

VEGETABLE CROPS HOTLINE

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

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From the Editor's Desk

(Petrus Langenhoven, plangenh@purdue.edu, (765) 496-7955)

Welcome to the [Vegetable Crops Hotline \(VCH\)](#), Purdue Extension's exclusive newsletter for people in the business of growing vegetables.

This is, again, a bumper issue. It seems we can look forward to warmer days. Farm activity will increase in the coming weeks as conditions become more favorable for the planting of tender vegetable crops. Remember, the [Midwestern Regional Climate Center](#) has a great interactive tool with freeze maps <https://mrcc.purdue.edu/freeze/freedatetool.html> and [Mesonet](#). Mesonets are a collection of observation stations that gather information about the environment, such as atmospheric, soil, and moisture conditions. These tools will help you to plan your farm activities.

This is also the time of year when vegetable growers may start to apply fungicides. In this issue, [Dan Egel](#) discusses 10 rules that will help vegetable growers apply fungicides effectively and safely. He is also writing about an online tool that will help cantaloupe and watermelon growers make informed fungicide

application decisions on the farm. There is no more guesswork for growers. A Purdue University program known as [MELCAST](#) will help you to make the right decision at the right time. Ask Dan Egel for more details by calling (812) 886-0198 or going to <http://melcast.ceris.purdue.edu/>.

The newsletter is also packed with lots of information about critters that can harm your young seedlings. There is a strawberry update and news from the Sustainable Agriculture Research and Education (SARE) program. We are also featuring the first article in a cover crop series and talking about the impact of soil temperature on the establishment of tender vegetable crops.

Frequently we include links to websites or publications that are available online. If you can't access these resources or can't see the web address, don't hesitate to contact your [local Extension office](#) or us to request a hard copy of the information.

Remember that all previous articles published in the VCH newsletter are available on the VCH website vegcropshotline.org.

We would like to hear from you

ANR Educators and Growers, reach out to us if you are experiencing a vegetable production-related issue you think other growers need to know of. Remember, we have a great Horticulture Team that can assist you. A complete list is available [HERE](#).

Send us pictures of success stories, activities, or issues in your county or on your farm. Please include a description and provide the name of the person that needs to get credit for the picture. These pictures could be used in future *Vegetable Crops Hotline Newsletter* articles. Submit your stories [HERE](#).

Enjoy reading this issue

Do not hesitate to contact me, Petrus Langenhoven, at plangenh@purdue.edu if you have any questions or suggestions to improve the newsletter.

Check Soil Temperatures Before Planting Cold Sensitive Crops

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

Most of us know a temperature lower than 32°F would kill tender vegetables like tomatoes, peppers, melons, and cucumbers.

Home gardeners would wait to plant those crops after the last frost passed, but commercial farmers may take the risk of planting earlier to capture early-season premium prices. Farmers use various strategies, i.e., high tunnels, low tunnels, floating row covers, and even cups, to protect the early-planted crops from frost/freeze temperatures.

Some plants (tomatoes) may be able to survive the less-than-optimal conditions. They hold in the field and wait to grow after the temperature rise. However, the risk of losing the plants under less-than-optimal conditions is much higher with cucurbits (cantaloupes, watermelons, cucumbers). To plant these crops in the early season, farmers should check the extended forecast, ensure that there are no frost/freeze events, and check soil temperatures. Cucurbits are best grown when soil temperatures are above 70°F. It may not always be possible to wait when soil temperatures rise above 70°F to plant, but at least wait to plant when soil temperatures are stable above 60°F. [This video](#) tells a story of early-planted watermelons and their suffering from low temperatures.

Melon Disease Forecaster 2023

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



MELCAST is a weather-based disease-forecasting program that helps growers schedule foliar fungicide applications for cantaloupe and watermelon. **MELCAST** stands for MELon disease for CASTER. This program, designed by Dr. Rick Latin, Professor Emeritus 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. **MELCAST** was designed for foliar diseases: 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:

Apply your first foliar fungicide application when vines first touch within a row or earlier.

