunscald. New primocanes are about knee high. [Tarnished Plant Bug](#) are beginning to appear as well as [Two-Spotted Spider Mites](#) (especially in high tunnels). Bloom is the key period for [Botrytis Gray Mold](#) infection, so be prepared for cover sprays if wet weather is forecast, especially where gray mold was a problem last year (due to high overwintering inoculum potential). Also [Powdery Mildew](#) can be a serious problem for raspberries in high tunnels.

Blueberries: Blueberries are in full bloom. There may be some damage from cold weather 10-14 days ago but it doesn't appear to be significant. Pheromone traps for [Cranberry or Cherry Fruitworm](#) have not yielded captures yet. Check them twice a week if you can to establish the first sustained catch which will mark a biofix for predicting egg hatch and spray

applications. As with other fruit, the bloom period is key for managing fruit rot fungi like **Botrytis** and **Anthracnose**.

For management recommendations for any of these insect pests or diseases, refer to the [2020 New England Small Fruit Management Guide](#) for materials and rates.



Figure 1) Strawberry foliage nipped by frost (left); Strawberry blossom killed by frost (center); Healthy strawberry field (right). **Photos:** S. Schloemann, UMass Extension 5/25/20



Figure 2) 'Natchez' blackberry immediate prebloom (left); red raspberry prebloom (center); 'Polana' primocane raspberry new growth (right). **Photos:** S. Schloemann, UMass Extension 5/25/20



Figure 3) Highbush blueberry full bloom (left); Blueberry showing good fruit set despite carolla injury from frost or other unknown cause (center); 'Erntedanke' Lingonberry full bloom. **Photos:** S. Schloemann, UMass Extension 5/25/20

Hawkeye's corner (notes from the field)

Liz Garofalo

Our predator friends are out and shaking their thing! This spined soldier bug and her offspring will devour stink bugs and other orchard pests throughout the summer. To distinguish the adult form BMSB, take note of the sharply pointed shoulder area (circled). The eggs are also "spined" making them easily distinguishable from other egg masses. So, be sure to use insecticides that are less toxic to beneficial insects when at all possible. These natural predators are important allies in the fight against insect pests.



Guest article

Predicting fruit set model, 'Ferri' Version

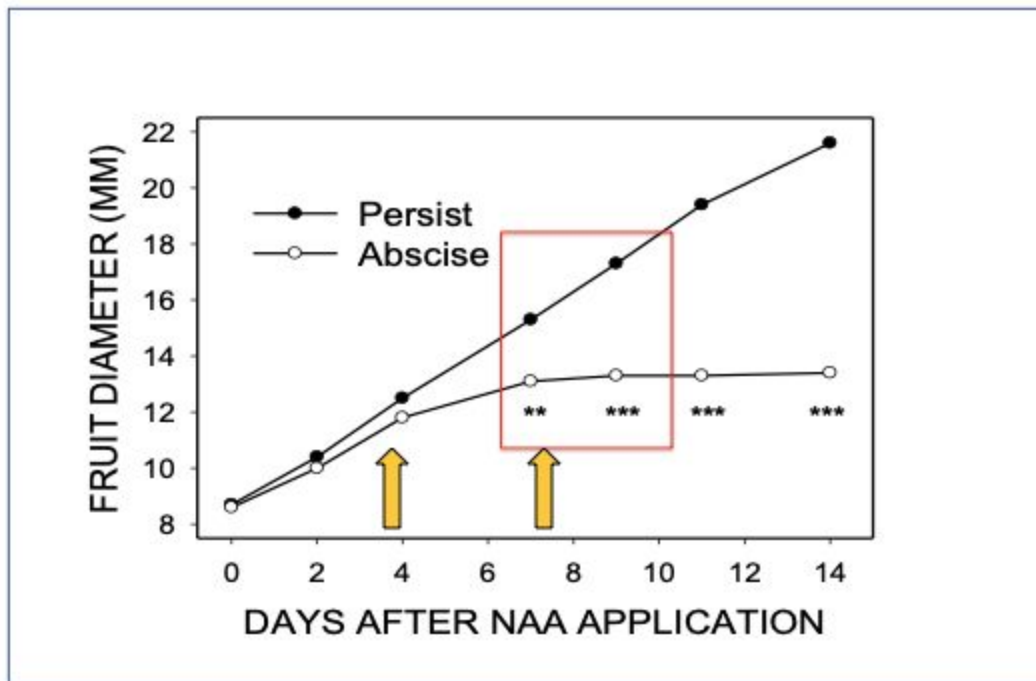
Philip Schwallier MSU, Amy Irish-Brown MSU, Jon Clements UMass

