Wednesday, May 26, 2017  Vol 24:8

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Thinning

Crop Load and Thinning Predictions

Apple trees at Highmoor Farm are still in bloom. Pears, peaches, cherries and plums are at petal fall. In southern Maine, trees are at or past petal fall, a time to begin fruit thinning. I don’t expect much to be different this year since bloom appears to be heavy and pollination was good. The biggest factor this year could be the severe drought that occurred last year. When trees do not get enough water, lack of photosynthesis prevents trees from building up carbohydrates and energy that is stored through winter and used to feed fruit and shoots as they rapidly grow the following spring.

A reduction in the amount of stored carbohydrates and other nutrients could make it easier to thin, increase June drop and reduce final crop load or fruit size. I expect thinning to be easy this year because of the drought, so I am recommending a less aggressive approach to thinning this year on trees that are normally easy to thin and a normal approach for thinning varieties that are usually underthinned. As fruit set becomes easier to assess, rates can be adjusted up or down.
Suggestions for thinning this year (with rate per 100 gal. dilute volume):

For easy to thin varieties (McIntosh, Cortland)

Sevin

Other varieties (Honeycrisp, Delicious, Zestar!, Gala, Jonagold, Empire, SnowSweet, etc.):

Sevin (1 pt.) with NAA (Fruitone or PoMaxa at 2-3ozs. per 100 gals.), (or

Sevin (1 pt.) with 6-BA (32 ozs. Maxcel per 100 gals.)

Difficult varieties (Macoun, Fuji, Golden Delicious, Paulared, etc.):

Sevin (1 pt.) with NAA (Fruitone or PoMaxa at 4-6 ozs. per 100 gals.)

or

Sevin (1 pt.) with 6-BA (48-62 ozs. Maxcel per 100 gals.)

For these and other NAA or 6-BA products, consult the label for rates and other considerations.

Website for the pest management guide:

Look under the apple section for Plant Growth Regulators for a list of chemical thinners, rates and timing. This website is not yet complete, and I suspect because the author has been busy with thinning studies. If you have any questions about thinning, please, call or Renae Moran at rmoran@maine.edu, 207-933-2100 or 207-713-7083

Lateral bud development on last year’s shoots appears to be poor, probably from lack of water during their formation last summer and fall. This could have consequences for next year’s bloom because these growing spurs are expected to form flower buds this summer. Because of their week condition, they may instead remain as leafy spurs. In the worst cases, no buds formed on a large number of shoots which makes the trees look like Cortland, a variety known for its “blind wood”. I don’t think that this can be corrected. However, good fertility may help the weak buds become stronger, but the blind wood is likely to remain blind wood. My recommendation is to follow through on foliar fertilization with zinc, urea, boron and magnesium sprays. To prevent bitter pit on Honeycrisp, begin foliar calcium sprays at petal fall rather than later.
Here is the thinning weather forecast charts for Sanford as of Wednesday, May 26. The Sanford and Monmouth charts are updated twice daily at

https://extension.umaine.edu/ipm/ag-radar-apple-sites/me-sanford-apple/#HORTICULTURE

and

https://extension.umaine.edu/ipm/ag-radar-apple-sites/me-monmouth-apple/#HORTICULTURE

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**Weather Influence on Apple Sensitivity to Chemical Thinners**

Excessive Thinning Risk! ➔

** Stronger weather influence for increased sensitivity ➔

* Increased sensitivity ➔

INTERMEDIATE ➔

Reduced sensitivity ➔

Stronger weather influence for reduced sensitivity ➔

Thinner spray date ➔

- Mon, May 22
- Tue, May 23
- Wed, May 24
- Thu, May 25
- Fri, May 26
- Sat, May 27
- Sun, May 28
- Mon, May 29
- Tue, May 30
- Wed, May 31
- Thu, Jun 1
- Fri, Jun 2
- Sat, Jun 3
- Sun, Jun 4
- Mon, Jun 5
- Tue, Jun 6
- Wed, Jun 7
- Thu, Jun 8
- Fri, Jun 9
- Sat, Jun 10
- Sun, Jun 11
- Mon, Jun 12

