PURDUE UNIVERSITY

FACTS FOR FANCY FRUIT

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A Newsletter for Commercial and Advanced Amateur fruit growers.

In This Issue

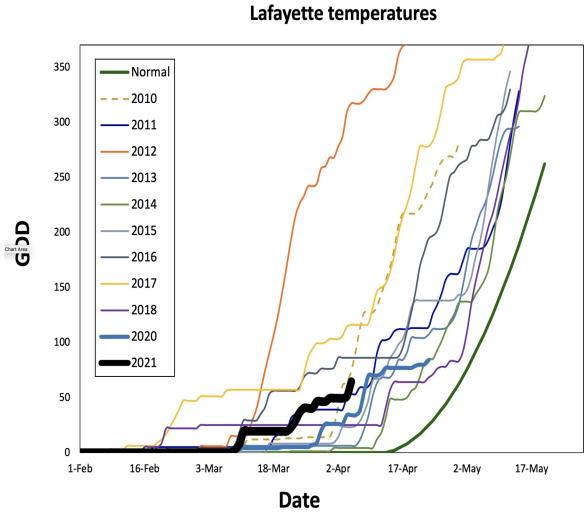
Crop Conditions

(Peter M Hirst, hirst@purdue.edu, (765) 494-1323)

Spring temperatures and the season so far

It seems like it's been warm and that we're way ahead of normal. But the data paint a slightly different picture. First, let's not talk too much about "normal". In the last 10 years or so that I've been plotting these data, EVERY year has been warmer than normal – some extremely early (like 2012) whereas others have been just slightly warmer. This year too we're ahead of normal, but not dramatically so. This year is plotted in the thick black line and you can see we're tracking about average for the last 10 years. We're slightly earlier than last year. Let's keep our fingers crossed that we don't get the late freezes that we had last year.

Having said that, we already had a freeze on April 2 that covered many areas of the state. In Lafayette a low of 20F was recorded. Thankfully crops were not developed enough to cause a lot of damage. Those in more southern areas of Indiana were not so fortunate. Some damage is showing up but thinning to both apples and peaches will likely still be required.



Apple: early pink

Peach: Half-inch green almost at pink

Plum: early bloom

Red raspberry: pre-bloom

Grape: bud break

Climate & weather

(Beth Hall, hall556@purdue.edu)

April Showers or Lingering Drought?
Beth Hall, Indiana State Climatologist

March wrapped up as one of Indiana's wettest (44th wettest out of 126 years) and warmest (16th warmest). It was marked by unusually warm days and then cool days. Was it ever just average? Certainly, most days fell within the climatological range of temperatures. Precipitation seemed to be partial to the southern part of the state with only teasing amounts up north. This kept the northern counties in an *Abnormally Dry* or *Moderate Drought* status throughout the month while the southern counties were hoping to avoid any serious flooding.

Which brings us to April.

The national Climate Prediction Center is indicating enhanced probabilities for a warmer than average April, but unfortunately the predictive models were all over the place with respect to precipitation. As plants start to come out of dormancy and thoughts of early planting are crossing farmers' minds, the question folks are wondering is if 2021 will be more like 2019 (wetter) or 2012 (drier). Shorter-termed outlooks are predicting enhanced probability for drier-than-normal conditions through the middle part of the month (April 12-20) and then after that, there is too much uncertainty. During this same period, temperatures are predicted to be favored toward cooler-than-normal conditions, so this should discourage evaporative demand from drying out soils too much. Additionally, the April-May-June outlook is still favoring wetter-than-normal conditions so the dry periods in April should not last long enough for us to start worrying at this point. With climate outlooks favoring warmer-than-normal temperatures over the next few months, a repeat of 2019 is highly unlikely. We'll have to keep monitoring for potential drought development or enhancement.

The cooler-than-normal temperatures later this month could pose a risk for near freezing or freezing conditions, so keep an eye on those forecasts and don't get too hasty to plant those flowers. In the meantime, sit back and enjoy the longer days and the nice evenings before Mother Nature starts testing our patience with the emergence of the Brood X cicadas, heat waves, and wind storms!

Finally, growing degree day accumulations have just started (Figure 1), but things are ahead of average in the northern half of the state and slightly behind average for this time of year

along the Ohio River (Figure 2). Recent warm temperatures have helped get things started across the state, but look for these accumulations to slow down over the next few weeks.

