PURDUE UNIVERSITY
PURDUE EXTENSION
FACTS FOR Fancy Fruit
Issue: 17-04
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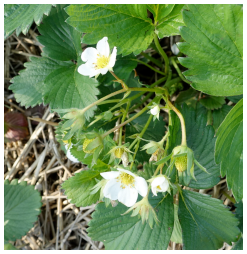
In This Issue

Crop Conditions


Peach – fruit approaching 1" diameter


Strawberry, full bloom to petal fall


Black raspberry, pre-bloom


Grapes, 4 to 6 inch shoots


Thorn-less blackberry, pre-bloom


Apple – fruit at 12 mm


Cherry – fruit set

Grapes are at the 8-10 inch shoot stage in southern Indiana and 6 inches or less in northern Indiana. Brambles are blooming in the south and approaching first bloom in central and northern areas. Blueberries are at petal fall to full bloom across the state.

There are a few reports of damage to grapes and berry crops

around the state from the frost event that occurred on May 5-6. Temperatures were mostly in the the low 30s, but low lying areas got a bit colder. Growers report some shoot tip death on grapes and bramble primocanes, and strawberry and blueberry flowers.

There are also some reports of herbicide drift injury in fruit crops. The rain over the past couple of weeks has mostly stalled field work and will put pressure on row crop farmers to get the rest of their fields planted as soon as soils dry out. That could lead to spraying under less than ideal conditions, which can lead to drift problems. If you suspect damage from pesticide drift, contact the Indiana State Chemist Office at 800-893-6637.

Venturia Inaequalis

The recent spate of cool, wet weather has left one organism happy, *Venturia inaequalis*, the fungus that causes apple scab. Most of the state just underwent an extreme scab period, and unfortunately, few of us could do anything about it because of the combination of rain and wind. The revised Mill's table (from http://www.fruit.cornell.edu/tfabp/revmills.htm)identifies this period as taking anywhere from 8 up to 30 hours.

Average Temperature[1]			Incubation
F	C	Wetting Period (hr)[2]	Period (days)[3]
79	26	11.3	---
77	25	8	---
75	24	6.1	---
73-63	23-17	6	9-10
61	16	6.1	9-10
59-57	14-15	7	12-13
55	13	8	14
54	12	8.3	14
52	11	9	15
50	10	11	16
48	9	12.2	17
46	8	13.4	17
44	7	15.4	17
43	6	18	17
40	5	21.2	---
39	4	27.8	---
37	3	29.6	---
35	2	34.7	---
34	1	40.5	---

[1]Average temperature during the wetting period in Fahrenheit or Celsius
[2]Minimum wetting period needed to achieve infection
[3]Time in days until visible symptoms appear

Average Temperature Table

Unfortunately, days of rain provide the perfect infection period. The kicker is the fact that infection develops really slowly under these cool, wet conditions. This means symptoms may not show up for another two to three weeks. At this point, everyone is thinking 'Fungicide resistance!', as opposed to what really happened—heavy rains that washed off any trace of fungicide, plus a long, cool wet infection period that delayed symptom development.

Obviously, we are past the point of rescue sprays. Furthermore, for those of you with the heaviest rains, you may have needed a canoe, kayak or small boat to get into the orchard. Heavy winds might (or should) have prevented spraying, too. So, what is a grower to do?

Keeping fruit protected is the key. Heavy rains will work against powdery mildew, but drive apple scab. The summer rots (bitter, black, white) require warm, wet conditions according to the literature. In my experience, fungi are not very good at reading the literature. Alternating between the DMI fungicides (FRAC 3; Inspire, Indar, Topguard, and Rally if you don't have significant resistance) and strobilurins (FRAC 11; Flint, Sovran) or FRAC 11+7 pre-mixes like Pristine, Merivon, and Luna Sensation; these fungicides will control scab, powdery mildew, rust and some summer rots. For those varieties still under the 77-day PHI, I cannot stress the use of mancozeb enough to provide a tank mix partner (where needed), as it provides good scab control plus excellent summer rot protection. Plus, in this period of crazy tank mixes (petal fall to 2nd cover), minimizing captan use (and risk) is always a good thing.