1. Find a **MELCAST** site near your farm. A table with the 2023 MELCAST locations can be found at [info](#), or to receive a hard copy of the *MELCAST Update*, see below. Select a **MELCAST** site near enough to your farm that the weather is similar to your field.
2. Go to [info](#), and click on the MELCAST location near you. A table listing the EFI values over the past 7-days will appear. I like to click on the state summary below the

table to read **MELCAST** values. Information at each location at MELCAST.info includes EFI's for cantaloupe and watermelon for the past 7 days, total precipitation, high temperature, and growing degree days.

3. 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, read the **MELCAST** EFI values each day.
5. When a fungicide has been applied, write down the new EFI value for the date 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 anyway. 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 (for example).

Starting in Mid-May, a weather and disease information summary will appear weekly on the state summary page and in the mailed copy of the *MELCAST Update*.

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

Are Pillbugs Pests? How Can They be Managed?

(Samantha Willden, swildden@purdue.edu) & (Laura Ingwell, lingwell@purdue.edu, (765) 494-6167)

Background

Pillbugs, roly-polys, and potato bugs are the dominant common names for the isopod genus *Armadillidium* spp. As the scientific name suggests, these little critters resemble mini armadillos but are, in fact, crustaceans that live on land (Figure 1). Therefore, they are more closely related to lobsters, crabs, and shrimp than insects. Pillbugs are important recyclers on farms, as they help to break down decaying organic matter to speed up the decomposition process. However, pillbugs can secondarily feed on

fruits, vegetables, young shoots or roots, or lower leaves at the soil level, sometimes causing damage.



Figure 1. Image of individual pillbug (Photo by Wikimedia Commons).

Examples of damage

Several growers this spring have reported pillbugs feeding on plant shoots and fruits (Figure 2). Feeding damage by pillbugs can resemble nibbling from mice, caterpillars (on leaves), or slugs. Most of this damage occurs at night and is concentrated at the soil level. They are also most common during springtime when the weather is cool and damp. It is currently unclear whether and to what extent pillbugs feed on roots below the soil surface. There are also suspicions that pillbugs climb plants at night, when they are most active, to feed on above-ground plant tissue.

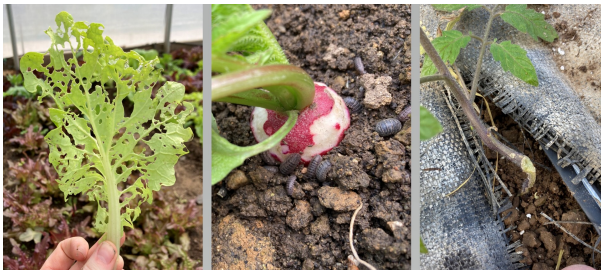


Figure 2. Examples of pillbug feeding damage. Far left: Large irregular holes on lower lettuce leaf. Center: Radish tuber with damage and surrounded by pillbugs. Far right: suspected pillbug damage on tomato transplants (Photos by Samantha Willden).

Scouting

Because pillbug feeding damage can be misidentified, scouting plants at night or early in the morning is recommended to confirm pillbug presence. Area-wide scouting and monitoring of pillbugs can be done by placing wooden boards throughout a planting. Pillbugs will congregate under these covers during the day and can be counted to monitor pressure (Figure 3).



Figure 3. The underside of a 2 x 4" wooden board placed between rows of leafy greens. A congregation of pillbugs, and several slugs, can be seen in this image (Photo by Samantha Willden).

Management

There are currently no economic thresholds of injury levels for pillbugs. They are likely to be most problematic in damp, undisturbed soil with high organic matter levels. If they are identified as pests using the scouting methods above, preventative and cultural control practices are the best lines of defense. First, reduce the amount of organic material and hiding spots on the soil surface by removing dead or decaying plants, unnecessary plants or mulch, debris, and weeds within and around the planting. Increasing plant spacing will also help to reduce canopy cover and hiding spots for pillbugs during the day (Figure 4). Second, minimize soil surface wetness by irrigating crops only as needed. Lastly, placing wooden boards in the planting as described above will help to consolidate pillbugs that can be relocated by tapping the wooden boards to dislodge pillbugs in a new area. Consider moving pillbugs to compost piles away from vulnerable crops. Infested wooden boards can be soaked in soapy water to kill the pillbugs if a suitable relocation area is unavailable.



