



UMass  
Extension

# Healthy Fruit

Volume 27, 2019

Prepared by the University of Massachusetts Fruit Program

## Healthy Fruit, Vol. 27, No. 5, May 7, 2019

Jon Clements, Author (unless otherwise noted) and Editor



### CONTENTS

[CURRENT DEGREE DAY ACCUMULATIONS](#)

[Current bud stages](#)

[Upcoming pest events](#)

[Upcoming meetings](#)

[The way I see it](#)

[New England Tree Fruit Management Guide](#)

[Insects](#)

[Diseases](#)

[Horticulture](#)

[Small Fruit Update](#)

[Guest article](#)

[Facebook Me](#)

[Useful links](#)

[Thank you sponsors...](#)






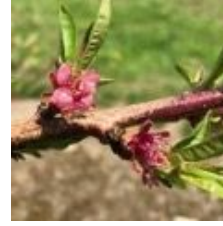

### CURRENT DEGREE DAY ACCUMULATIONS

UMass Cold Spring Orchard, Belchertown, MA	6-May
Base 43 (NEWA, since March 1)	276
Base 50 (NEWA, since March 1)	111



## CURRENT BUD STAGES

Current bud stages. May 6, 2019, UMass Cold Spring Orchard, Belchertown, MA

				
McIntosh apple Late pink	Honeycrisp Late pink	Bartlett pear White bud +	Redhaven peach Bloom to petal fall	Regina sweet cherry White bud

More 2019 bud stages [here...](#)



## UPCOMING PEST EVENTS

Coming events	Degree days (Base 43)
Black stem borer 1st catch	256 to 364
European red mite egg hatch	231 to 337
Green fruitworm flight subsides	267 to 499
Lesser apple worm 1st catch	276 to 564
Obliquebanded leafroller larvae active	158 to 314
Pear psylla 1st egg hatch	174 to 328

Redbanded leafroller 1st flight peak	232 to 382
Spotted tentiform leafminer 1st flight peak	267 to 405
McIntosh pink bud stage	267 to 316



## UPCOMING MEETINGS

**May 15 (Wednesday).** Fruit Twilight Meeting, Red Apple Farm, 455 Highland Ave., Phillipston, MA. 5:30 PM. Light supper will be served. 1 Pesticide recertification credit. No pre-registration necessary, however, \$20 meeting fee for pesticide credit will be collected.

**May 16 (Thursday).** Fruit Twilight Meeting, Sweet Berry Farm, 915 Mitchell's Lane, Middletown, RI. 5:30 PM. Light supper will be served. No pre-registration necessary, however, \$20 meeting fee (except for RI and MA Fruit Growers' Assoc. members) will be collected. In cooperation with RI Fruit Growers' Assoc. And URI Extension.



## THE WAY I SEE IT

Apple bloom -- drum roll please -- is finally here. And it's looking pretty good. Other than some more rain -- what else is new? -- the forecast looks favorable. No frost/freeze at least for the immediate future. Although the [8 to 14 day outlook](#) for May 14-20 shows us predicted to be below normal.

This may be a good year to get rolling on apple fruit thinning at bloom. A conservative approach would be to start with an NAA (Fruitone-L, refine) application as petals start to come off. Use a modest rate centered around 3 oz. per acre. 6-BA (Maxcel, exilis) can also be used beginning at petal fall, however, I would use only if the weather is warm. (70 degrees plus.) There is renewed interest, or at least talk about, of doing bloom thinning with caustic chemicals such as lime-sulfur or ATS (Ammonium ThioSulfate). In Massachusetts (and New England) lime-sulfur can be used for disease control, however, it may cause fruit thinning. ATS is a source of foliar nitrogen, but again when applied at bloom, it may cause fruit thinning. IF your bloom is strong, and you are considering lime-sulfur at bloom for scab suppression, you must read [this article](#) by Jim Schupp (and Tom Kon) at Penn State Extension. You must read. It's really good. Note that we have the [Pollen Tube Growth Model](#) available for our [NEWA](#) sites in Massachusetts. See pictures below

on how to measure the style(s). (More information and pictures [here](#).) Also, please see additional comments about bloom thinning from Daune Greene in [Horticulture](#).

