



**Maine Tree Fruit Newsletter**

**Saturday, May 21, 2022**  
Vol 29:13

**Apple growth stages**

The updated growth stage chart now includes estimated diameters for King Fruit on cultivars that reach 95% Petal Fall around the same time as McIntosh and Cortland. For cultivars such as Honeycrisp and Gala which tend to reach 95% Petal Fall a day or two later, the King Fruit diameter dates would be pushed later by about the same number of days.

The diameters of 5 & 6mm, 12 & 14mm, and 17 & 20mm are highlighted because they are markers for the multistep thinning recommendations from Cornell Cooperative Extension.

The 7+mm diameter marks when fruit swelling is sufficient for Plum Curculio to begin making egg-laying cuts in apples. The table below is for Highmoor Farm in Monmouth, ME. Tables for Springvale ME and Levant ME are attached as separate documents.

**Fire Blight**

Fire blight blossom infections require substantial accumulation of heat units for enough bacteria to replicate to create a quorum of enough bacteria to launch the infection process. It takes about 3-4 days with daily high temperature above 75F, about 2-3 days with daily high temperature above 80F, 2 days above 85F, and possibly in as little as 1 day with a high temperature of 90F. These are rules of thumb because the nighttime low temperatures also affect the bacterial doubling rate.

Statements about infection being possible anytime the temperature is over 60F reflect a lack of understanding of how fire blight works. That statement comes from a rule that was in one of the fire blight models that require average daily temperature on the day of a rain event AFTER sufficient heat units had accumulated had to be above 62F. Leaving the heat units out of a fire blight risk assessment is like leaving the gas out of the car and expecting to drive somewhere. There is nothing to drive a fire blight infection without the prior heat units. Moreover, observations since that rule was invented decades ago have shown that temperature on the day of infection is not a controlling factor. It is all about the number of heat units acquired during the period during which an open flower is vulnerable to infection. Any single flower remains susceptible for about 4 days after opening. That is why heat units are accumulated over a 4-day period.

An effective streptomycin application at

- 1) correct dose, do not calculate dose for less the 150 gallons per acre dilute basis),
- 2) with good coverage (no less the 6X amount of water, e.g. 50 gallons per acre for 300 gallon per acre trees, but no less than 25 gallons per acre even for the smallest trees
- 3) and with slow and complete drying conditions (preferably at least an hour for drying that ends before any rain occurs.

Dry conditions with relative humidity of below 60% have been found to prevent or slow bacterial multiplication and infection, but this factor has not been incorporated into the models yet. The optimum timing seems to be in the early evening before 10pm. But this is definitely a case of not letting the perfect be the enemy of the good. When strep is needed, having it applied imperfectly is infinitely better than not getting it applied at all.

The hot air coming from the west appears to be meeting up with cooler air near the Maine coast. The exact location of the hot air/ cool air boundary is has made for extremely fickle are varying temperature forecasts over the last few days. Changing forecasts changes the number of heat units and risk assessment by the fire blight models.

The other complicating factor is how much open bloom is left on the tree. A sage plant pathologist tells me that one way to think of it is to recommend that growers or their workers walk through the orchard to remove any open flowers remaining just before the start of a rain that (if enough heat units have accumulated in the prior 4 days) could start fire blight blossom infections. If the number of flowers is too many do hand removal, then that is a good estimate of how many flowers still open makes spraying streptomycin worthwhile within 24 hours before or after the start of a blossom blight infection period. If it is too much work to deblossom trees now, it will be much more work to deal with strikes if that number of flowers gets infected.

Regulaid, LI700, or some other nonionic spreader and penetrant adjuvant to increase absorption of the streptomycin into the flower tissue is recommended. Concerns about combining fungicide with streptomycin are not because of the interaction between the fungicide and the streptomycin, but between a spreader/penetrant and the fungicide in the

tankmix. Specifically, combining captan with a spreader/penetrant could result in phytotoxicity. If combining a fungicide + streptomycin spray, either replace captan with fungicide with less phytotoxicity potential (e.g. Koverall, Inspire Super), or do not use Regulaid, LI700, or another nonionic adjuvant. The streptomycin does not absolutely require the adjuvant partner, it just helps ensure successful control if they accompany the streptomycin. A recommendation still floating around is that you could reduce the dose for streptomycin when combining with Regulaid or a penetrant. The current opinion is that while that may be essentially true, it is worth the risk to save a few dollars by skimping on the streptomycin rate for a blossom blight infection period.