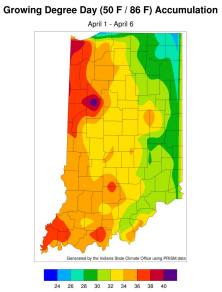


Figure 1. Growing degree day accumulations since April 1, 2021

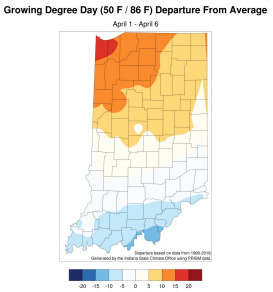


Figure 2. The growing degree day departure from average from April 1 through April 6

Early Season Disease Management

(Janna L Beckerman, jbeckerm@purdue.edu, (765) 494-4628)

After what can only be described as a very early spring, we are entering the unusual situation of worrying about fire blight in April. Summer-like weather, rainfall, thunderstorms and hail mean that growers should be very concerned about fire blight. It is important to note that the fire blight pathogen, *Erwinia amylovora*, is always present at some level on the surface of most apple trees, and on other rosaceous plants (Fig. 1). After the crop loss that most of the state experienced last year, heavier bloom, and warm, wet weather has the potential to make for catastrophic fire blight in 2021. Never forget that fire blight appears suddenly and spreads quickly—causing significant damage in a matter of days, but taking weeks, months or even years to get under control.

Fire blight infections start primarily at the flowers, although bacteria can enter and establish through wounds caused by hail or high winds associated with summer storms (referred to as shoot blight or trauma blight. Note: shoot blight is often the result of carryover flower infections from the previous year). How much the bacteria spread has a lot to do with type of cultivar infected: Red Delicious, Honeycrisp, McIntosh, and Empire are more resistant to fire blight, compared to cultivars like Crispin (Mutsu), Fuji, Gala, Ginger Gold, Gravenstein, Jonathan, Ida Red, and Lodi that are much more susceptible. How much the bacteria spread also has a lot to do with the age of the tree, with younger trees more susceptible than older ones. Finally, excessive N fertilization, especially if ammoniacal nitrogen is used, can make even 'resistant' cultivars susceptible to fire blight.

Susceptible cultivars serve as reservoirs for the fire blight bacteria. Years ago, at our research plot at Meigs, we witnessed a severe outbreak of fire blight in the Fuji/Gala/Jonathan/Ruby Jon planting. This block of super susceptible cultivars acted as a source of inoculum for other cultivars, quickly spreading throughout the block, and then radiating out to those trees adjacent to or downwind from the Fuji/Gala/Jonathan/Ruby Jon planting.

If your orchard has a history of fire blight, I would strongly encourage you to consider applying Apogee or Kudos(Prohexadione-Ca). Apogee is a growth regulator that does not directly kill the fire blight bacterium, but reduces shoot growth, thereby increasing plant resistance by reducing host vigor. Apogee suppresses apple shoot

growth when applied near petal fall as a single spray, or as several applications over time. Apple response to Apogee depends upon the cultivar, timing, rate of application, crop load, and even geographical location. Regardless of this variability, Apogee remains the best management tool available for controlling the shoot blight phase of fire blight that growers may be faced with after a freeze.

For those at tight cluster through pink: Assuming trees have less than 3" of new growth, early applications of apogee will help prevent fire blight in what is shaping up to be another challenging year. With temperatures flirting with 80 today, fire blight needs to be on your radar.

For those at bloom: Now is the time to protect blossoms with streptomycin. To date, we have not identified any streptomycin -resistant fire blight bacteria. With proper stewardship, we can do a lot to keep it that way. Apply streptomycin with the first (king) bloom, followed by full bloom and possibly petal fall, depending how quickly this stage transpires.

Apple Scab

Now is the time to do a quick scab scouting. I did a quick survey in our unsprayed research plots out at Meig's Farm and could not find scab (I also didn't have my readers with me, so…). I'm sure it's there—I'm probably too short to reach it. This orchard, or at least the blocks I work in, would qualify as a high-inoculum orchard with serious fungicide resistance issues. Because the trees are so far along, infection courts will include the upper and lower leaf surface, petals, green shoots, developing fruit—you name it. It will take about 10 to 17 days from the time of infection by the apple scab pathogen until symptom development occurs, whereupon we'll see feathery olive to blackish, velvety scab lesions that drive secondary infection. I'm really excited about our scab and bitter rot trials this year, which include a head-to-head trial of different SDHI fungicides, because, inquiring minds want to know!