Dry stretches of weather should be taken advantage of for tree planting. When planting dwarf apple trees, remember to keep that graft union well above (4 to 6 inches) ground level!

Finally, as petals fall and fruit starts to set consider using the newly released (by Cornell) Malusim app to assess progression of apple fruit set in your orchard. Jump to [Horticulture](#) for the official announcement. I'd like to know if anyone is actually using it, last year I did beta testing for them and it was interesting. Still some bugs, but overall could be a very useful tool for more precision orchard management (if you are into that).



## NEW ENGLAND TREE FRUIT MANAGEMENT GUIDE

The New England Extension tree fruit specialists -- which include myself, Dan Cooley, Jaime Pinero, and Elizabeth Garofalo at UMass. Mary Concklin at UConn, Heather Faubert at URI, Terry Bradshaw at UVM, George Hamilton and Anna Wallingford at UNH, and Glen Koehler and Renae Moran at UMaine -- have officially launched, and updated for 2019 -- an online edition of the **New England Tree Fruit Management Guide**. Note that it is easy to print any of the sections, if you want to have old-school reference, for example, to hang on your spray shed wall. Also, it is quite mobile-friendly so make a home screen shortcut to here:

<http://netreefruit.org>. Finally, if you really, really want a printed version, order here: <https://www.umassextensionbookstore.com/products/29>.



## INSECTS

Jaime Pinero

### **Plum curculio (PC) activity update.**

For the last 7 days, PC captures have been VERY low, as reflected by the 4 PCs that were captured in 8 odor-baited traps. PC immigration is expected to continue to be slow unless a warmer weather pattern moves into the area, which seems unlikely to happen for the next 10 days or so!

### **First OFM flight recorded in Belchertown (UMass CSO).**

On May 5th, the first OFM moths (four males in one trap) of the season were captured by a pheromone-baited trap at the UMass CSO, as reported by Jon Clements.



*Picture: Jon Clements*

Below is the NEWA information on the DD accumulation prior and after (forecast) that event. So, it will not be too long before biofix can be established.

**First Trap Catch:**

*First Trap Catch date above is estimated based on degree day accumulations or user input. Enter the actual date for blocks of interest and the model will calculate the protection period after first trap catch more accurately.*

**Accumulated degree days (base 43°F) first trap catch through 5/6/2019: 25 (0 days missing)**

	Past	Past	Current	5-Day Forecast					<a href="#">Forecast Details</a>
Date	May 5	May 6	May 7	May 8	May 9	May 10	May 11	May 12	
<b>Daily Degree Days (Base 43BE)</b>	9	15	15	9	8	11	12	12	
<b>Accumulation since January 1</b>	324	339	354	363	370	381	393	405	

[Show Degree Day Graph](#)

**Pest stage:**

*The pest stage above is estimated. Select the actual stage and the model will recalculate recommendations.*

The normal petal fall spray should control OFM larvae hatching early in the season. If you have had a past history of damage from OFM in an orchard and if trap catches are high (>10/trap/week), it is possible that local OFM populations are resistant to organophosphates. Therefore, you may want to use another class of chemical at petal fall for OFM control. Although first generation OFM larvae can damage fruit, particularly in orchards with high pest population densities, most larvae from this generation in apples will infest only apple shoots. Therefore, the primary reason to control the first brood is to cut down on resident populations in the orchard that could lead to more severe infestations later in the season.