The charts below are for Highmoor Farm in Monmouth ME. Charts for Springvale and Levant are attached as separate files.

When viewing the tables, remember that each day's rating assumes that inoculum is present and that no streptomycin applications have been made. When a strep application is made, it resets the accumulated heat unit value back to near zero. In addition to the accumulated value for the lifetime of any open flowers, the daily heat unit value (or % of EIP level for the Eastern Fire blight model, where 100% = infection possible) is shown in parenthesis for each single day.

This table shows estimates of RELATIVE daily fire blight blossom infection risk based on weather conditions. Rating criteria are from the Cougar Blight 2010 model developed in Washington and Oregon by Dr. Timothy J. Smith.

ABSOLUTE risk depends on the amount of fire blight bacteria in the area, the number and age of open flowers, tree age (1-5 years old most vulnerable), cultivar and rootstock susceptibility. Ratings are for flowers that have NOT received an application of streptomycin or other fire blight suppression material. You can use the daily heat unit values between application date and a subsequent wetting event to estimate heat unit accumulation for flowers that received antibiotic treatment. Relative infection risk may be overstated for first few days of bloom because fire blight bacteria may not have been distributed to open flowers. Individual cultivars may start or finish bloom a day or two earlier or later than the range of open blossom dates shown. Gray shading indicates dates when most trees will have lost open blossoms, but late blooming cultivars, "straggler" or secondary bloom (e.g. Cortland and Golden Delicious), or young trees may still have open flowers and be susceptible to blossom blight. Infection of a few late blooms can provide a foothold for fire blight to colonize an orchard.

Fireblight infection can occur without rain if there is wetting caused by dew. If there are enough heat units for infection but no rain, if leaves are expected to be wet for 2 or more hours, then infection risk is reported with a "dew risk" label. Infection potential on "dew risk" days is not well understood. Infection potential may increase with high relative humidity prior to and during infection events, and be

Fire blight blossom infection risk varies with block history. If you do not know orchard history, use category II as default assumption.

**I = No active fire blight within 1 mile of the orchard in last two years. Requires 500 – 799 heat units for HIGH rating, 800 – 999 for EXTREME!, and 1000+ for EXCEPTIONAL!**

**II = Fire blight was present within 1 mile of the orchard within last 2 years, but not currently active in the area this year. Requires 200 – 349 heat units for HIGH rating, 350 – 499 for EXTREME!, and 500+ for EXCEPTIONAL!**