Forecast values begin May 25, 2017

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Green columns show thinning sensitivity rating for apples up to 12mm diameter on unstressed trees for the 3 day window after application of thinner on morning of date listed. For evening application, use rating for the following day. Ratings reflect the influence of daytime cloud cover and night temperatures for 72 hours following a morning application, not just for that day. You do not need 3 days in a row with high ratings for good thinning. Each day's rating is for a 3 day period. Most of the weather influence on sensitivity to a thinner is during the first 3 days after application.

Horizontal lines mark transition levels between sensitivity categories. "Good thinning" for trees with average sensitivity is associated with ratings in the "Increased Sensitivity" range.

Vertical blue dashed line marks estimated McIntosh fruit diameter exceeding 12mm, causing decline in sensitivity below rated value.

Vertical purple dashed line marks estimated McIntosh fruit diameter exceeding 15mm, causing decline in sensitivity substantially below rated value, and rapid decline in efficacy of NAA and Maxcel.

Vertical black dashed line marks estimated McIntosh fruit diameter exceeding 18mm, bringing an end to the thinning window for carbaryl. Ratings for dates beyond the McIntosh 18mm date are for later cultivars that still have fruit smaller than 18mm diameter.

Vertical solid orange line marks date when fruit have reduced sensitivity after 2 or more days of temperatures > 75F. This may occur on same day and overlap one of the other vertical bars.
We’re not done with fire blight. Let’s hope we are not just getting started. If blossom infections occurred on Friday morning May 19, dead fruit clusters would be visible by Wednesday June 7, and earlier than that if you are looking closely. Shoot blight arising from those infections could start showing roughly around June 18.

While fire blight has our attention, this is as good a time as any to clarify some common misconceptions and get up to speed on how to prevent and manage fire blight.

The following is based primarily on May 1 articles by Drs. Kerik Cox and David Rosenberger, Cornell University in the Scaffolds Newsletter. You can read the original at http://www.scaffolds.entomology.cornell.edu/2017/SCAFFOLDS-5-1-17.pdf. It also includes comments by Dr. Tim Smith, author of the Cougarblight model, e.g. http://extension.wsu.edu/chelan-douglas/agriculture/treefruit/pestmanagement/fireblight/cougarblightmodeloverview/

**Risk Indicators**

* As with apple scab, flyspeck, plum curculio, apple maggot and other pests, block history is a key factor in estimating risk of new fire blight infections. The greater the amount of inoculum (in this case, *Erwinia amylovora* bacteria) in the area, the greater the chance of new infections.

* Fire blight can be unseen in a location for 20 years or more, and then flare up when favorable conditions for infection occur in the absence of protective measures.

* Not all trees are equal with respect to fire blight susceptibility. Young, rapidly growing trees less than 6 years old, and especially 1 or 2 year old trees are most at risk. Fire blight strikes on young trees can lead to tree death. Conversely, ignoring accumulating fire blight on large old trees can suddenly escalate from a nuisance to loss of the orchard when optimum infection conditions occur. This has happened in Maine.

* **Highly susceptible cultivars** include: Gala, Fuji, Ginger Gold, Jonagold, Mutsu and Paula Red (a prime FB target in Maine).
  
  Moderately susceptible: Cortland (but they certainly do get FB), Enterprise, Golden Delicious (ditto), Honeycrisp, Jersey Mac, Macoun, McIntosh, Northern Spry, Pioneer Mac, Pristine, Spartan, and Zestar!.

  Low susceptibility cultivars include: Early McIntosh, Empire, Liberty, Red Delicious, and Smoothee Golden Delicious.

* **The most susceptible rootstocks** include M9, M26, Mark, and Ottawa 3.

  Moderately susceptible rootstocks include Bud 9, G11, G935, M7, MM109, and MM111.