### **Codling moth research on mass trapping taking place at UMass soon...**

Mating disruption, which was developed to reduce the reliance on insecticides, is most effective at controlling low population densities of codling moth (CM) in comparatively large orchard blocks. Where CM populations are not effectively controlled by mating disruption, alternative methods are required (e.g., pesticide applications). **Mass trapping** may represent a useful strategy to remove CM females from the population when insecticides are not effective (due to resistant populations) desired, or appropriate.

In a recent (2018) publication, B.D. Jaffe and collaborators demonstrated that lures can be used to mass-trap CM in Washington state orchards. Orchard blocks with mass trapping devices had

a reduction in the percent of apples damaged by CM compared to control plots that received monitoring traps only. To access the full research article, click [here](#).

In 2019, the Pinero lab will evaluate the performance of two lure formulations (from Trécé, Inc.) at capturing CM males and females. **We are currently seeking 1-2 MA orchards with a history of CM infestations for these evaluations.** If you are interested, please let me know (e-mail: [jpinero@umass.edu](mailto:jpinero@umass.edu)). These evaluations will not interfere in any way with your current CM management program. The mass trapping formulations can be evaluated in plots with or without mating disruption.

For these evaluations the main goal is to determine which lure is most effective at attracting and killing CM males and female, so for this year we won't be assessing fruit damage.