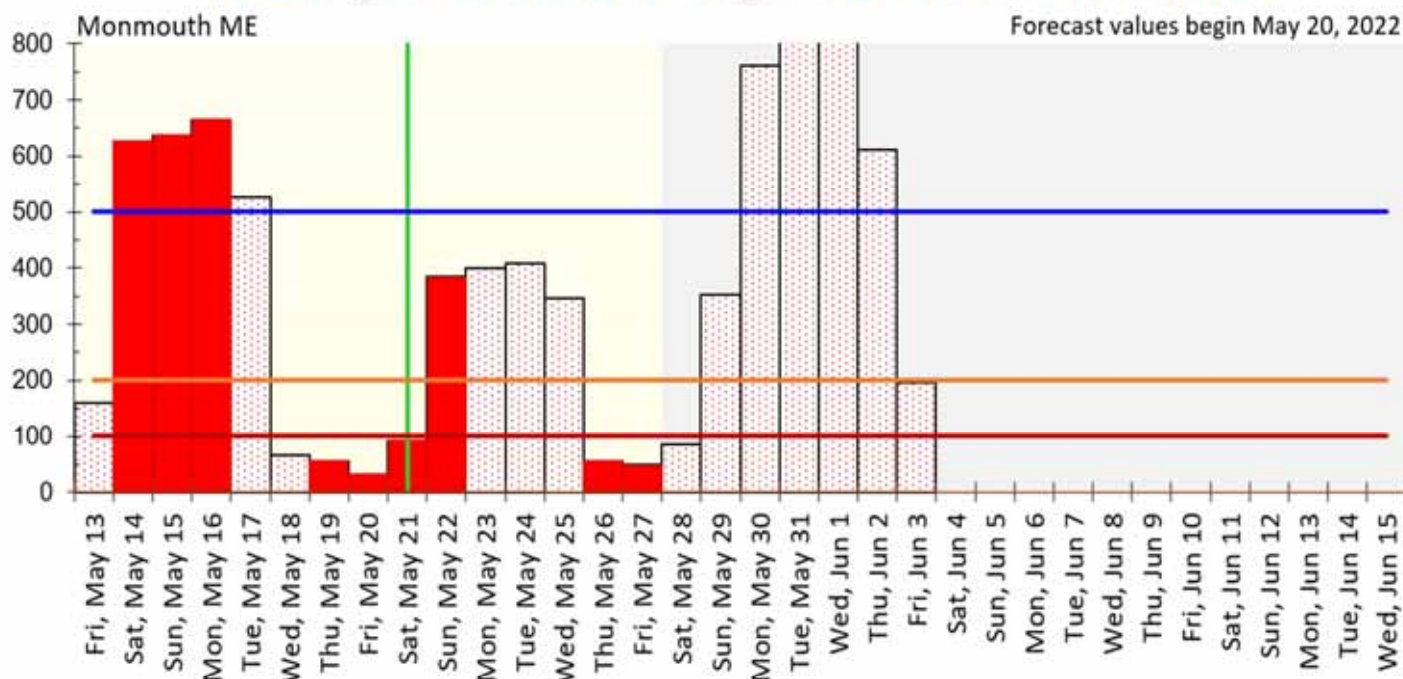
**III = Active fire blight cankers within 1 mile of the orchard this year. Requires 100 – 199 heat units for HIGH rating, 200 – 299 for EXTREME!, and 300+ for EXCEPTIONAL!**

If blossom infection occurred May 14, then blossom blight would be noticeable by May 31, and shoot blight by June 14.

Open blossom dates for common apple cultivars. "Date" is from 8am to 8am the next day, not midnight to midnight.	Cumulative Heat Units (single day units) Inches Rain, & Leaf Wet Hours 8am to 8am next day	I - No active FB within one mile of the orchard in last two years	II - FB active within one mile of orchard in last two years, but not this year	III - Fire blight currently active within one mile of orchard.	blight (and shoot blight) symptoms would be obvious if infection occurred
possible early cultivar King Bloom: May 13	160 HU (160) 0.0", 12 hrs	Caution (dew risk)	Caution (dew risk)	HIGH (Dew risk)	May 30, (June 12)
McIntosh King Bloom: Sat, May 14	626 HU (467) 0.02", 8 hrs	HIGH	EXCEPTIONAL!	EXCEPTIONAL!	May 31, (June 14)
Sun, May 15	638 HU (11) 0.25", 24 hrs	HIGH	EXCEPTIONAL!	EXCEPTIONAL!	June 1, (June 15)
Mon, May 16	665 HU (28) 0.12", 18 hrs	HIGH	EXCEPTIONAL!	EXCEPTIONAL!	June 2, (June 15)