Figure 4. A cluster of pillbugs hiding below a dense plant canopy during the day (Photo by Samantha Willden).

Unfortunately, there is little information on spray recommendations for additional management of pillbugs. One resource from Texas A&M suggests pyrethroid insecticides, namely permethrin, for managing pillbugs. However, cultural control options of reducing suitable habitat and excess soil moisture are the most effective long-term solutions for pillbug management.

10 Useful Rules for Fungicide Application

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

Since we are well into fungicide application time, below I have listed 10 rules that will help vegetable growers apply fungicides effectively and safely.

1. Apply fungicides prior to the development of disease. Although many fungicides have systemic (“kick back”) action they will not completely eradicate diseases after they have started. And by the time a single disease lesion is observed in the field, many more lesions too small to observe are already working at your crop. Most systemic fungicides move less than an inch toward the tip of the plant or may just move from the upper to the lower side of the leaf.
2. Use shorter spray intervals during weather conducive to plant disease. Each plant disease has its own “personality” and thus prefers different weather. However, most plant diseases require leaf wetness. Therefore, during periods of rain and heavy dews, more frequent fungicide applications are a good idea. The normal range of spray applications is every 7 to 14 days. Cantaloupe and watermelon growers have the guesswork taken out of this process with a Purdue University program known as **MELCAST**. Ask the author for more details by calling (812) 886-0198 or go to melcast.info.
3. Apply fungicides before a rain if possible. Water is necessary for most fungal spores to infect foliage and for the splash dispersal of spores. Therefore apply fungicides before a rain if it appears that the fungicide will have a chance to dry before the rain. Some fungicides list the rain fastness period on the label. It is not necessary to apply fungicides again after every rain. Most fungicides have a good sticker and will persist through rains pretty well. The **MELCAST** program takes into account the affect weather has on fungicides.
4. Know when to alternate fungicides. Systemic fungicides, those with a single mode of action, if applied again and again in sequence, may cause the disease fungi to mutate into a form resistant to the fungicide. Always alternate fungicide applications from one FRAC code (MOA code) number to another. Contact fungicides with a FRAC code of M like chlorothalonil and mancozeb are very unlikely to cause such mutations and therefore may be applied without alternation. Table 29 (page 76) in the Midwest Vegetable Production Guide <http://mwvguide.org/> will help growers alternate fungicides.
5. Timing of fungicide applications is more important than nozzle type and spray pressure. Studies here in southern Indiana as well as by researchers in other areas of the country have found that nozzle type and spray pressure doesn’t make as much difference as we once thought. See the article [Spray Pressure and Nozzle Types](#) in issue 596 of the *Hotline*. In general, the more water one uses per acre, up to about 50 gallons, results in better coverage.
6. Some diseases cannot be managed by foliar sprays. Problems caused by soil borne fungi or nematodes cannot be controlled with foliar fungicides. Examples of these types of problems would be Fusarium wilt of watermelon or root-knot nematodes of tomatoes. Also, be certain that the problem you observe is really a disease. No amount of fungicide will improve a problem caused by soil fertility. Send a sample to the Purdue Plant and Pest Diagnostic Laboratory to determine the official diagnosis <http://www.ppdl.purdue.edu/ppdl/index.html>.
7. Use copper products for bacterial diseases. For the most part, copper products are more effective against bacterial diseases than they are against fungal diseases.
8. Some diseases require specialized fungicides. Diseases, such as downy mildew and Phytophthora blight may require specialized fungicides. It may be wasteful to apply specialized fungicides all season long for diseases that are not a threat. For example, downy mildew of cucurbits usually does not arrive in Indiana until late in the season.
9. Double-check the label for details. Rates may vary widely based on label changes and different formulations. While you are checking the rate, also make sure that the crop and disease are on the label. Can this fungicide be applied in the greenhouse? Did you get the rate from the *Midwest Vegetable Production Guide for Commercial Growers*? Check the label anyway.
10. Play it safe. Always adhere to the Post-Harvest Intervals, Re-Entry Intervals and Worker Protection Standards listed in the label. No one wants an accident or lawsuit. Besides, the label is the law.