  Low susceptibility (with many resistant) rootstocks include: G16, G30, many other Geneva rootstocks, and V.1.

For complete listings, see the May 1, 2017 Scaffolds newsletter article linked above.
Temperature requirement for blossom blight infection

* Contamination of flowers by fire blight bacteria does not necessarily lead to infection. After infesting the flower, populations of the pathogen have only a few days to grow to a colony size of at least 100,000 or 1 million live bacteria. They have to do that before the flower becomes too old for infection. If they do not reach the required colony size, the bacteria do not cause blossom infection.

* While an individual flower can last for 6-8 days in cooler weather, an apple blossom supports growth of fire blight bacteria for about 4 days during the warm-hot temperatures needed for bacteria to rapidly multiply. Under optimum temperatures, the bacteria colony can increase enough to cause infection with one or two days. If temperatures are warm enough during that 4-day period, and it is followed by a wetting to carry bacteria into the nectaries, then infection can ensue.

* Fire blight bacteria grow slowly below 70F, and moderately between 70 and 75F. Infection potential increases rapidly with temperatures between 75 and 90F. Growth is less at temperatures above 90F, declines rapidly above 95F, and reaches zero at about 99F.

* The Cougarblight and Eastern Fire Blight models focus on this 4-day heat unit accumulation. The original Maryblyt model has a requirement for temperature on day of wetting to be at least 60F. Experts no longer agree that this requirement is accurate. Cougarblight author, Tim Smith writes, “Infection can occur on a ‘cool’ day if temperatures during the three days leading up to the cool, wet day were warm. Blight bacterial colonies that developed to dangerous size on the warm days do not suddenly go away on the first cool day after the warm period.”

Wetting requirement for blossom blight infection

* Rain is the most common source of wetting. Unseasonably warm days such as May 18, 2017 with a high temperature of 91 in Sanford and 89 in Monmouth, often lead to convective thunderstorm rain. Observations of infections where no rain was recorded indicates that heavy dew can provide enough water for infection. Infection without rain has been observed in New England in recent years. Higher infection rates in low areas of orchards with poor air drainage also supports this conclusion.

* Two or more hours of leaf wetness is used as a guess at when heavy dew might contribute to infection potential. This is just a guess. Relative humidity increases as temperatures fall from 2am – 6am. Airblast sprayer applications in arid Washington and Oregon orchards have not been found to induce blossom blight infection. However, with high relative humidity of 80% or more in an east coast orchard, spray application may provide enough extra water to cause sufficient wetting in blossoms that are already just short of the dew point. This risk increases with high volume applications of 100 gallons per acre and slow drying conditions.

* High relative humidity may also play a role in the growth rate of bacteria on the days leading up a wetting event. A few years ago, the lack of infections despite high temperatures and unprotected bloom in Northeast orchards was possibly due to generally dry conditions prior to the wetting event.
**Streptomycin**

* Extensive test in New York and New England has not found streptomycin-resistant fire blight. That is not the case in Michigan and in some western states. In areas where streptomycin resistance has developed, growers must use alternate materials that are somewhat less effective and more expensive. Streptomycin is the best fire blight control option and is still viable in Maine. If multiple antibiotic applications are needed, then Kasumin (kasugamycin) provides an alternative to reduce resistance pressure.

* Proper use of streptomycin can prevent resistance from developing. The worst thing to do encourage resistance is routine use of streptomycin on summer shoot blight. To prevent resistance, streptomycin should be reserved for preventing blossom blight, and in case of hail in a fire blight infested block, to prevent trauma blight (rapid magnification of fire blight infections caused by hail damage).

* I have been told that if kept cool and dry, streptomycin should remain effective for several years at least. Normally, it only makes sense to stockpile the pesticide you need for the current year to avoid storage issues and to insure having fresh material when you need it. But dealers may not be able to keep enough streptomycin on hand to service every customer if there is rapid and unexpected development of blossom blight risk. Blossom blight and trauma blight is routinely develops rapidly and unexpectedly. So keeping at least a minimal emergency supply safely and securely stored is good insurance to have it when you need it in a hurry for either blossom blight or trauma blight.