Tue, May 17	525 HU (20) 0.0", 0 hrs	High (if wetting)	Exceptional! (if wetting)	Exceptional! (if wetting)	June 2, (June 16)
Wed, May 18	65 HU (7) 0.0", 5 hrs	Low (lack of heat)	Low (lack of heat)	Caution (if wetting)	
Thu, May 19	56 HU (2) 0.16", 16 hrs	Low (lack of heat)	Low (lack of heat)	Caution	
Fri, May 20	32 HU (3) 0.03", 19 hrs	Low (lack of heat)	Low (lack of heat)	Unlikely (lack of heat)	
Sat, May 21	92 HU (80) 0.18", 16 hrs	Low (lack of heat)	Low (lack of heat)	Caution	
McIntosh 95% Petal Fall on Sun, May 22	384 HU (298) 0.72", 14 hrs	Caution	EXTREME!	EXCEPTIONAL!	June 6, (June 19)
McIntosh 100% Petal Fall on Mon, May 23	399 HU (17) 0.0", 0 hrs	Caution (if wetting)	Extreme! (if wetting)	Exceptional! (if wetting)	June 7, (June 19)
Tue, May 24	407 HU (12) 0.0", 1 hrs	Caution (dew risk)	EXTREME! (Dew Risk)	EXCEPTIONAL! (DEW RISK)	June 7, (June 19)
Wed, May 25	346 HU (19) 0.0", 0 hrs	Caution	HIGH	EXCEPTIONAL!	June 8, (June 20)
Thu, May 26	55 HU (8) 0.02", 4 hrs	Low (lack of heat)	Low (lack of heat)	Caution	
Late Cultivar Petal Fall on Fri, May 27	48 HU (10) 0.23", 22 hrs	Low (lack of heat)	Low (lack of heat)	Unlikely (lack of heat)	