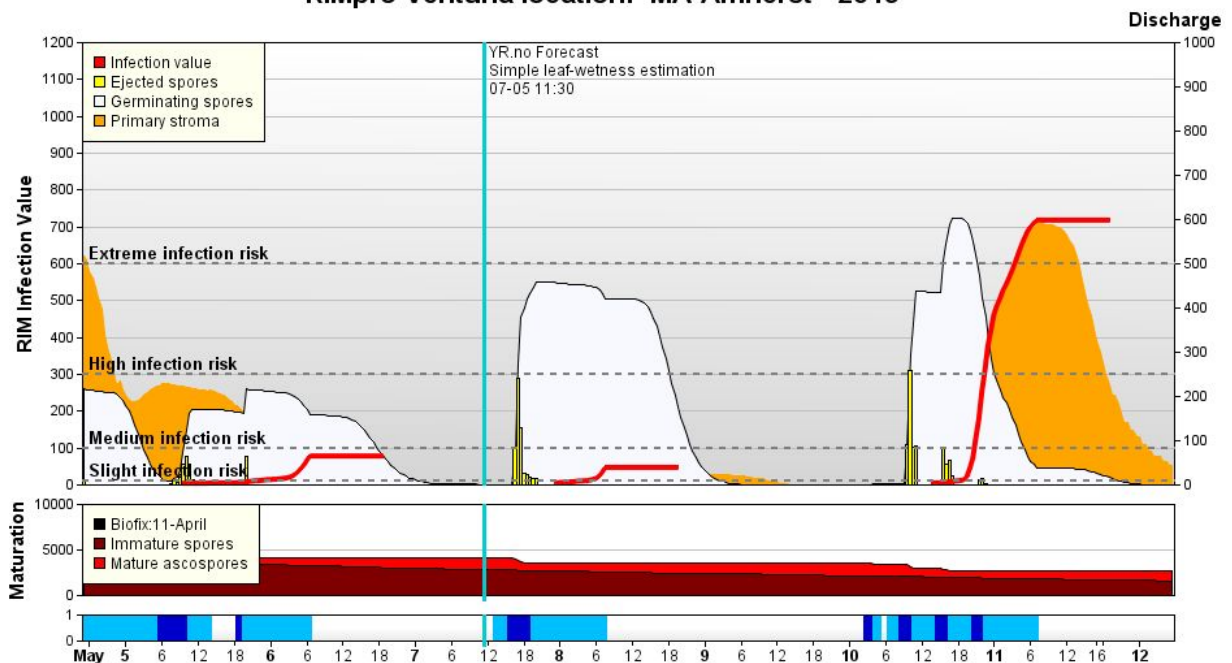


## DISEASES

Liz Garfalo

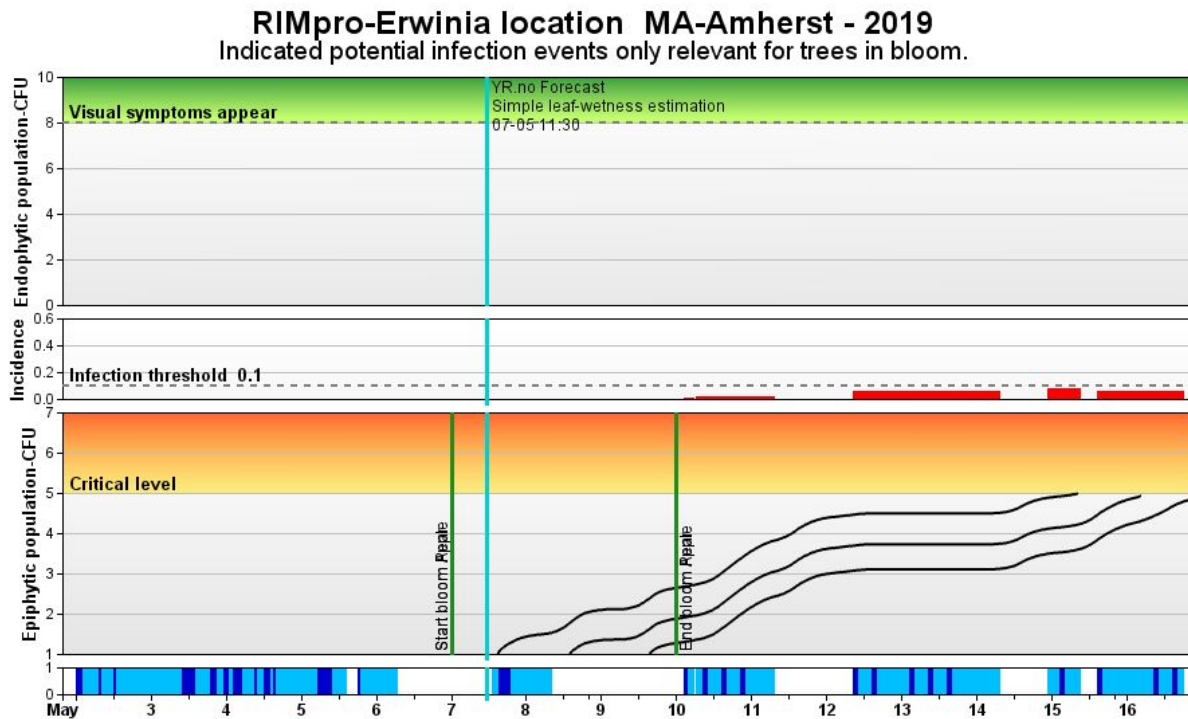
**Apple Scab** spores continue to mature (and be caught in the lab). The event forecast for Amherst MA below is estimated to begin this afternoon around 4pm (with the rain). Overnight temperatures will be in the mid-40's, hence the relatively low RIM for the upcoming event. There appears to be a window between this afternoon's forecast event and that forecast for this coming Friday. The best news, however, is we are below 50% estimated ascospore maturity, meaning, scab season is half over!

RIMpro-Venturia location: MA-Amherst - 2019



## Fireblight

The bad news is fireblight is on the horizon... Sort of... Maybe... Ok, it's not really warm enough to be worried all that much about fireblight right now. There are open blossoms, but, *Erwinia amylovora* likes it nice and warm, minimum *optimum* bacterial growth occurs around 75°F to 80°F. While the bacterial colonies do grow at lesser temps, these are preferable temperatures. And so, you get a disease forecast like you see below. The blue bar at the bottom represents leaf wetness and ran. The graph above that indicates the bacterial colony growth (Epiphytic population-CFU). As things stand now, the bacterial colonies will not be large enough to cause infection during bloom time (for Amherst, MA).