* A penetrant such as Regulaid, LI700 etc. is not essential for combination with streptomycin to make it work, but it certainly helps and is recommended to increase the chance for effective control. Combination of captan and other materials with penetrants can increase phytotoxicity risk. Weigh the relative need and cost for switching fungicides, or making a separate application, if you need to apply both fungicide and streptomycin.

Regulaid is especially helpful if streptomycin is applied in fast drying conditions. I do not know why the focus is on Regulaid for combination with streptomycin, or if other penetrant adjuvants are equally effective for this use. Regulaid is used at 1 pint per 100 gallons Tankmix.

* No treatment is guaranteed 100% effective. At best, streptomycin is 80-98% effective. If you spray strep and still get blossom blight, take comfort in how much worse it would have been without the streptomycin.

**Fire blight suppressants**

* ‘Biological’ products such as Blossom Protect, Serenade, Double Nickel provide alternate means to reduce the growth of fire blight bacteria within flowers. They must be use proactively during the days leading up to a wetting event. Their use can markedly decrease fire blight incidence, but they are not rescue materials and do not replace the need for streptomycin under high-risk conditions.
**Blossom blight season**

* Hot weather that drives flowers from pink into bloom is much less risk than heat that occurs towards the end of bloom. Early bloom infection potential may be overestimated by model thresholds because the flowers have not been open long enough to acquire fire blight bacterial prior to heat unit accumulation.

* The most severe blossom infections often occur near petal fall. Blossom blight risk does not end at “Petal fall” because of straggler and secondary bloom. These late flowers can continue to open during the 2 to 4 weeks, and even later, after primary bloom has ended. When such flowers are present, if removal is not practical, watch heat unit accumulation. If the current or previous year’s fire blight situation indicates inoculum availability, with heat, flower and wetting conditions likely to be met, then the decision is whether a few flowers is worth a streptomycin application. A relatively small number of late flowers becoming infected is thought to be a common way that fire blight gets established in an orchard.

That is a tough call and depends on weighing the likelihood of infections and the consequence should infection occur. The cost of a streptomycin application is less than dealing with fire blight removal. The possibility of infection on 20-year-old semi-dwarf McIntosh trees is of less concern than in a 2-year block of Honeycrisp on M26.

* First year trees typically bloom much later than established trees. If flowers on those trees are not removed or protected from fire blight, the whole planting can be lost from one infection period. This has happened in Maine.

**Interpreting model estimates**

* Models are just tools to summarize a bunch of numbers into a meaningful estimate. The thresholds use to differentiate between high and low risk are arbitrary. Because the models do not have all the information about cultivar, rootstock, block history, age of tree etc., the threshold values are a generic best guess. Do not discount risk if it is just short of a threshold. For example, think of the 200 unit threshold for high risk in a Cougarblight category II orchard as the center of a range from 175 – 225.

* Having several high risk days in a row is more threatening that a single risk day.

* The models help you focus on the status of the heat and wetting risk factors, which can avoid unnecessary treatment when risk is low, and provide incentive and alarm for concerted action when risk is high.

* The models use standard weather data for a specific location. You will need to know how weather at the nearest reporting site compares to your site. Keep in mind local topography that can influence temperature and dew formation. The weather data used to make estimates does not account for irrigation.
* If conditions are met for infection on unprotected flowers, antibiotic materials must be applied within 24 hours before or after the infection (wetting) event. Applying streptomycin earlier than that would ostensibly know down the bacterial population. As with the biological suppressants, that may reduce or eliminate subsequent blossom infection risk, depending on subsequent temperatures and timing of wetting. However, early application will miss flowers that open after the application. The closer before the wetting event the more likely strep will provide control.

* Don’t overthink the heat unit thresholds. They are not specific measurements of how many heat units are required for an individual flower, inoculated with X number of bacteria, to generate an infection. They are simply associations with past observations, i.e. “Under these temperature conditions, serious outbreaks of fire blight have occurred.”