Using DMIs at petal fall and first cover will protect not only against scab (especially using Inspire Super, which we found was effective against highly Nova/Rally-resistant isolates) but will also protect against powdery mildew and the juniper rusts. Dodine can be applied no later than pink, and will only work against scab. Note: Inspire does not seem to have the juniper rust or powdery mildew control of Rally. Thus, you may wish to use Inspire for petal fall and revert back to Rally for first cover, where Rally resistant scab is not an issue.

Stone Fruit:

Peach Scab (Fig. 2). Timing sprays to early shuck-split and shuck-fall are essential for peach scab control. Apply the first spray about one week after petal fall and continue to spray on a 7 to 14-day interval until 40 days before harvest. If you're using Bravo for brown rot control (in addition to scab), be sure to stop at shuck-split, or things can get ugly. See the Midwest Fruit Pest Management Guide for further information at https://ag.purdue.edu/hla/Hort/Documents/ID-465.pdf

Bacterial Spot

Unlike peach scab, which only attacks the fruit, bacterial spot attacks the fruit, leaves (Fig. 3), and newly developed twigs and shoots, usually around the time of petal fall to shuck split. Symptoms of bacterial fruit spot are tiny, purple to black specks on peaches with yellow halos, and as water-soaked spots on nectarines and other smooth skinned *Prunus* spp. Later, the skin is "broken" and the flesh beneath the spot becomes sunken. These lesions do not appear velvety, like peach scab. Foliar spots are usually angular, delimited by leaf veins. In the next few weeks, they become watersoaked and may

eventually fall out, creating a “shot hole” type appearance. Mycoshield and Flame-out are labeled for use from petal fall to shuck split. Captan or a “too late” copper application can cause damage that can be confused with bacterial spot.

Brown Rot

Prevent infection by the proper application of fungicides prior to shuck-split; the protectant fungicides Chlorothalonil (Bravo, Echo) and Captan provide the best protection against brown rot. For those of you in northern Indiana, from pink to petal fall, Topsin-M (FRAC 1), Rovral(FRAC 2), Quash, Rally Indar. Tilt, Elite (all FRAC 3), Fontelis (FRAC 7), Pristine, Merivon or Luna Sensation(FRAC 11+7), Elevate (FRAC 17), are all labeled for use. Unlike the Eastern US, we have not seen any evidence, nor have I heard of any reports of Topsin-M resistance in the brown rot fungus, so feel free to incorporate Topsin-M in your rotations. Rotating different classes of fungicides is essential for good resistance management, and will hopefully allow us to continue using Topsin-M, and other systemic fungicides for a long-time. Check out the Indiana peach disease management guide at https://www.extension.purdue.edu/extmedia/BP/BP-208-W.pdf

Blueberries

Mummyberry

Where blossoms are open, apply Indar or Pristine to prevent mummy berry infection from occurring. Flowers are most susceptible immediately after opening with susceptibility decreasing over time. As pollination increases, so increases the risk of infection as bees vector spores from infected plants to susceptible flowers. Infection begins when the spores germinate on the stigma of the flower and then grows just like a pollen tube through the pistil into the ovaries. Once the fungus reaches the ovaries, it colonizes in the developing berry and can be seen as white fungal growth if the green berries are cut open.

Phomopsis

Phomopsis canker and twig blight, caused by the fungus *Phomopsis vaccinii,* has been and continues to be a serious problem in Indiana (Fig. 4). Our mild winter means we wouldn’t anticipate this being a problem this year, and growers with a history of this disease can try to get a jump on eradicating what phomopsis they do have, and really protecting the new green growth, reducing the risk for future problems.

If you haven’t already, or even if you started, continue to prune out dead and diseased twigs, even if they are green, and as they develop! Destroy all infected plant material. Protect the new growth from mechanical or chemical injury—these injuries allow the fungus to get into the plant!

Use fungicides to protect new canes from infection. The following fungicides are labeled:

- Captan or
- Ziram
- Indar
- Pristine
- Flint Extra (excluding high bush)
- Luna Sensation (excluding high bush)
- Merivon
- Miravis Prime
- Quash
- Switch

These fungicides should be applied every 10-14 days from early pink bud through pea-size fruit. Under high pressure, fungicides should be used through August, as spore activity of Phomopsis ceases around September.

Figure 1. Fire blight ooze from last year's canker. Photo by George Sundin

Figure 2. Peach scab is often misdiagnosed for bacterial spot. Photo by Janna Beckerman.