HORTICULTURE

Jon Clements

### Bloom thinning thoughts from Duane Greene...

I agree with Jon that it may be very appropriate to start your chemical thinning program with a blossom thinner. This is a real opportunity to make life much easier for yourself during the traditional thinning season. The chances of over-thinning at this time are overstated. Try using a high rate of either NAA or Ethrel on one of your more difficult blocks to thin. I consider it a moderately conservative way to start thinning. Jon has suggested some good references to check on this subject especially when using caustic thinners. While ATS is an option, it may be very difficult to find it now. There are also other options at bloom that do not involve using



caustic thinners. NAA use at between 12 to 15 ppm would be a good way to start. It is not nearly as potent as a thinner when applied at bloom or petal fall. Another option is to use Ethrel at 300 (1 pt/100 gal) to 400 ppm at bloom. The advantage of using either NAA or Ethrel at bloom is that both have the ability to enhance flower bud formation in addition to what they promote by thinning. There are some varieties (Honeycrisp) that a very biennial and application of either NAA or Ethrel at bloom and/or petal fall may be a key to getting some return bloom. Some may be concerned with the use of NAA on Fuji. However, the problem associated with pygmy fruit when NAA is used is associated with using it during the traditional thinning season not when applied at bloom or petal fall.

### **Malusim update: NEWA and app on the web or mobile device**

Ed. note: This announcement from Terence Robinson, Cornell University. I have considerable experience with Malusim on all counts, feel free to contact me if any questions. Duane Greene should be able to help too. JC

We are pleased to announce the official release of the 2019 carbohydrate thinning model (Malusim) on the [NEWA website](#). The model will have an updated look and information. The input page will require growers to input the % of spurs that are flowering in one of 4 ranges (0-25, 26-50, 51-75 and 76-100%). The output data table will have a column of DD base 4°C and will have colors highlighting when we are in the sweet spot for thinning (200-250DD from bloom). The new version will also give a Thinning Index composed of the average carbohydrate balance of 2 days before, the day of thinning and the next 4 days = 7 day running average. The thinning recommendations will be based on a new 3 dimensional lookup table taking into account, DD from bloom, % of spurs that are flowering and carb balance over 7 days. The thinning recommendation cells in the table will also be color coded to indicate red=high risk of over-thinning, blue=mild thinning expected, yellow= caution possible aggressive thinning efficacy and green=good thinning efficacy.

We are also pleased to announce the official release of the Malusim app, including an Android and an iOS versions. You can download the app from the Google Play Store or the iTunes Store, OR use the app from any browser at <https://malusim.org> (note that speech recognition features are not supported in the browser version of the app).

**IMPORTANT:** If you used the 2018 beta version of the Malusim app for Android, you must uninstall it from your devices and download the new release from the Google Play Store. The data storage method has changed, and any changes you make to your data in the old app will not be accessible via the new app on any of the supported platforms.

You can continue to access any data that you entered last year - however, remember that when entering data for this year, you should clone any existing locations, rather than editing them and simply updating the year. Cloning will allow you to access data from previous years in the future.