## Fire blight heat units vs. High infection risk thresholds



Values do not appear until McIntosh King Bloom date is within forecast range.

Vertical green line marks date of latest update.

Solid Red columns show fire blight heat units on days with rain, and is an estimate of the favorability of weather for fire blight blossom infection on that day. Red dotted white columns show fire blight heat units on days without rain. These columns indicate potential severity of fire blight blossom infection if accompanied by rain or heavy dew.

Gray background indicates dates with reduced risk because most cultivars should have lost open blossoms. However, young trees and late blooming cultivars may still have open blossoms and susceptibility to fire blight blossom infections on those dates.

Colored horizontal lines = High infection risk (if flowers present) heat unit thresholds for type I, II and III site risk categories.

Blue horizontal line = Category I sites (No FB within 1 mile last year or this year). High threshold is 500, Extreme threshold is 800.

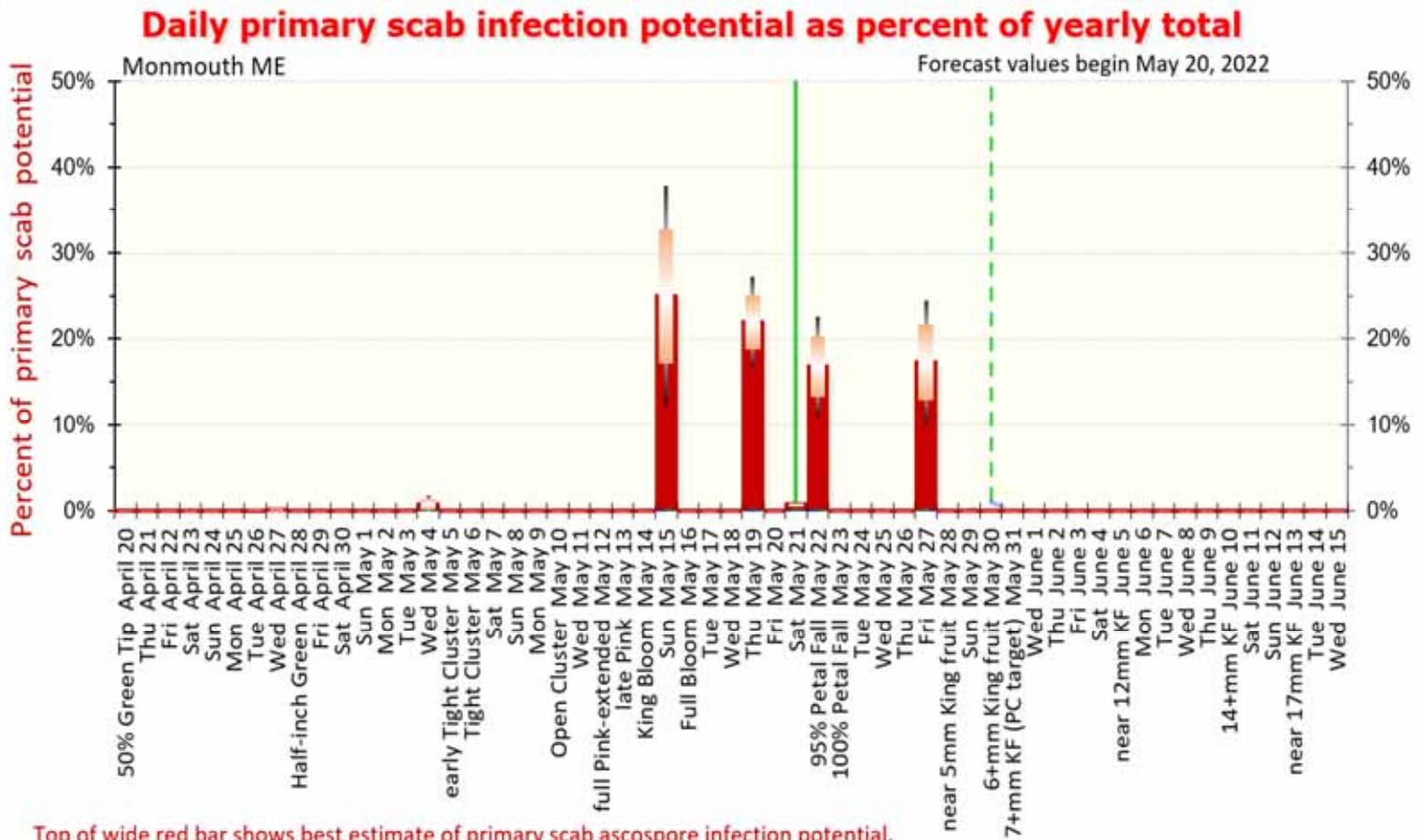
Orange horizontal line = Category II sites (FB within 1 mile last year, but not active within 1 mile this year). High threshold is 200, Extreme threshold is 350. Exceptional threshold is 500.

Red horizontal line = Category III sites (Active FB within 1 mile this year). High threshold is 100, Extreme threshold is 200. Exceptional threshold is 300.

Heat units and thresholds are from Cougar Blight 2010 model by Tim Smith, Wash. State Univ.. See Cougar Blight table for daily values.

## Apple Scab

Apple scab infection risk is much less variable than fire blight. Maines orchards are in the middle of primary apple scab infection risk for the next couple of weeks. Any daylight hours rain of over 0.1" is enough for a full strength infection period at this time. The frequency for protective coverage sprays is sometimes said to increase with rapid tissue growth in the bloom – fruit set period. There is disagreement about whether reapplication at less than a 7-day interval or 1.5" rain, whichever comes first, is needed. If you do get caught with little protection remaining from the previous protective fungicide application, use of a post-infection fungicide within 48-72 hours, possibly 96 hours, after the start of an unprotected scab infection can half the infection process.