Strawberry Crop Update

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

Frost/freeze damage is one of the major risks of growing strawberries in Indiana. During the morning of April 24, a widespread freeze event caused damage to several crops, including strawberries. Strawberries in southern Indiana, particularly on plasticulture, have entered full bloom. Without protection, freeze damage was extensive in some fields. A case study was described in [this article](#). The late-blooming cultivars may have suffered less damage. Again, floating row covers are approved to protect the flowers from low-temperature damage. Farmers in southern Indiana reported minimal damage in the fields covered with thick floating row covers.

A high tunnel strawberry production system is much more

resilient toward unpredictable weather in the spring. Floating row covers inside the high tunnel may protect crops with temperatures down to 20°F. In southern Indiana, the peak bloom of high tunnel strawberries occurred in March. Although we went through cold days in March, we successfully protected the blooms. Harvest of the early cultivars started on April 14 this year at the Southwest Purdue Ag Center. The yields are continuously going strong. The harvest also began in central Indiana and in caterpillar tunnels. Farmers reported high market demand for the strawberries.

More information about the pros and cons of a high tunnel strawberry production system can be found in [this video](#). Previous years' yields of the production system at the research farm were reported in [this article](#).

Resources

[Strawberry Cultivar Evaluation for Fall-planted High Tunnel System](#)

[Without Protection, Freezing Temperatures Monday Morning Caused Damage on Plasticulture Strawberries in Southern Indiana](#)

Cover Crop Species Spotlight – Buckwheat

(Ashley Adair, holmes9@purdue.edu)

Buckwheat (*Fagopyrum esculentum*) has been cultivated for thousands of years (Figure 1). Not at all related to wheat, buckwheat gets its common name from an old Dutch word that means “beech wheat” due to the seed’s resemblance to a beech nut. A member of the smartweed family, buckwheat is a cousin to familiar species like Pennsylvania smartweed, curly dock, and rhubarb.



Figure 1. Buckwheat (Photo by Ashley Adair).

Though buckwheat is not a traditional cereal grain species, its seeds can be processed into many of the same products as cereal grains, such as groats and flour. Humans began cultivating buckwheat thousands of years ago, which has led to its cultivation worldwide today. Common buckwheat foods include *kasha*, noodles, and pancakes. In the United States, about 27,000 acres of buckwheat are planted as a food crop every year, primarily in a

few states in the northern US.

While buckwheat was initially cultivated as a food crop, this adaptable plant has recently grown popular as a cover crop species. Growing to 2-3 feet, buckwheat establishes rapidly and flowers prolifically. It tolerates soils with low fertility and poor structure. Its short life cycle allows it to bloom in as few as 21 days and reach maturity in as few as 70. Buckwheat is a warm-season species, so while it will not survive a hard frost, it thrives in warm to hot conditions. Due to its short life cycle and rapid establishment, buckwheat provides farmers with several ecosystem services when used as a cover crop species:

- Weed suppression (one colloquial name for buckwheat is “smother crop”)
- Pollinator reservoir
- Soil texture improvement
- Rapid residue decomposition
- Nutrient scavenging

There is some evidence to support buckwheat as a phosphorus-scavenging species. This process is thought to occur via buckwheat root exudates that liberate phosphorus from soil minerals.

Depending on the equipment available, you may plant/drill buckwheat or broadcast it. When drilled, buckwheat establishes well at 50-60lbs per acre at 1-1.5 in. deep. When broadcast, an increased seeding rate to nearly 100 lbs/acre and a pass with a gentle harrow aids establishment and improve the stand. Thinner stands adapt to gaps between plants by branching more, similar to soybeans. Plan to seed after the danger of frost has passed, preferably when soil temperatures are in the 50s.

