VEGETABLE CROPS HOTLINE

A newsletter for commercial vegetable growers prepared by the Purdue University Cooperative Extension Service

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In This Issue

MELCAST 2021

(Dan Egel, egel@purdue.edu, (812) 886-0198)

MELCAST is a weather-based disease-forecasting program that helps growers schedule foliar fungicides applications for watermelon and cantaloupe. **MELCAST** stands for MELon disease for CASTer. This program, designed by Dr. Rick Latin, Professor of Plant Pathology at Purdue University, keeps track of weather conditions so that cantaloupe and watermelon growers can apply foliar fungicides to their crops when they are most needed. The foliar diseases that **MELCAST** was designed for are Alternaria leaf blight, anthracnose and gummy stem blight. In a typical year, **MELCAST** will save growers 2 to 3 foliar applications of fungicides without sacrificing yield. **MELCAST** works by having growers apply fungicides at specific Environmental Favorability Index (EFI) values instead of using a calendar-based schedule. The extension bulletin "Foliar Disease Control using **MELCAST**" **BP-67** describes this program in more detail.

To use **MELCAST**, follow these steps:

1. Apply your first foliar fungicide application when vines first touch within a row or earlier.
2. Find a **MELCAST** site near your farm from Table 1. Select a **MELCAST** site near enough that the weather is similar to your field.
3. Using either the table at **melcast.info** and write down the EFI value on the date when the first fungicide was applied on your **MELCAST** Record Sheet (contact me for a hard copy). Note that the EFI values are cumulative. That is, the values keep increasing.
4. It is not necessary to read the **MELCAST** EFI values every day. Keep in mind, however that cantaloupe growers will apply a foliar fungicide again at 20 EFI values and watermelon growers will use a 35 EFI threshold. So, when the EFI values are close to the threshold, watch the **MELCAST** EFI values closely.
5. When the EFI threshold has been reached or is close for your site, apply a foliar fungicide and write down the new EFI value for the date when the spray was made. If at all possible, do not let the EFI values go over the threshold. It is better to apply a fungicide before the threshold is reached than to wait until the threshold has gone over.
6. If 14 days have expired and the threshold has not been reached, apply a foliar fungicide. This is because after 14 days, new growth will have occurred and some of the products applied 14 days ago will have weathered. Again, when the next fungicide application has been made note the EFI value.

Using **MELCAST** is much like keeping track of the mileage for oil changes in your truck. Note the accumulated EFI values when you make your first spray much as you would write down the mileage on your truck when you change the oil. Make your next spray when the EFI threshold nears the threshold by keeping track of the accumulating EFI values much as you would change the oil in your truck every 4,000 miles.

If you choose to view **MELCAST** information on the Internet, go to **melcast.info**. You will see a table with several **MELCAST** sites around Indiana as well as in other states. The table also has more detailed information about each **MELCAST** location. Click on the location nearest your farm.

Information at each location includes EFI's for cantaloupe and watermelon for the past 7 days, total precipitation, high

temperature and growing degree days. Below the table is a link for the past week's data and the state summary.

If the Indiana state summary is chosen, all the Indiana **MELCAST** sites can be viewed along with the EFI values for the past 7 days and, a 14-day EFI total for each site. All EFI values are updated on the Internet 7 days a week. Plus, on the state summary page, a weather summary may be found and a paragraph about pest information.

It is possible to sign up for a free hard copy of the weekly *MELCAST Update* newsletter (during the season) by contacting Dan Egel.

Another new item in 2021—several new **MELCAST** sites have been added. A list of all the **MELCAST** sites can be found below.

Site name/city
Washington
Decker
Princeton
Goshen
Ft. Vallonia
Oaktown
Wanatah
Williamsburg
Marshall
Merom Station
SW Purdue Ag Center
West Lafayette
Vincennes
Starlight
LaGrange

Why do Watermelon and Melon Plants Wilt?