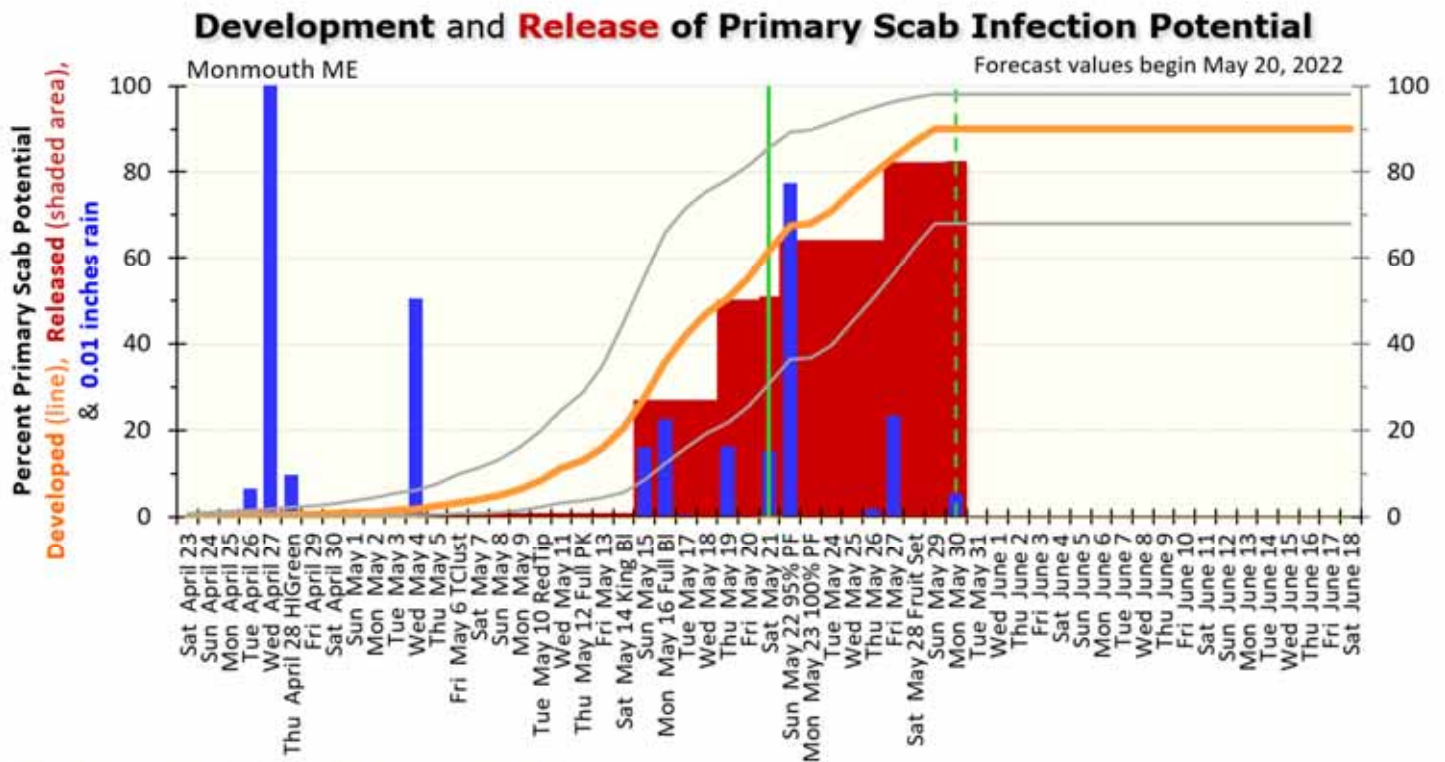
Top of wide red bar shows best estimate of primary scab ascospore infection potential.

White-to-light red shaded narrow boxes overlaid on red bars show range expected to contain the true value most of the time (68% confidence interval). Thin vertical black bars show 90% confidence interval.

Vertical green line = today's date. Vertical dotted green line = end of forecast range.

Vertical orange dotted line = date of final significant primary scab infection period (estimated 99+% cumulative spore release, and 95% chance of at least 95% cumulative spore release).

Infection potential rating is for scab ascospores (i.e. primary scab) only. Uncontrolled infections can produce secondary scab spores that magnify infection risk beyond what is indicated by this chart, starting 9-17 days after the infection period.



Blue columns show 100ths of inch rain for each date.

Rising thick orange line = cumulative primary scab infection potential developed by that date.

Rising thin gray lines = 90% confidence interval for estimate of cumulative infection potential developed, but not necessarily released, by each date.

Solid red area under orange line shows estimated cumulative percent primary scab infection potential released by end of that date. The red area is below the orange line unless a warm soaking daytime rain allows full expression of infection potential.