On a vegetable farm, you might choose to plant buckwheat in a tight crop rotation window to suppress weeds before planting the next cash crop. Since it establishes rapidly and decomposes quickly, you can use it in much tighter planting windows compared to other cover crops. You might also use buckwheat to break the cycle of plant disease, particularly soil-borne disease. Since buckwheat is from a plant family, unlike most vegetable crops found on the farm, it generally does not host the same diseases (see [Appendix 2 in Crop Rotation on Organic Farms by Mohler and Johnson](#)). Finally, the pollen and nectar reserves provided by buckwheat attract many beneficial pollinators and predators – and if you’re a beekeeper, buckwheat allows you to add buckwheat honey to your market offerings.

Mow or crimp buckwheat to terminate it, usually 1-2 weeks after flowering begins. Residue decomposition accelerates with a tillage pass after mowing, but more nutrients might be tied up and unusable by your cash crop during that time.

The primary drawback of using buckwheat as a cover crop is its weedy behavior. It’s nearly impossible to prevent buckwheat from producing at least a tiny viable seed once it has flowered, so buckwheat will continue to live on the farm here and there as a volunteer. Luckily, it’s an easy-puller and easy to identify, so if you happen to find it comingling with your vegetable crops, it is easy to manage.

I crimped a mixed stand of sorghum-sudangrass and buckwheat at the Purdue Student Farm in July 2022 as a demonstration at the Small Farm Education Field Day (Figures 2 and 3). I used an Earth Tools BCS-compatible roller crimper, measuring 320 lbs and 30 in. wide, and made two passes with the unit. The buckwheat formed a beautiful mat, terminating nearly uniformly. Sorghum-sudangrass continued to grow, and a few buckwheat seeds germinated through the crimped buckwheat mulch. Farm staff left the field this way until just a few weeks ago when students and staff transplanted onions into this bed. Chris Adair, Student Farm Manager, noted he had seen relatively low weed pressure in this bed since the crimping operation and is optimistic about the bed's performance moving forward.



Figure 2. Roller crimping buckwheat (Photo by John Obermeyer).



Figure 3. A perfect stand of buckwheat roller crimped (Photo by Ashley Adair).

This article is the first in a new series of articles for the Vegetable Crops Hotline called "Cover Crop Species Spotlight." Make sure to look for more species spotlights in future editions of the VCH!

For more information on cover crops and their use on vegetable farms, please consult the following:

- [Crop Rotation on Organic Farms: A Planning Manual](#) – available as a free PDF download from [SARE.org](#)
- [Managing Cover Crops Profitably \(3rd\)](#) – available as a free PDF download from [SARE.org](#)

Cut Seedlings and the Potential Culprits

(Laura Ingwell, lingwell@purdue.edu, (765) 494-6167)

Each year we get several reports of seedlings being cut at or near the base of the plant/soil surface. The critter who gets the blame

most often is cutworms. And that makes sense because the damage is in the name. However, with closer inspection, it seems that the blame can often be misplaced. There are other organisms, many of which have a backbone, that may be the culprit. Here we will review cutworm identification and discuss other possible causes for cut seedlings.

Cutworm diversity and biology

The black cutworm (Figure 1) is our most commonly found species in field crops in Indiana, but we also have dingy, claybacked, and variegated cutworms.



Figure 1. Various sizes (ages) of black cutworm larvae (Photo by John Obermeyer).

So, how do you tell the difference, and does it really matter? Timing and the type of damage caused can give clues to the species. Black cutworms do not overwinter in the Midwest. We monitor their arrival every spring with pheromone traps. Once they arrive in large numbers (intensive captures), we begin predicting their development and subsequent damage with heat unit accumulations. To stay up to date on black cutworm trapping information, subscribe to the [Purdue Extension Entomology Pest & Crop Newsletter](#). While trap catches are high as of late, there have not been enough heat units accumulated this spring for black cutworms to get 1/2 to 3/4 inches long, that being the size where they cut plants.