## SMALL FRUIT UPDATE

Sonia Schloemann

**CROP CONDITIONS: Strawberries:** Fruit trusses are expanding out of the crowns and will be progressing toward bloom over the coming week in most areas. Growers who used double layered row cover instead of straw for winter protection report better overwintering success. This is anecdotal, but seems to be a common sentiment. Where fields are saturated with water, conditions are highly conducive to root disease infections, especially by *Phytophthora* spp. Plantings in such saturated fields may benefit from proactive applications of Phosphorus Acid (e.g., Prophyt), or Mefenoxam (e.g., Ridomil Gold) products, especially where *Phytophthora* has occurred in the past. If more than one application is planned, be sure to rotate between the two chemistries to avoid mefenoxam resistance development. Wet field conditions might also prompt some light fertilization to compensate for nutrients washed out of the root zone, but don't overdo it. Similarly, spring herbicide applications might need to be repeated if heavy rains have fallen since application. Read product labels to determine if re-application is needed. Since bloom is around the corner, be sure to get your frost protection system set up and ready for when it is needed. **Brambles:** Summer fruiting varieties are showing variable shoot growth along the canes. This may even out with time or indicate latent winter injury that will be more evident with time. Watch for early mite infestations as the weather warms up. Where growth is good, new shoots are showing 5+ leaflets and are 4"-5" long. As with strawberries, the wet field conditions may lead to increased root disease infections. Proactive treatment with phosphorous acid and/or mefenoxam may be helpful. But my experience is that raspberries are hard to rescue from root/crown infections. It could be worth a try in margins of lightly infected areas but heavily infected plants will probably not recover. **Blueberries:** Bud development has progressed and is now in full pink to early bloom in most areas and many varieties appear to have a heavy bloom. This means that pollination is happening soon and the time to set out honey bee hives or bumble bee boxes is coming soon. See [this link](#) for an excellent article about honey bee and bumble bee stocking rates for blueberries. Don't set bees out until a significant amount of bloom is out or they may orient to dandelions instead. Scout fields for [shoot strikes](#) of [Mummy Berry](#). Treat where found to reduce the chances of [blossom/fruit](#) infections. See the [New England Small Fruit Management Guide](#) for treatment recommendations. **Other Fruit:** Gooseberries are in late bloom to early fruit set stage. Currants are in full bloom with bees very active in them.



**Berry Bud Stages 5/7/19** - from top left; Strawberry flower trusses expanding from crowns, middle; good shoot growth (4-5 leaves) from red raspberry, right; blueberry early bloom, lower left; gooseberry early fruit set, right; red currant bloom.



**HAWKEYE'S CORNER (notes from the field)**

**Liz Garofalo**

Gypsy moth update: So far, on the egg mass I am monitoring, I am not seeing any signs of these caterpillars slowing down. Keep watch if you have had an issue in the recent past. You

will be happier if you catch them before they get big and require more aggressive management than they do at smaller caterpillars.



Gypsy moth monitoring continues on the same egg mass. The photo on the left shows last week's (5/2/19) progress, the photo on the right, this week's (5/6/19). Lighter larvae are the most recently hatched. While it is not visible in the picture, there are ballooning threads present in the photo on the right.

Pollinators gone wild:



Just in time for bloom! Native pollinators enjoy a snack and a break (albeit brief) from the gloomy weather.



## GUEST ARTICLE

### Effective Pollination: The Next Three to Five Days.

by [PETER J JENTSCH \(Cornell University Hudson Valley Laboratory\)](#) posted on [MAY 5, 2019](#)

**Synopsis:** First king bloom on Empire, one of our earliest blooming varieties at the Hudson Valley Research Laboratory orchards (mid-Hudson Valley), occurred April 29th. From April 29th – May 5th, the mean daily temperature was 52.8F, ranging from 48.3F to 57.3F. Over the past 6-days cloudy and wet weather prevailed with cool or mild temperatures.

Environmental conditions have been generally poor for pollinator flight activity hampered by cloud cover and rain through early to mid stages of bloom. Aside from wind driven pollen distribution in apple where pollinator trees are upwind, its is likely orchards experienced a pollination deficit last week.

For apple, pollination must occur within 2 to 4 days after the flowers open for fruit to set. As these cool temperatures reduced pollinator flight, decreased pollination of the king blossoms are likely. [Maintaining and conserving pollinators](#) during upcoming pest management applications should be taken into account using [tools with low impact to pollinators during pollination](#)\*.

**\*Pinero's note:** Click on the above link to access this relevant publication “*A Pesticide Decision-Making Guide to Protect Pollinators in Tree Fruit Orchards*” By Maria van Dyke, Emma Mullen, Dan Wixted, and Scott McArt.