Vertical line = today's date and beginning of forecast values. Vertical dashed green line = end of forecast range.

Note: This is a relative, not absolute, measure of scab infection severity. In high scab blocks even a small portion of the year's scab potential can cause significant infection! This chart represents risk from primary spore releases only. If primary scab is not controlled, secondary spores can greatly magnify infection potential for later infection periods.

## Thinning

### Apple Thinning Outlook May 19

The weather has been mostly favorable for pollination and fruit set this spring. The few days of very high temperatures may have increased pollination, but hot weather decreases pollen tube viability so that fertilization does not take place. This may impact fruit set in some apple and peach varieties if their peak pollination coincided with this period of hot weather. The cooler temperatures slow down pollination, but are better for fruit set.

Maine is now part of the NEWA network of weather-based tools for estimating pest and disease activity, but the carbohydrate model for thinner efficacy is not yet available for Maine. Currently, there are weather stations in Bangor, Augusta and Lewiston, with hopefully additional stations added in the future. <https://newa.cornell.edu/crop-and-pest-management/>



Temperatures will be warm enough for good chemical thinning this weekend. Sunday's high temperatures will be in the mid 80's, so avoid aggressive thinning rates on that day. This will be followed by cooler temperatures which are not good for effective thinning, so Friday or Saturday look to be the best day for applying the first thinner if trees are past bloom. Sevin should not be applied to trees in bloom because of bee toxicity.

Petal fall thinners include Amid Thin, NAA (Fruitone-L, PoMaxa, Refine 3.5 WSG, Refine 3.5L), 6-BA (Maxcel, Riteway and Excellis), and carbaryl if bees and other pollinators are no longer visiting trees. For rates and variety specific recommendations, consult the Guide (<https://netreefruit.org/apples/chemical-fruit-thinning-and-other-plant-growth-regulator-uses/apple-fruit-thinning/chemicals>) and read the product labels. If you have any questions about thinning, feel free to call or text Renae Moran at (207) 713-7083, or by email at [rmoran@maine.edu](mailto:rmoran@maine.edu).

### Peach Thinning

Peach flower bud survival turned out to be better than I had originally thought in most orchards. Therefore, some level of thinning may be needed to ensure good fruit size and flavor at harvest, and to prevent limb breakage. Peach trees do not have the structural strength to support a heavy crop. Hand thinning can be done any time after fruit set.

## Insect Pests

On Friday May 20, there were very few **European Apple Sawfly** on 11 traps in three blocks at Highmoor Farm. The average number of EAS per trap in the blocks were 0.25, 0, and 0.25. The threshold at Petal Fall is an average of 5 – 7 EAS per trap. The warm weather this



Above: European sawfly (with black midge underneath) on sticky trap. Note orange color on lower body.

Right: EAS damage to young fruit last year.  
Photos: Koehler, UMaine Diag. Lab.





weekend may bring out more EAS activity, but with temperatures turning cooler next week and such a low count so far, it seems doubtful that EAS will reach treatment threshold at Highmoor Farm this year.

A check of 100 to 200 vegetative and fruit clusters per block in 7 blocks at Highmoor Farm on Friday May 21 found little activity in six of the blocks. But in the 7th block, where **Obliquebanded leafroller (OBLR)** caused extensive damage last summer, young OBLR caterpillars were found in 21 of 100 fruit clusters. The treatment threshold is 3. Early control of OBLR is important because experience at Highmoor shows that waiting to control the summer generation larvae that emerge in mid-late July is difficult to achieve coverage and control. The caterpillars tie leaves in a cluster together with silky webbing create a protective shelter. With early control, there is still a good chance to expose them either directly to spray residue, or to reach through residue on the leaves in their immediate vicinity upon which they feed.



Above: External appearance of OBLR infested leaf cluster..



Left: OBLR larvae exposed from within leaf nest.



Bottom: Two OBLR in two adjacent clusters.