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198)

In early May, we had an extended cold period with daily average air temperatures in the 50s°F. Min temperatures are in the 40s°F, some nights even upper 30s°F. In most areas in southern Indiana, it is fortunate we did not encounter a frost with temperature dropped below 32°F, but the low temperature for the extended period has brought trouble to early planted melon plants, a phenomenon called chilling injury. What growers observed is widespread plant wilt in the newly planted field. In less severe conditions, old leaves die or show symptoms, while growth points stay green (Figure 1). In more severe cases, entire plants were wilting and then dead. This is not an unusual observation that happened in early May in watermelon and cantaloupe production in southern Indiana. If I remember correctly, this happened in 2020, 2019 and 2017 in the past five years.

The reason plants wilt is because cool roots lack hydraulic conductivity that substantially inhibits water uptake from the soil. The wilt is more dramatic under sunny and windy conditions, as the less humid condition encourages water loss on the leaf surface. Plants recover from wilting if the low-temperature period did not last long and roots regain the capability to take up water, but keep in mind it takes a longer time for the soil to warm up than air. Another issue that can cause newly planted seedlings wilt is insect damage, please read the next article in this issue from Elizabeth Long about seed corn maggot.

Figure 1. A newly planted watermelon plant after a cold period.

Why do plants wilt in some fields, but not others?

A slight temperature variation could make a difference. So factors such as where the field is, the topography of the field, whether row covers are used all play a role. Another important thing to consider is the physiological stage of the seedlings. Transplants grow roots first when planted in the field. So even plants that look about the same size from above ground, may have differences in root establishment. Clearly, the plants with more extensive root growth are more tolerant to low-temperature stress.

Do cucurbit species and cultivars make a difference?

Evidence shows watermelon is more tolerant to chilling injury than cantaloupe and cucumber; cantaloupe is intermediate, and cucumber is the most susceptible to chilling injury. Within the same species, genetic variation exists. Unfortunately, such information is often not included in cultivar descriptions. Grafting makes a difference too. Grafted watermelon plants on either hybrid squash rootstock or citron rootstock are more tolerant to chilling injury than non-grafted watermelon plants. Comparing between the two rootstocks, hybrid squash rootstock is more cold tolerance than the citron rootstock.

More information about this topic can be found in a video and a previous newsletter article

When to plant watermelons
https://www.youtube.com/watch?v=tHT2mAnNRWk&t=144s

Low temperature caused watermelon establishment failure https://vegcropshotline.org/article/low-temperature-caused-watermelon-establishment-failure/

Vegetable Seedlings with Emergence Issues? Seed Corn Maggot may be to Blame.

(Elizabeth Long, eylong@purdue.edu, (765) 796-1918)

Whether the focal crops are vegetables, field corn, or soybeans, we're hearing from growers that poor germination has been an issue this season. The cool, wet conditions we've had this spring have delayed seedling germination and growth, and this just happens to be the perfect scenario for seed and root maggots to do their worst damage. Although there are several species of seed and root maggots that attack crops in Indiana, the seed corn maggot (Figure 1) is one species that feeds on a variety of crops in different plant families. The larval (maggot) stage of this insect is headless, legless and feeds directly on the seed, destroying it so that it does not germinate, or it germinates into a weak seedling that will not survive. The adult stage of this insect looks like a small house fly, and the female flies are attracted to disturbed soils with decaying organic matter to lay their eggs.

Figure 1. Seedcorn maggot on a corn kernel. (Photo by John Obermeyer.)

Conditions that slow crop germination and growth, extend the period of vulnerability to seed and root maggots because seeds/seedlings are unable to outgrow feeding damage. Fields with a history of seedcorn maggot infestation, fresh organic matter (tilled cover crops, or manure), and cool, wet soils are at higher risk of damage by this insect. Unfortunately, there is no rescue treatment for seedcorn maggot damage; rather, replanting is the only option. However, cultural practices, such as delaying planting until soil temperatures are optimal for rapid seed germination and delaying planting into fields with fresh incorporated organic matter for at least two weeks can help reduce seedcorn maggot injury. For more details and information about other seed and root-feeding maggots please read Seed and Root Maggots, in an earlier edition of the Vegetable Crops Hotline!