* Cougarblight has three categories based on orchard history. The lowest risk category 1 is designed for arid west coast orchards and may not be applicable to humid east coast orchards. Maine growers should go by category II ratings. Use category III is you have active fire blight in the orchard or a reasonable presumption for a high number of overwintered cankers based on a large number strikes seen the previous year.

**Management calendar**

* Fire blight reduction starts with winter pruning to remove fire blight cankers, and removal of entire trees that have cankers on the main trunk. Pruned wood should be removed from the orchard and burned or placed where it can dry.

* Copper application at Green Tips serves several purposes, one of which is to make apple tree surfaces less suitable for fire blight bacteria. Treat the entire orchard not just fire blight hot spots.

* During and after primary bloom, watch the weather, the trees, and the models to determine if and when to apply fire suppressants, and/or streptomycin to prevent blossom blight.

* In the first weeks after bloom look for fire blight strikes and remove them if possible. Don’t wait until you incidentally notice fire blight. Take the time to schedule scouting checks, especially if blossom blight conditions occurred earlier or if there was fire blight in the orchard last year. The earlier you can find and remove strikes the better.

* Destroy pruned strikes by burning or leaving them out to dry. Pruning on a dry day reduces risk of spread from cuttings left on the ground to dry. Prune at least 12 inches below infected tissue and back into healthy wood. If there are too many strikes to remove within a week, then prioritize the most important trees to protect. For the others, removing a large number of strikes before terminal bud set may result in flush regrowth and recurring cycles of new shoot blight. Trees with fire blight on the main trunk should be removed. It is safe to replant a new tree in that spot. It is best to replant in the fall so that the new trees will be in bloom synchrony with the other trees the following spring.
**Shoot blight**

* Shoot blight is more commonly observed than blossom blight. Shoot blight can arise from bacterial inoculum in ooze from overwintered fire blight cankers, or from new blossom infections that occurred this spring.

* Trees that have received high nitrogen fertilization and have abundant lush foliar growth are more susceptible to shoot blight.

* Shoot growth reduction by use of prohexadione calcium (Apogee, Kudos) needs to begin by late bloom, with a follow-up application 14-21 days later. If you miss that window, a late start with a high rate application will still be effective at reducing shoot growth after about a 5-day lag. Subsequent application 14-days later may be beneficial to continue shoot growth suppression until terminal bud set in July. Cut the dosage in half for trees less than 5 years old so as not to overly delay their growth.

* Growers are having success with low rate copper application to prevent new shoot blight infections. The risk of phytotoxicity fruit finish damage from summer copper application is reduced by keeping the amount of copper applied to a minimum, combining the copper with a safener such as hydrated lime, and making applications under good drying conditions. The Cornell newsletter gives an example Badge SC at rate of 0.75 to 1.75 pints per acre buffered with 1–3 pounds of hydrated lime for every 2 pints of Badge. Use of copper for shoot blight suppression may require applications at 7-10 day intervals to provide protection during rains that increase infection risk, until terminal bud set.

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**Apple Scab**

Primary scab season just got longer! In Sanford, the final significant primary scab ascospore release will not be until rain arrives on or after Monday May 29. Captan or mancozeb protectant fungicide coverage updated on or after Monday May 22 would be recent enough to protect through a May 29 infection period, but protection against secondary scab would require new coverage by May 30. Scab lesions were just beginning to appear on unsprayed trees in the Sanford area on Tuesday May 23. About half of the years primary scab infection potential will be visible by May 30.