**Plum curculio (PC)** begin migrating into apple orchards around Pink. But Petal Fall, over half of this migration is completed and continues until 308 Degree days 50F after Petal Fall. The presence of PC in the orchard does not require control until the fruit begin to swell to 7mm or greater, when female PC start cutting the fruit to lay eggs. The 7mm date is indicated on the following Monmouth PC respray table and activity chart. At Highmoor Farm, the date for 7+mm King fruit diameter on early cultivars is estimated as May 31.

Need for protection against plum curculio egg laying begins around 7mm fruit diameter.  
 A final plum curculio insecticide application on Monday, June 6 is expected to give adequate protection until the end of the immigration period on Friday, June 17 (indicated by yellow highlight).  
 If using Surround deterrent, rough estimate for decline in plum curculio egg laying is Sunday, July 3.

Weather data for Monmouth ME. Forecast values begin May 20, 2022

95% McIntosh Petal Fall estimated or reported as: May 22, Sunday

Full-dose Plum Curculio insecticide application date	Cumulative Plum curculio degree days	Inches Rain	Estimated end of protection	Percent of PC control period (& PC degree days) completed by end of protection
	95% McIntosh Petal Fall			
Sun, May 22	10	0.78	June 3, Fri	45% (139)
Mon, May 23	17	0	June 4, Sat	49% (150)
Tue, May 24	24	0	June 5, Sun	52% (162)
Wed, May 25	29	0	June 6, Mon	56% (173)
Thu, May 26	39	0.02	June 7, Tue	60% (184)
Fri, May 27	51	0.23	June 8, Wed	64% (196)
Sat, May 28	69		June 9, Thu	68% (208)
Sun, May 29	91		June 10, Fri	72% (221)
Mon, May 30	100		June 11, Sat	76% (233)
Tue, May 31	110		June 12, Sun	80% (246)
Wed, June 1	120		June 13, Mon	84% (259)
Thu, June 2	131		June 13, Mon	84% (259)
Fri, June 3	142		June 14, Tue	88% (272)
Sat, June 4	153		June 15, Wed	93% (285)
Sun, June 5	164		June 16, Thu	97% (299)
Mon, June 6	176		June 17, Fri	100% (313)
Tue, June 7	188		June 18, Sat	100% (327)
Wed, June 8	200		June 19, Sun	100% (342)
Thu, June 9	212		June 20, Mon	100% (357)
Fri, June 10	225		June 21, Tue	100% (372)
Sat, June 11	237		June 22, Wed	100% (387)
Sun, June 12	250		June 23, Thu	100% (402)
Mon, June 13	264		June 25, Sat	100% (434)
Tue, June 14	277		June 26, Sun	100% (450)
Wed, June 15	291		June 27, Mon	100% (467)
Thu, June 16	305		June 28, Tue	100% (483)
Fri, June 17			June 29, Wed	100% (500)

Codling moth CM flight is beginning. Insecticide used to control PC and EAS usually also controls CM. More on CM in next newsletter.

## Wildlife Pest Control Regulations

The Maine Farm Bureau & Maine Department of Inland Fisheries and Wildlife have produced a summary of regulations on controlling vertebrate wildlife species causing damage to farm production. It was updated in April 2021.

<https://www.maine.gov/ifw/docs/A%20farmers%20guide%20for%20control%20of%20wildlife%20damage%20to%20crops%20and%20livestock.pdf>



## Farm Labor

Red Tomato is a marketing initiative best known to Maine tree fruit growers through the Eco Fruit program. Eco-Apple is a rigorous, ecology-based farming, certification, and marketing program for Northeast growers. In addition to promoting local farms and lower risk production methods, Red Tomato also attends to social justice concerns. The website has a brief introduction to the importance and some of the challenges for H2A workers in the Northeast fruit and vegetable industries.

"Immigrant and temporary workers who grow, harvest, pack and work on US farms make it possible for us to have and enjoy, fresh local food."

<https://redtomato.org/big-thinking/farm-labor-in-the-northeast/>

## Closing Words

"Science is not the truth. Science is finding the truth.

When science changes its opinion, it didn't lie to you. I learned more."

~ Mohamad Safa

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