Cover Crops in May: Soil Health Podcast on Spring Management and Observations of Winter Rye at Pinney Purdue

(Liz Maynard, emaynard@purdue.edu, (219) 548-3674) & *(Joe Rorick, jdrorick@purdue.edu)*

In a recent Hoosier Ag Today/CCSI Soil Health Podcast, Stephen Meyers of Purdue Horticulture and Dan Perkins of Perkins Good Earth Farm covered spring management of cover crops on vegetable farms. They discussed a variety of methods for terminating: flail mowing and tarping, roller-crimping, tillage, and killing with herbicide. They pointed out that decisions about when to terminate depend not only on the weather and following crop, but also on the prime purpose of the cover crop which can include:

- If fixing or scavenging nitrogen, producing a lot of biomass/residue, or providing blooms for pollinators are important, letting the cover grow longer into the spring will increase benefits.
- If protecting soil from erosion by winter winds and rain was the main goal, the cover crop has served its purpose by spring.

They reminded us how important it is to have a back-up plan if the cover crop can't be killed with the planned method.

The last of the winter cover crops on vegetable farms will likely be terminated in the next few weeks to make room for warm-season vegetables. Before terminating is a good time to assess the cover stand and take a look at the roots and soil underneath. We did that at the Pinney Purdue Ag Center the second Monday in May. 'Hazlett' winter rye was seeded after soybeans in late September at 100 lb./A. The soils are predominantly well drained Tracy sandy loams. By early April there was a healthy stand of well-tillered plants (Figure 1). By May the rye was 2 to 3 ft. tall and in the boot stage (Figure 2). Notice that in both Figure 1 and Figure 2 that the stands are thick and even.

- If the goal of the cover crop is a mat of residue to retain soil moisture and block weeds from germinating into the season, you want a nice thick even stand of plants.

Figure 1. 'Hazlett' winter rye in early April. (5808) (Photo by Liz Maynard)

Figure 2. 'Hazlett' winter rye on May 10. (Photo by Joe Rorick)

Also in Figure 2, note that in addition to the stand being thick and even, it is all at the same growth development stage. We are planning to terminate some of the rye in Figure 2 with a roller-crimper, so consistent growth stage is more important. Occasionally with a "Variety Not Stated" rye (VNS) there will be a mix of varieties with different growth habits and maturity characteristics, further complicating an already challenging termination timing issue. With a chemical termination plan, a consistent growth stage is less important because the rye will respond favorably at most growth stages to common grass herbicide programs. While you are evaluating the stand you also want to scout for any problem weeds. If there are problem weeds present, account for that in your termination plan or weed control strategy for the season.

Looking into the soil, rye roots were plentiful, and had penetrated through a slightly compacted layer about 4 to 5 inches below the surface (Figure 3, upper arrows). We saw earthworms and rye roots growing down earthworm channels. Some of the many benefits of cover crops are that roots will:

- find existing channels
- hold existing channels and connected pores open
- create new paths for crop roots to utilize as cover crop roots decay

Figure 3. Soil under winter rye showing rye roots, slightly compacted layer several inches below the surface (top arrows), and deeper compacted layer between the plow layer or Ap horizon, and subsoil, or B horizon (bottom arrows). (Photo by Liz Maynard)

Dropping the soil block gently on the ground allowed it to split at natural break points. About 8 to 10 inches deep a natural break was visible associated with a second compacted layer and change in soil color from light brown to orangey-brown (Figure 3, lower arrows). This break represents the division between the plow layer, or Ap horizon, and the subsoil, or B horizon. The soil was quite wet after a 2.5-inch rain two nights previous, and by using the 'ribbon test' we could see the difference in soil texture between surface and subsoil (Figure 4).

Figure 4. 'Ribbon-test' illustrating differences in soil texture between subsoil (left) and surface soil (right). (Photo by Liz Maynard)

One thing we are sometimes concerned about with that horizontal fracturing and compaction layer is root restriction. There was no obvious sign of this in the cover crop, and good soil aggregation and granular structure are visible.