Ed. note: I have tried to excerpt from a longer set of instructions on why and how to use the fruitlet growth rate model to predict fruit. The full version of instructions, and spreadsheets to enter fruit measurements and run the model to predict fruit set can be downloaded here: <http://fruitadvisor.info/ferri/> JC

Chemical thinning is a very critical annual apple orchard practice, yet the most stressful and difficult practice to implement. Over time, new approaches to crop-load management have been developed. The most recent approach involves the use of a spreadsheet tool called Predicting

Fruitset. This model will allow growers to evaluate ongoing fruitset and/or help to assess the effectiveness of their chemical thinning applications. This model is based on the assumption that setting fruitlets grow faster than abscising fruitlets.

Abscising fruitlets will stop growing many days before they will drop. Abscising fruit slow down growth in three to four days and stop growth within four to six days following a thinning application. This slowing of growth is temperature dependent - warmer temperatures will hasten the stopping and cold temperatures will delay the stopping of growth. The growth rate difference between setting fruitlets (fast growing) and dropping fruitlets (slow growing) is all that is needed to predict fruitset. Two measurements usually will suffice to predict set. The first diameter measurement should be performed three days after the time of a thinning application or no earlier than the 6 mm stage. The second diameter measurement should be performed three to four days later. This will maximize the difference in growth rates. The slowing fruitlets will reveal themselves as abscising fruitlets. The model calculates the growth rates and predicts set.



The fruitlet growth rate model shows that fruits that are still growing will stay on the tree, while those where the growth rate flattens will fall off

This model starts you planning your thinning program early. It encourages a more precise approach to crop load management. It also gives you confidence to strategize, evaluate and achieve a successful thinning plan. The model will encourage appropriate actions based on the predictions. The predictions may require additional thinning applications to reduce cropload.

Predicting Fruitset Model

This model was developed by Dr. Duane Greene, of UMASS, et.al. and a Predicting Fruitset Excel spreadsheet was designed by Philip Schwallier, MSU, and is downloadable at <https://www.canr.msu.edu/apples/horticulture/>. Click on Horticulture and scroll down to thinning. The Ferri version of the model will also be downloadable at the same site, but for now it is here: <http://fruitadvisor.info/ferri/>.

Abscising fruitlets will normally start slowing their growth rate four or five days after a thinner application. Abscising, slow growing fruitlets stop growing all together at day seven. The abscising fruitlets appear normal until a few days later (day 9 or 10) when they start turning an off color (dark green or yellow). This is the first visible evidence that fruitlets are going to abscise. Dropping fruitlets will have sepals that fold outward and setting fruitlets will have sepals that fold closed inward over the calyx. Seeds will sometimes turn an off color, but all these visible symptoms are inconsistent and can be misleading. The Predicting Fruitset Model will predict fruitset based on the diameter growth disparity of fruitlets. It is quite accurate and provides a decision point for thinning before you can visually determine fruit set.