Figure 2. Dingy cutworm larva (Photo by John Obermeyer).

The other three species of cutworms that can be found in Indiana include the dingy (Figure 2), claybacked (Figure 3), and variegated (Figure 4). The dingy cutworm, probably the second most common species, is primarily a leaf feeder and will rarely cut plants, and if it does, the cutting is above the ground. The dingy

and claybacked cutworms overwinter as partially grown larvae. Therefore finding cutworms 3/4 of an inch or more at this time would likely point to these species. Given that many of the reports we receive on potential cutworm damage occur in high tunnels, there is always the possibility that some of the other species may be overwintering in that habitat or that their development could be accelerated because of increased heat units. High tunnels always make things a bit messy when it comes to pest biology!



Figure 3. Claybacked cutworm larva curled in the identifiable 'C' shape on a leaf (Photo by John Obermeyer).



Figure 4. Variegated cutworm larva (Photo by John Obermeyer).

Cutworms are generalist feeders that readily eat a wide range of vegetable and fruit crops (Figures 5-6). Species like the black cutworm exhibit the characteristic snipping of young plants (seedlings and new transplants) right at the base of the stem where it emerges from the soil, leaving behind seedlings that appear to have been 'cut down', thus the name 'cutworm.' Most often, if the cut seedling is damaged by cutworms, you will find the top of the plant with herbivore damage near the root/stem. Occasionally cutworms will drag the top down into their burrow and continue to feed, but you should be able to find this under the ground cover if you are scouting often. In addition to early-season stem cutting and defoliation, cutworms can also cause damage later in the season. For example, we have seen cutworms feeding on ripening tomato fruit in high tunnels – an unpleasant discovery!



Figure 5. Cutworm larva emerging from the soil to feed on a young pumpkin seedling (Photo by Liz Maynard).



Figure 6. Variegated cutworm larva and damage on tomato seedling (Photo by John Obermeyer).

Other potential causes

There are other insects that occur in the soil and feed on dead/decaying plant material. These include beetle grubs (juvenile stage of beetles), crane fly larvae, millipedes, centipedes, worms, and other even smaller invertebrates. If you go digging in the soil, you will likely encounter some of these, which are *typically* not to blame for troubles with seedling establishment.

Rabbits are on the list of top contenders in my book. They have been detrimental in our high tunnel strawberry production but are too cute to get mad about (Figure 7). They are voracious little critters and will leave a clean-cut stem in their tracks. The plants are usually cut at a 45-degree angle up to about 2.5' from the ground. Furthermore, when we suspect rabbit damage, there is very consistent plant removal, as if they just eat their way straight down the nicely planted rows.



Figure 7. Rabbits munching on the strawberry patch in the high tunnels at Meigs Horticulture Farm (Photo by Laura Ingwell).

Some of a rabbit's favorite crops include peas, beans, lettuce, and beet leaves. In general, they avoid asparagus, cucurbits, solanaceous crops, corn, onions, and herbs. However, if there is not much available, they can't be picky. Management can include exclusion, frightening devices like motion-activated sprinklers, repellents, and trapping depending on local laws.

Moles, voles, and mice are the remaining contenders. Mice leave nibble marks here and there, with signs of their feeding left behind in the form of mouse pellets, a contaminant for our produce growers. They don't usually cause widespread destruction unless they are harvesting nest material. I witnessed this mess when they ate my master's thesis trees off at the base and piled them into a neat little nest in the middle of the greenhouse. I have not seen reports of this happening with fruit and vegetable plants. Traps and baits are usually effective at controlling this group of pests.

Warmer Temperatures on the Way

(Austin Pearson, pearsona@purdue.edu, (765) 675-1177)

It is May, the sun is shining, of course the wind is blowing, and the weather forecast is calling for warmer temperatures. Things are looking up from here. Despite the warm start and cool end to April, the preliminary statewide average temperature ran 1.2°F above normal (Figure 1).