It is too early to estimate the next rain and final infection period date in the Monmouth area, but it will occur with the first soaking daytime rain on or after Friday June 2.
The May 22 rain was the most important scab infection event of the year. If you have doubts about protection during that infection period, a postinfection application of a DMI (Inspire Super, Indar), strobilurin (Cabrio, Flint, Sovran, Pristine) or SDHI fungicide (Merivon, Luna Sensation/Tranquility, Fontelis, Aprovia,) as soon as possible could still provide kickback protection, especially if backed up by second application a week later. After primary scab releases are over, you can use the secondary scab respray table http://ag‐radar.umext.maine.edu/MEmodel/ME‐Sanford‐SecondaryScabSpray.htm to estimate spray intervals. Potential scab lesions from all primary scab releases will have had time to become visible by June 10. Finding no scab lesions by that date is good indication that primary scab control was effective. When second generation scab lesions have had time to appear and are not found, that provides solid confirmation that scab protection can safely be relaxed.

I updated Ag‐Radar to curtail unlimited ascospore maturity with increasing cumulative degree‐days base 32F (DD32F). This will delay the estimated date for final scab ascospore release this year because the hot days on May 17‐19 will no longer be fully credited as providing accelerated scab ascospore maturation. At Monmouth, it adds about a week to primary scab season.

The rest of this article is “Inside Baseball” talk that is not going to help you decide why, when, or what to spray next, or help you make money growing apples, so you may want to skip it and leave it for winter reading or for when you need some paper to light the wood stove. It is included because the end of primary scab season has a big impact on spray scheduling, so an explanation for why there has been a change in the estimation method may be of interest.

A paper by Roubal and Nicot 2016 (attached) criticized the NH model for not having an upper temperature limit and as a result overestimating ascospore maturity with warming temperatures in late spring. Their logic makes sense to me. They tested several models including their ABCD nonlinear model vs NH and got a better fit to observations with their model.

I am not keen on replacing the venerable NH model with one developed in southern France without further deliberation and consultation. Moreover, the NH model has generally performed very well once the dry‐switch issue was addressed. But Roubal & Nicot's critique in light of our recent hot weather got me to look at the high‐temperature filter I used to have in the scab ascospore model but took out a few years ago (because at the time it was primarily my gut sense without much documentation to back it up). I hesitate to add conditions or to otherwise alter model calculations because in order to use a model's interpretive context for what values mean, you have to use the same methods they used to calculate those values.

But in this case, I think we are on safe ground for many reasons:
1) The original NH model data, (along with others) show a declining ratio of degree-days to maturation at temperatures above 59-61F.

For example, in the NH model definition data, the DD32F per day to mature spores was much lower at lower temperatures than at higher temperatures. Thus, increasing temperatures are less efficient at generating spore development.

At 43F - 11 DD32 required per day
50F - 18
59F - 27
--------
At 68F - 36 DD32 required per day.

2) While some of the input data for the NH model was from incubations at 20C (68F), most of the lab data came from leaves kept at lower temperatures. The temperatures that affected the field incubations are not stated in the paper, but as days with average temperature >61F are uncommon (esp. back in 1979-1980 when the data were collected), it is likely that few or at least not many such days were not included in the field data.

3) The same applies for the field data used to verify the model. The lab data used to verify the model only included incubations at 6C (43F) and 12C (54F), far below the 60.8F threshold temperature threshold. Thus, it is possible that none of the verification data included daily average temperatures above 60F.

4) The NH model mixed both spore release and apparent visible spore maturity. Subsequent research found that ascospores can become visibly mature as much as two weeks before they actually release. Thus, the NH model is based on "maturity" where many of the spores counted as mature were not necessarily functionally ready for release. This is a separate issue than a high-temperature impact. However, to the degree that it is significant, it would cause the NH model to overestimate end of season ascospore maturity.

5) Roubal and Nicot 2016 found that the NH model overestimated end of season ascospore maturity compared to their spore release observations. They make a convincing argument that giving full credit to high-temperature days is the reason and that on hot days scab spore development does give a parallel increase in degree-day accumulation.