Under normal circumstances, we would not suspect that a root restricting layer will develop, especially with all of the root channels and connected pores intact, but still want to be mindful of field conditions during heavy traffic times to avoid creating a problem.

When we compare Figure 3 and Figure 5, we see several differences in soil structure. These are the same soils with the same cover crop planted at the same time. The only difference is one tillage pass has been done in Figure 5. Clear differences in soil structure can be seen when comparing the spade depth of soil from the right side of Figure 5 to the same spade depth of soil from Figure 3. The soil in the tilled area (Figure 5) is much less friable and shows less granular structure. In addition, we see clearly defined horizontal fracturing at several layers with larger, less open, soil structure in between. These layers in Figure 5 we might be more concerned about in less than ideal conditions, especially at or right after planting when the small crop roots would have to punch their way through these structures. At least one more tillage pass will be needed to break up these layers in the tilled treatment to prepare those plots for planting. This soil will be more susceptible to degradation by heavy traffic and rain that will continue to break down the positive structure built by the cover crop roots.

Figure 5 Plot where winter rye was tilled in mid-April, photo May 10. Left: surface; right: below-surface. (Photo by Joe Rorick).

This rye will be part of the no-till pumpkin and sweet corn plots this season. Rye in some plots was treated with glyphosate the second week of May, so it will be killed by planting time scheduled for the second week of June. In the next group of plots, rye was tilled in mid-April and additional tillage will fully work it in by planting time. The third group of plots are scheduled to be roller-crimped just before or just after planting sweet corn or pumpkins.

Watch this newsletter for more updates during the season, and for information about the Vegetable Field Day at Pinney Purdue, planned for the evening of August 10, when you are invited to join us and see how the season winds up.

Pumpkin Resources

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198)

Pumpkin planting is right around the corner. The recent Vegetable Beet Podcast produced by Great Lakes Vegetable Producers Network featured Brad Bergefurd from The Ohio State University and Nathan Johanning from University of Illinois talking about Pre-season Pumpkin Tips. They shared many of their insights in planting spacing, fertility management, weed control, no-till etc. A lot of great information helping folks getting ready for the pumpkin season.
https://podcasts.apple.com/us/podcast/pre-season-pumpkin-tips/id1511218540?i=1000521546162

It is always a lot of fun to look at the different pumpkin cultivars. Illinois Extension Local Foods and Small Farms produced a series of nice videos on Nathan Johanning discussing a variety of pumpkin cultivars, including
Specialty pumpkins
https://www.youtube.com/watch?v=3YLmUx20fws&t=713s
Mdium Jack-O'-Lanterns
https://www.youtube.com/watch?v=V79jdY07CPI
Large Jack-O'-Lanterns
https://www.youtube.com/watch?v=SmVBXDz9s8g
If you are interested in learning about detailed comparison among cultivars, a recent trial report *Pie/Decorative Pumpkin Cultivar Evaluation* conducted in University of Kentucky and published in *Midwest Vegetable Trial Reports* is a good source for variety information
https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1036&context=mwvtr You can also find results of more pumpkin variety trials conducted in previous years in the *Midwest Vegetable Trial Reports*
https://ag.purdue.edu/hla/fruitveg/Pages/MVVTRB.aspx

Last but not least, Dan Egel updated the pumpkin fungicide schedule. The most recent version can be found at
https://ag.purdue.edu/arge/swpap/Documents/Pumpkin%20Fungicide%20Schedules_egel.%20March%2024%202021.pdf

More information on pumpkin production can be found in the *Midwest Vegetable Production Guide for Commercial Growers 2021*. https://mwveguide.org/

Growing Degree-day Accumulations Still Lag While Dry Conditions Linger

(Beth Hall, hall556@purdue.edu)

Abnormally dry conditions are still lingering in parts of Indiana (Figure 1) with interest growing on how much the warmer weather might exacerbate the situation. Fortunately, the climate outlooks for the next several weeks and through June are favoring above-normal precipitation (in addition to above-normal temperatures), so hopefully any dry periods will be short lived.