Climate Division Data by State between Two Dates
From Midwestern Regional Climate Center

Indiana 4/ 1/2023 to 4/30/2023								
cd	temp	Temperature norm	dev	prcp	Precipitation norm	dev	percent	
1	50.7	49.5	1.2	2.21	3.60	-1.40	61	
2	50.7	48.9	1.8	2.43	3.59	-1.16	68	
3	50.4	48.5	2.0	2.49	3.47	-0.99	72	
4	52.5	51.5	1.0	2.43	3.88	-1.45	63	
5	51.9	50.9	1.1	2.83	3.91	-1.08	72	
6	51.3	49.9	1.4	3.02	3.78	-0.76	80	
7	55.8	54.9	0.9	3.47	4.45	-0.98	78	
8	55.3	54.2	1.0	3.49	4.42	-0.92	79	
9	53.9	53.1	0.8	3.53	4.21	-0.68	84	
State	52.6	51.4	1.2	2.86	3.94	-1.07	73	

Midwestern Regional Climate Center
MRCC Applied Climate System
Generated at:
Wed May 3 13:06:05 CDT 2023

Figure 1. Indiana climate division and state temperature, normal temperature, temperature departure from normal, precipitation, normal precipitation, precipitation departure from normal, and percent of mean precipitation for April 1-30, 2023.

The largest temperature departures occurred in northern Indiana (near 2.0°F above normal). Rockville, located in Parke County, recorded the lowest minimum temperature in the state for the month (21°F) on April 24. The station's highest temperature, 85°F, occurred just four days earlier. If I can do my math right, that's a 64°F temperature drop in four days... brrr. Modified growing degree days (MGDDs) got off to a quick start but tapered off toward the end of the month. As of May 2, the state accumulated 140-350 MGDDs (Figure 2) and is running within 40 units of normal. Similar to last week, soil temperatures hovered in the mid-40s to mid-50s (Figure 3).

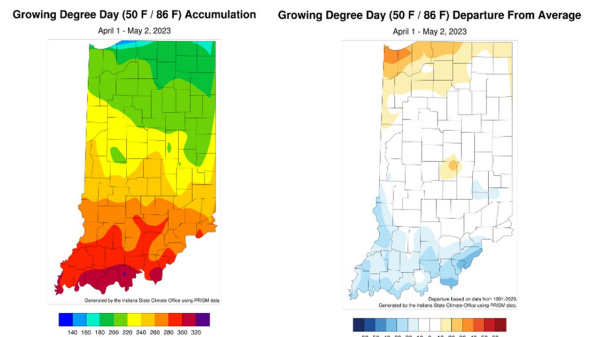


Figure 2. Total Accumulated Indiana Modified Growing Degree Days (MGDDs) April 1-May 2, 2023 (left) and Total Accumulated MGDDs represented as the departure from the 1991-2020 climatological normal (right).

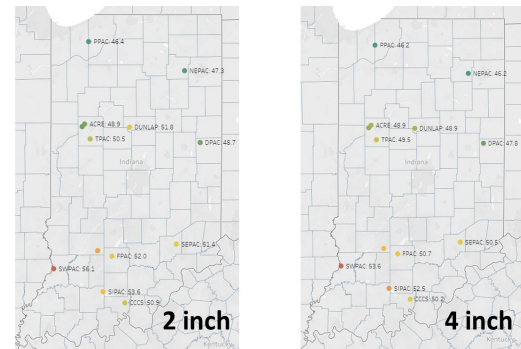


Figure 3. Two-inch (left) and four-inch (right) soil temperatures for stations located at Purdue Mesonet sites in Indiana on May 3, 2023. Data can be obtained from the Purdue Mesonet Data Hub.

Preliminary April precipitation averaged 73 percent of normal statewide, but larger departures occurred in the north (Figure 1). Over the last 30 days (April 4-May 3), precipitation ranged from 25-75 percent of normal (Figure 4). Cold temperatures aloft allowed showers with mixed precipitation to fall during the last two weekends of the month. Locations even saw minor accumulations of sleet and hail. Rensselaer WWTP (Jasper County) measured 1.42 inches of precipitation over the last 30 days, which was 2.58 inches below the 1991-2020 climatological normal. The driest locations were in western Indiana, which reintroduces drought concerns moving into the next couple of weeks. However, the rain forecast does indicate rain over the next week.