## A Pesticide Decision-Making Guide to Protect Pollinators in Tree Fruit Orchards

2018 Edition

By Maria van Dyke, Emma Mullen, Dan Wixted, and Scott McArt



We are presently at or near full bloom in most apple varieties. Temperatures on May 7th & 9th (Monday and Wednesday) are forecast to be in the low 70's with partly cloudy skies. These two days will be critical for fungicide applications. It will also be important for pollinations as temperatures creep into the low 70's.

[Improving pollination](#) has been shown to increase production owing to larger and better-shaped fruit and/or a greater number of fruit per tree. Research is presently underway to use electrostatic sprayers to apply pollen during bloom. Results have shown increased apple fruit set between 56 and 75 percent higher compared to natural pollination in Washington State trials.

[Keeping an eye on cool wet weather ahead:](#)

[Orchard Pollination: Pollinizers, Pollinators and Weather](#)

### Excerpts taken from Penn State's Dr Robert Crassweller

Cold periods during flowering can reduce pollination and subsequent fruit set. Pollen may fail to germinate when temperatures are below 41°F, and pollen tube growth is extremely slow below 51°F. Therefore, in some situations, temperatures could be warm enough for bees to fly (65°F for the honey bee, 5 to 10 degrees cooler for bumble bees and solitary bees), but if the weather turns cold, the pollen tubes may not grow fast enough before the embryo sac deteriorates.

### Effective Pollination Period (EPP)

The effective pollination period (EPP) is the difference between the period of time for pollen tube growth and that of ovule longevity. The longer the effective pollination period, the greater the likelihood of adequate fertilization and seed development. Pollination must occur within 2 to 4 days after the flowers open; otherwise, the embryo sac will degenerate before fertilization can occur. Studies have shown that this period can vary depending on cultivar. The growth of the pollen tube and eventual fertilization of the embryo is largely dependent on temperature and its relationship to the effective pollination period.

The EPP was introduced in the mid-1960s as a way of establishing the time frame between when a flower is pollinated and when the embryo becomes unreceptive. After pollination it takes a certain time for the pollen tube to reach the embryo sac. Once a flower opens, the embryo has only a limited time when it is receptive. If the pollen tube does not reach the embryo before it degenerates, then the flower will not set. The length of the EPP will vary by flower position within the cluster and by certain cultural practices. In general, the EPP can be as short as 3 days and as long as 12 days; Delicious has one of the shortest EPPs. Williams and Wilson developed a temperature response index to allow the estimation of the time required for a pollen tube to grow to the embryo (see below). The index is based on the daily mean temperature over a period of days. When the index reaches or exceeds 100 percent, the pollen tube should have reached the embryo and fertilized the egg. As an example, suppose the average mean temperature over the past five days had been 50, 54, 50, 52, and 59 degrees. Pollen tube growth would be expected to be  $14 + 20 + 14 + 17 + 50 = 115$  percent, meaning pollen tube growth would have taken slightly less than 5 days.

### Effective Pollination Period Index

Mean daily temp (°F)	41	43	45	46	48	50	52	54	55	57	59
Pollen tube growth index (%)	8	9	10	11	12	14	17	20	25	35	50



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**Elizabeth W. Garofalo**

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In the Game of Spores, either you germinate or you die.



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**Jon Clements** Scab ascopore says "Where's My Starbucks Caramel Macchiato???"



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## USEFUL LINKS

[27th Annual March Message \(2019\) to Tree Fruit Growers \(Google Doc\)](#)

UMass Fruit Advisor: <http://umassfruit.com>

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

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

Follow me on Twitter (<http://twitter.com/jmccextman>) and Facebook (<http://www.facebook.com/jmccextman>)

[Acimovic Lab at Hudson Valley](#)

[Peter Jentsch's Blog](#)

The next Healthy Fruit will be published on or about May 14, 2019. 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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