Fruitlet Growth Model Ferri Version 2020

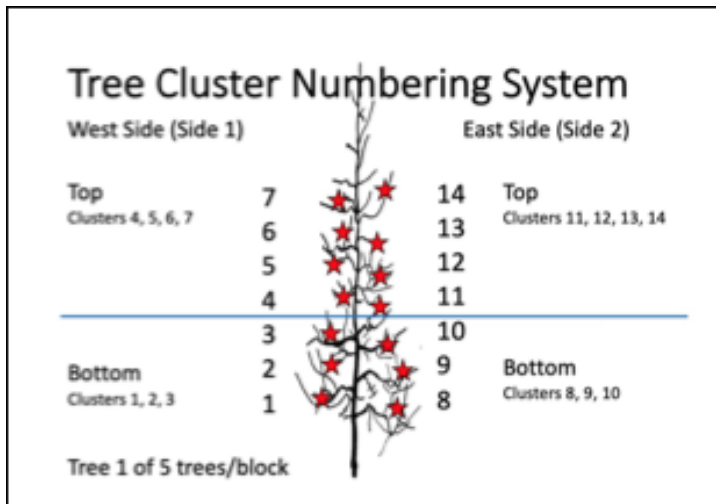
Tom and Joe Ferri of Clarksburg, Ontario, Canada have improved the spreadsheet to provide additional predictions. Data clusters are numbered (14/tree on 5 data trees). It is optional to use a whole tree (14 clusters) or split the tree between top (8 clusters) and bottom (6 clusters). Fruitlets are not marked. Only 14 clusters are numbered on each of the 5 data trees for a total of 70 clusters measured. The spreadsheet includes a sorting routine that will arrange each cluster's fruitlets in order from the largest to the smallest. An error check is also included in the spreadsheet. Non-numeric characters and 0's (zeros) are replaced with an empty cell function. Missing measurements are calculated to be halfway between the prior measurement and the following measurement (6, missing and 12 is corrected to 6, 9 and 12). The Ferri version takes the predicting fruitset prediction one step further by predicting the actual fruits setting per tree using actual cluster counts (see Tree Cluster Counts section below). To get a prediction of the apples setting, the whole tree's clusters have to be counted and entered with each measurement. Also, the spreadsheet calculates the largest fruitlet dropping. Fruitlets less than that diameter are probably dropping.

Jill MacKenzie of Appleton, NY explained her method of conducting her Precision Cropload Management program. Her recommendations include: 1) use the same pattern in each block to select data trees to better find each data tree in the same order, 2) flag data trees with ribbons around the lower trunk, for ease to see ribbons, 3) count flower clusters using a clicker, 4) do not mark fruitlets, (the model will automatically sort fruitlets from largest to smallest). To use the Ferri model version, mark the sampling clusters in a consistent manner on every tree. Start

numbering at the bottom on one side (west side for example) and number to the top cluster numbered 1-7 and on the other side clusters numbered 8-14.

Bottom and Tops of trees

The Ferri version introduces the idea of keeping track of individual tree clusters separately at both the top and the bottom of the data trees. In the model, answering “Yes” on the Data Sheet to the question “Split tree?” will calculate the data for whole tree and the top and the bottom. If using the split tree method, then clusters 1, 2, 3, 8, 9 and 10 are considered to be in the bottom of the tree and 4, 5, 6, 7, 11, 12, 13, and 14 are in the top. Tops of tree set better than the bottom and this information is quite helpful when spray thinning. Ferri measures fruitlets the day after a thinning spray or when the fruitlets have grown at least 3 mm. When temperatures are warm, waiting 3 days to remeasure may be too long. Use your own good sense to monitor fruitlet growth.



Suggested tree cluster tagging to use the Lower and Upper canopy measurements in the “Ferri” method of assessing fruitlet growth rate

Fruitlet measurements and Cluster Counts

Try to place the calipers on the widest portion of the fruitlet each time, measuring to the nearest 0.5 mm. Measuring to the nearest 0.5 mm will give accurate repeatable predictions. Don’t re-measure fruitlets unless you have at least 3 mm. of growth to give a better prediction with less work. Fruitlets do not need to be measured in any order, once the diameters are entered into the spreadsheet the program will sort from largest to smallest and correct typo’s and missing data. To get a prediction of the apples setting the whole tree’s clusters have to be counted and entered with each measurement at each sampling date. The program cannot correct input data that is too large (missing a decimal point). It does correct measurements that shrink. For example, growth measurements (e.g. 6, 8, 7.5) will be changed to (6, 8, 8).

Find more detailed instructions with illustrations and the Ferri spreadsheet here:

<http://fruitadvisor.info/ferri/>

Facebook Me



Jon Clements is at **UMASS Cold Spring Orchard**.

2 mins · Belchertown · 🌐



Measuring tagged Gala apples to input into the precision thinning fruitlet growt rate model...



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Scaffolds Fruit Journal: <http://www.nysaes.cornell.edu/ent/scaffolds/>

Network for Environment and Weather Applications (NEWA): <http://newa.cornell.edu>

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[Acimovic Lab at Hudson Valley](#)

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The next Healthy Fruit will be published on or about June 2, 2020. 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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