There's not much we can do about the weather. "May and June. Soft syllables, gentle names for the two best months in the garden year: cool, misty mornings gently burned away with a warming spring sun, followed by breezy afternoons and chilly nights. The discussion of philosophy is over; it's time for work to begin." –Peter Loewer

Phomopsis Cane and Leaf Spot in Grapes

The weather the past 3 weeks has been ideal for development of Phomopsis cane and leaf spot. Temperatures have been cool with frequent rain, and shoot growth has been slow. These conditions favor sporulation and infection by *Phomopsis viticola*. This pathogen is one of the major causes of fruit rot in the Midwest. Early season infections of shoots, cluster rachises and berry stems remain latent until veraison. Then as the fruit begins to ripen, the fungus resumes development and infects berries and girdles cluster stems. Damage can be severe and fruit quality greatly diminished. If a few sprays were missed and infections have occurred, infected shoots should be removed during shoot thinning to minimize problems later. As the weather gets warmer, new infections are less likely. But, any infected shoot can result in fruit rots later. Remove those during shoot thinning if possible.

I've had several emails about the best fungicide to apply during these rainy conditions. Mancozeb is our product of choice for Phomopsis, but it is a protectant fungicide that remains on the outside of the plant and must be present prior to infection. Even the "Rainfast" formulations, or those where a sticker was added will be washed off with heavy rain. The general rule of thumb is that about 1/2 of the residue is removed by 1 inch of rain. Two inches of rain means that most of the product was removed from the plant and reapplication is necessary. The very heavy rainfall we saw across the state this past 10 days has been a challenge for growers. Ideally we would apply a rainfast "systemic" fungicide during rainy periods. Unfortunately, the systemic sterol inhibitors (FRAC 3) we use for black rot and powdery mildew control are are not effective against Phomopsis. There are a couple of options for systemic fungicides: The FRAC 11 strobilurins (Abound, Flint, Luna Experience, Pristine, Quadris Top) are listed as 'Fair' for control of Phomopsis. Topsin-M, which is also systemic to a certain extent, provides 'Good' control. So

those are a couple of options to consider. But don't forget the role of sanitation. As mentioned above, removing any heavily infected shoots during shoot thinning makes a lot of sense. Fruit on those shoots is very likely to rot prior to harvest anyway.

Phomopsis shoot and rachis infection

Phomopsis leaf spot

Phomopsis shoot infection

Phomopsis rachis infection

Phomopsis rachis infection and berry rot

Shoot and Cluster Thinning Grapes

One of the most critical management practices for grapes is crop load management through shoot and cluster thinning. Many varieties grown in Indiana tend to produce a large number of "non-count" shoots from adventitious buds and basal buds at count nodes. This can lead to excess crop and shading in the canopy. In addition, some of the varieties we grow tend to be overly fruitful, producing more fruit than the vine can feasibly ripen. Carrying a large crop can result in reduced vine size and capacity, so careful thinning to balance fruit production to vegetative capacity is required.

Shoot thinning reduces excess shoot number to both adjust crop and reduce shading. Growers typically select 40-60 nodes per vine during dormant pruning. If delayed-double pruning was done, that number may be much higher. Now that the danger of frost is "mostly" past (wow, close call this week), it is time to go through the vineyard and assess shoot number and adjust it to the desired number. Five to six shoots per foot of row is generally considered to be the optimum density. That equates to 40-50 shoots per vine at typical 8 foot vine spacing. It is very easy to accomplish now while the shoots are short and tender. They are not attached to the vines very firmly so the break off easily. If you wait too long, the shoot attachment toughens and the shoots many need to be cut, greatly increasing the time required for removal.

Cluster thinning will also be necessary on most large clustered varieties. Typically each shoot is allowed to carry only one or two clusters. Excess clusters are removed, and all clusters from short, weak shoots are removed. Growers should try to adjust the crop to balance the fruit production for a "crop load ratio" of about 10. e.g. vines that average 2 lb of pruning wood should be able to produce 20 lb of fruit (and 2 lb of pruning wood again). By taking pruning weight data in your vineyard you can estimate the appropriate number of clusters to leave to produce the optimum yield. If you do not know the average cluster weights, see HO-221 Grape Varieties for Indiana for average cluster weight data from my trials and a discussion about crop load ratio. Large clustered varieties such as Chambourcin and Vidal typically have clusters that weigh 0.3 to 0.4 lb. That means you will have 1 lb of yield for every 2.5 to 3 clusters. If you leave 50 shoots per vine and each one produces 2 large clusters, you could have twice as much fruit as desired. So thinning is very important at maintaining vine size and producing high quality fruit. Cluster thinning for wine grapes is best done after bloom and fruit set. Waiting until then results in looser clusters. Thinning prior to bloom can increase berry set, resulting in full clusters that are very compact and potentially prone to bunch rots later in the season.

Census of Agriculture Countdown Begins for America's Farmers and Ranchers

WASHINGTON, Mar. 15, 2017 –America's farmers and ranchers will soon have the opportunity to strongly represent agriculture in their communities and industry by taking part in the 2017 Census of Agriculture. Conducted every five years by the U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS), the census, to be mailed at the end of this year, is a

complete count of all U.S. farms, ranches, and those who operate them.