6) Multiple other studies have found that ascospore maturation does not scale infinitely with increasing temperature. James and Sutton 1982 provides a rationale and formula for not giving full DD credit on days when the average temperature is over 60.8F. That does not happen very often during primary scab season. Adding a high-temperature filter based on that does not change the cumulative DD very much under "normal" conditions (i.e. few days during primary scab with average temperature over 61F). But the new filter does add a few days to the duration of primary scab season this year because of the hot days we had on May 17-19.
7) The main function of the scab ascospore maturity model is to estimate ascospore maturation as an input for estimating the end of primary scab spore releases. It is less harmful to underestimate than to overestimate spore maturity in this context. (Better safe than sorry).

8) It is just as much of an assumption, (actually more so given the prevalence of asymptotic temperature curves in biology), to assume that development accelerates with increasing degree days with no upper limit as it is to use information from a peer reviewed study by the great Turner Sutton to curtail the DD - development ratio at high temperatures, and by doing so to address an issue, like the dry switch, that was not addressed in formulating the NH scab degree day model.

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I do not take changing a key decision model mid-stream lightly. However, there is no excuse for standing still when we have reason and good background to adjust a model. July weather in bloom requires attention. Ag-Radar is a platform and methodology, and not a fixed entity. That is one of its best aspects - it does not require piles of money, memos, and meetings to hire server script coders to invoke logic for which they have no gut sense feeling for or understanding, followed by weeks of waiting and corrections.
## Foliar Fertilizers

### Foliar Fertilizer Application Schedule in Established Orchards in Maine

<table>
<thead>
<tr>
<th>Fertilizer</th>
<th>Concentration</th>
<th>Timing</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed copper fungicides</td>
<td>variable</td>
<td>Green tip</td>
<td>Follow label directions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Copper sulfate burns fruit and foliage when applied after green tip.</em></td>
</tr>
<tr>
<td>Manganese-containing fungicides</td>
<td>variable</td>
<td>Tight cluster</td>
<td>Follow label directions.</td>
</tr>
<tr>
<td>Chelated zinc or Zinc-EDTA</td>
<td>variable</td>
<td>Tight cluster to 3rd cover</td>
<td>Follow label directions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Some zinc products will burn fruit and foliage. Use only those products that have been previously tested on tree fruits.</em></td>
</tr>
<tr>
<td>Boron</td>
<td>variable</td>
<td>Pink to 2nd cover</td>
<td>Follow label directions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Do not mix with pesticides in water soluble plastic pouches. Do not tank mix with oil or calcium nitrate.</em></td>
</tr>
<tr>
<td>Epsom salts (magnesium sulfate)</td>
<td>10% magnesium</td>
<td>Petal fall to 2nd cover</td>
<td>15 lbs. / 100 gallons in each application</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Not compatible with calcium chloride.</em></td>
</tr>
<tr>
<td>Calcium chloride</td>
<td>78% calcium chloride</td>
<td>1st cover to two weeks before harvest</td>
<td>1 - 2 lbs. / 100 gallons in each application. Increase to 3 - 4 lbs. / 100 gal. in August.</td>
</tr>
<tr>
<td>Other calcium products</td>
<td>variable</td>
<td>1st cover to two weeks before harvest</td>
<td>Follow label directions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Products that contain less than 10% calcium may not provide sufficient calcium to prevent bitter pit in Honeycrisp apples.</em></td>
</tr>
</tbody>
</table>

Apply foliar fertilizers according to leaf analysis. Do not apply fertilizers or chemicals during or just before hot weather. Concentrate sprays of more than 3X can result in fruit scarring. 1st Cover is 7 – 10 days after petal fall.

Where brand names are used it is for the reader’s information. No endorsement is implied nor is any discrimination intended against products with similar ingredients. Always consult product label for rates, application instructions and safety precautions. Users of these products assume all associated risks.
Closing Words

David Slack ✡
@slack2thefuture

Remember sitting in history, thinking “If I was alive then, I would’ve…”

You’re alive now. Whatever you’re doing is what you would’ve done.
11:25 PM - 27 Jan 2017
↩ 104,294  ❤️ 159,416

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http://extension.umaine.edu/fruit/

Putting Knowledge to Work with the People of Maine
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