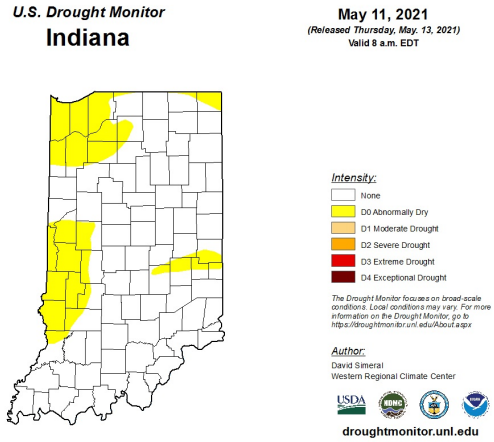

Figure 1. Indiana drought monitor

The El Nino – Southern Oscillation (ENSO) pattern has finally shifted away from the La Nina phase to the Neutral phase. It is expected that this Neutral phase will continue throughout the summer. For Indiana, a Neutral phase this time of year has not correlated strongly with either above- or below-normal temperatures or precipitation, but have slightly favored higher corn yields. This may imply that temperature and precipitation patterns could still be highly variable but average toward normal conditions at the monthly or even seasonal time scales. Hopefully, the variability swings back and forth often enough to provide the necessary relief every few days!

Modified growing degree-day (MGDD) accumulations (Figure 2) are still slightly behind the climatological average with the greatest lags in the southern counties (Figure 3). However, as Figure 4 shows, for most of the state MGDD accumulations this year are slightly ahead of where they were in 2020.

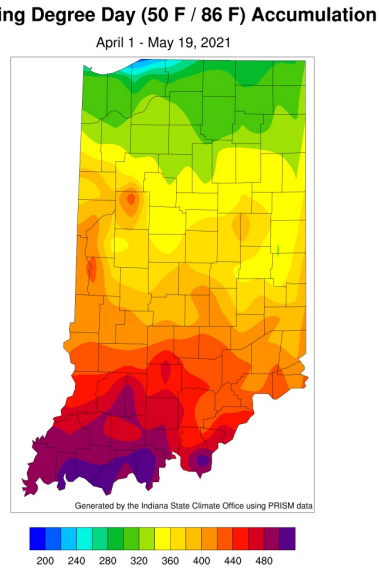

Figure 2. Modified growing degree day accumulation from April 1 to May 19, 2021.

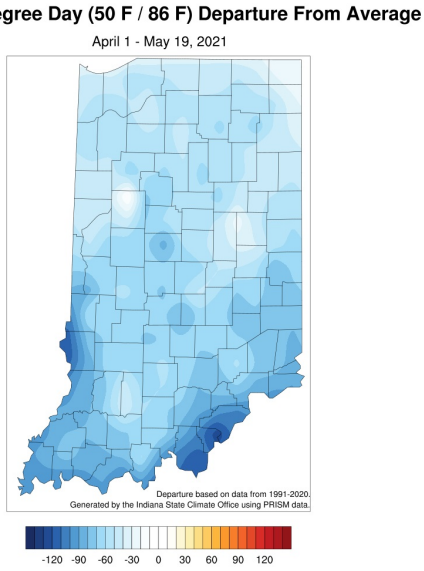

Figure 3. Modified growing degree-day accumulation departures for April 1 through May 19, 2021 compared to the 1991-2020 climatological period.

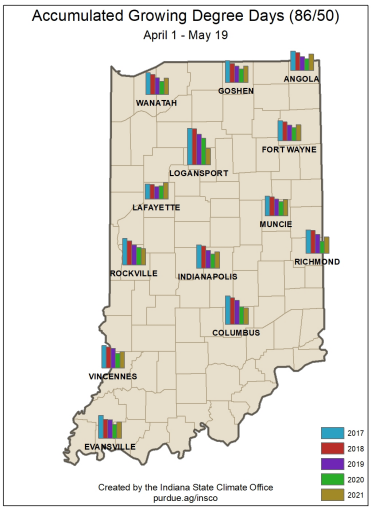

Figure 4. Accumulated growing degree days April 1 through May 19, 2021.

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