"The Census of Agriculture remains the only source of uniform, comprehensive, and impartial agriculture data for every county in the nation," said NASS Administrator Hubert Hamer. "As such, census results are relied upon heavily by those who serve farmers and rural communities, including federal, state and local governments, agribusinesses, trade associations, extension educators, researchers, and farmers and ranchers themselves."

The Census of Agriculture highlights land use and ownership, operator characteristics, production practices, income and expenditures, and other topics. The 2012 Census of Agriculture revealed that over three million farmers operated more than two million farms, spanning over 914 million acres. This was a four percent decrease in the number of U.S. farms from the previous census in 2007. However, agriculture sales, income, and expenses increased between 2007 and 2012. This telling information and thousands of other agriculture statistics are a direct result of responses to the Census of Agriculture.

"Today, when data are so important, there is strength in numbers," said Hamer. "For farmers and ranchers, participation in the 2017 Census of Agriculture is their voice, their future, and their opportunity to shape American agriculture – its policies, services, and assistance programs – for years to come."

Producers who are new to farming or did not receive a Census of Agriculture in 2012 still have time to sign up to receive the 2017 Census of Agriculture report form by visiting www.agcensus.usda.gov and clicking on the 'Make Sure You Are Counted' button through June. NASS defines a farm as any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year (2017).

For more information about the 2017 Census of Agriculture and to see how census data are used, visit www.agcensus.usda.gov or call (800) 727-9540.

Contact: Sue King, (202) 690-8122 sue.king@nass.usda.gov
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Spring Temperatures

What an unusual spring it's been. We started out extremely early, then it was cool for a month or so with hardly any Growing Degree Day accumulation, then warm again (see Figure 1). Just when apple crops started to get in the window for chemical thinning (around 12 mm), it became cool again. The good news is that we are not as early as we were previously and the risk of frost has almost passed. Although we've had a lot of rain, with associated disease control issues, from a fruit growth perspective we're looking pretty good. A few areas in the state experienced a light frost (28F) a few nights ago, but I have not heard any reports of damage.

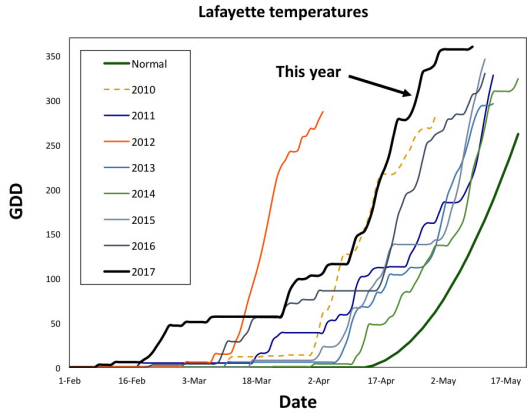

Figure 1

Apple Thinning

Remember that many chemical thinners don't work very well when daily temperatures are below about 65 F. So here we are with warm days ahead, which means rapid fruit growth, perhaps up to 1 mm per day. Apple fruit here in Lafayette are about 12mm which leaves us some good options for chemical thinning. However in more southern areas, fruit is considerably larger, maybe 15 mm or more. Even if chemical thinners have been applied, in many cases these applications didn't seem to have worked very well so we still have too many fruit on the tree.

So what to do at this point? There are really two main options for chemically thinning in this situation: ethephon and sevin. While ethephon can be a very effective thinner, it tends to be pretty unpredictable and so the risk associated with this product is higher than many growers are comfortably with. Sevin can thin fruit up to 20 mm and is more predictable so is probably the best option for growers who have larger fruit that need additional thinning. But with warm temperatures ahead and fruit sizing quickly, growers will need to act fast.

Upcoming Events

Eastern Indiana Fruit Growers Association
Hosting Orchard Garden tours at the "Slice of Paradise"
3912 S. Felton St., Marion, IN.
Tuesday, May 23 at 6:30pm
Dr. Rick Foster from Purdue University will be in attendance
For more information, call 765-661-4597

Indiana Horticultural Society Field Day
June 28, 2017
Tuttle Orchard
Greenfield, IN
More details to come but mark the date on your calendar and plan to attend

Indiana Winery and Vineyard Association Summer Meeting and Vineyard Tour

July 18-19, 2017
Brown County Inn, Nashville IN
More details to come, but mark the date on your calendar and plan to attend

Indiana Horticultural Congress

February 13-15, 2018
Indianapolis Marriott East
Indianapolis, IN
For further information contact Lori Jolly-Brown @ljollybr@purdue.edu or visit www.inhortcongress.org for more details.

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