Figure 3. Bacterial spot, cause by the bacterium Xanthomonas, is also called shot hole. Photo by Janna Beckerman.

Figure 4. Phomopsis on blueberry. Photo by Mary Ann Hansen.

Extension Organic Agriculture Specialist announcement

(Lori K Jolly-Brown, ljollybr@purdue.edu)

On behalf of the Purdue University Department of Horticulture and Landscape Architecture, we invite qualified candidates to apply for the Extension Organic Agriculture Specialist, full-time staff position based at the Purdue University, West Lafayette, IN campus.

The primary purpose of this position is to help coordinate Purdue University's Extension efforts through the diversification of Indiana agriculture. The position will work closely with the Assistant Program Leader for Diversified Farming and Food Systems, Faculty leaders, Extension specialists and educators. They will connect with farmers, governmental and non-governmental organizations across the state to provide support for their operations.

Qualified candidates employed by Purdue University should apply at:https://performancemanager8.successfactors.com/sf/jobreq?jobId=13520&company=purdueuniv

Qualified candidates not employed by Purdue University should apply at: https://career8.successfactors.com/sfcareer/jobreqcareer?jobId=13520&company=purdueuniv

Review of applications will start on May 17, 2021.

Visit the websites listed above or see the position announcement below for more information. ExtensionOrganicAgricultureSpecialist annoucement

Please contact Petrus Langenhoven, Chair, at plangenh@purdue.edu with questions about the position.

Sincerely
Search Committee members:
Petrus Langenhoven (Chair), Tamara Benjamin,

Stephen Meyers, Amy Thompson, Joe Rorick, and Colleen Flynn

Strawberry Frost Protection

(Wenjing Guan, guan40@purdue.edu)

Last week when the heavy frost hit us, air temperature at Southwest Purdue Ag Center (SWPAC) in Vincennes, IN dropped to 24°F. We did not take action for frost protection on the strawberries growing with the annual plasticulture system, considering only two early cultivars start to bloom at that time. However, this appears to be a mistake. After a few warm days, flowers grow out on a few other cultivars and they all seem to be damaged. Apparently, the frost not only killed open blooms but also damaged flowers in the popcorn stage. It is important to keep in mind that open strawberry flowers can not tolerate temperatures lower than 30°F, popcorn stage flowers and tight buds may tolerate temperatures low to 26 and 22°F, respectively. Our mistake illustrated the importance of carefully checking the blooming stage of plants in the spring. Even if they have not had open blooms, the spring frost can damage popcorn-stage flowers and cause yield loss. It became apparent that the harvest of early cultivars in our trial will be delayed and yield of some of the cultivars will be reduced significantly. These may include cultivars Radiance, Sensation, San Andreas, Ruby June, and Rocco. Cultivars that have not bloomed in our trial include Chandler, Liz, Camino Real, Galletta, and Flavorfest. They were not affected by last week's frost in our trial. As more cultivars on the plasticulture system are entering full bloom and early cultivars grown with matted-row system are starting to have open flowers, it became extremely critical for growers to be very careful of any potential frost event in the next a few weeks.

One way to protect strawberry plants from spring frost damage is using floating row covers. Floating row covers have many different weights. Strawberry growers should choose the heavy-weighted ones (1.5 oz/sq. yard or above) in this case. Place the row covers on top of strawberry plants prior to the frost event, and remove them after the frost; adding wire hoops on top of strawberry bed so that the floating row cover is not directly touching the plants will add protection. In a case study last year at SWPAC, we placed 1.5 oz floating row cover on wire hoops in strawberry rows successfully protected flowers as temperature dropped to 24 °F (Figure 1. detailed information of this case study is in this article). Light-weighted row covers (0.5 oz) provide little frost protection. They are more suitable to be used as an insect barrier that covers plants for an extended period of time.

If strawberries are growing in a field without overhead irrigation for frost protection, growers should consider investing in heavy-weighted floating row covers, which can save the crop if there was a heavy frost in the spring. Although we hope not, mother nature may not work the way we hope.

Figure 1. The strawberry field was covered with floating row covers (1.5 oz) for frost protection in the spring.

Extension Events

(Lori K Jolly-Brown, ljollybr@purdue.edu)

Small Farm Education Field Day July 29th, 2021 at the Purdue Student Farm.

Small Farm Education Field Day Webinar Series August 2, 4, 6, 9, 11, 13, 2021.

Watch for details at the Purdue Student Farm website https://www.purdue.edu/hla/sites/studentfarm/

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