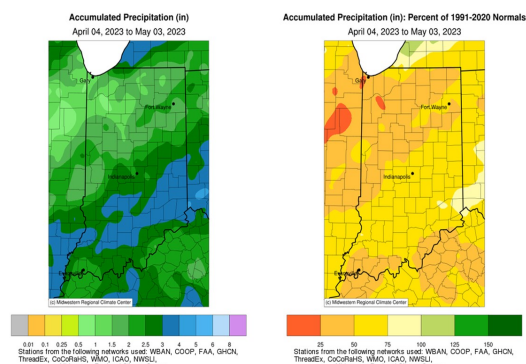


Figure 4. Interpolated map displaying accumulated precipitation for April 4-May 3, 2023 (left). Interpolated map displaying accumulated precipitation as a percent of the 1991-2020 climatological normal (right).

Rain forecast totals over the next seven days range between 0.10-2.00 inches statewide (Figure 5).

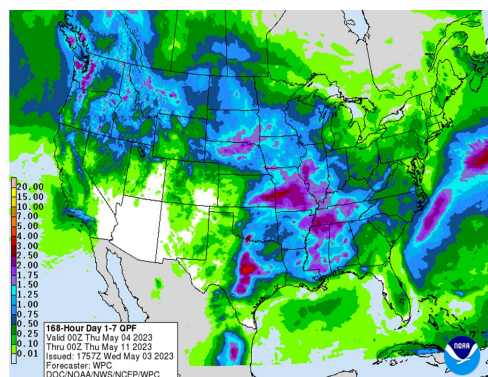


Figure 5. NWS Weather Prediction Center 7-day quantitative precipitation forecasts for the continental United States, valid May 4-May 11, 2023.

The lightest totals appear to fall in the northeast, and the heaviest totals are expected to be in southwestern Indiana. The Climate Prediction Center's 6-10-day (Figure 6) and 8-14-day (Figure 7) temperature and precipitation outlooks indicate higher chances for above-normal temperatures and near-normal precipitation. The warmer temperatures will certainly be welcomed by all.

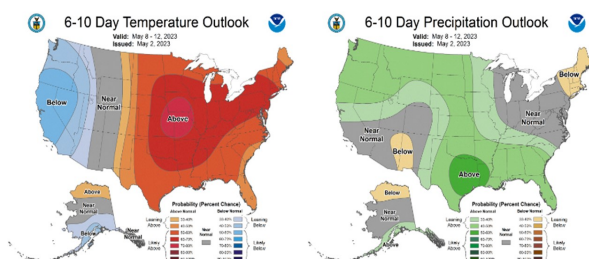


Figure 6. The CPC's 6-10-day temperature and precipitation outlooks, valid for May 8-12, 2023.

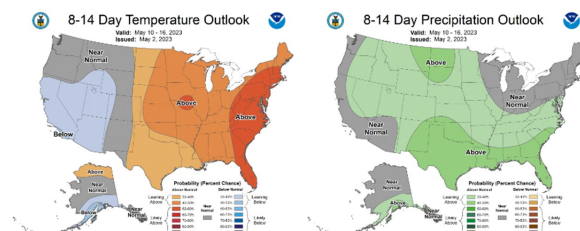


Figure 7. The CPC's 8-14-day temperature and precipitation outlooks, valid for May 10-16, 2023.

Sustainable Agriculture Research and Education (SARE) News

(Lais McCartney, lmccartn@purdue.edu)

Heritage Corn: Planting, Challenges, and Educating from the Family Plot Perspective



Figure 1. 24 pounds of Avati Moroti Mita corn seed were collected in 2022. (Photo by Gerardo Morales)

This winter, Northern Indiana farmer, Zuleyja Prieto, finished her SARE farmer rancher grant that focused on planting and preserving heritage corn varieties (Figure 1). Prieto worked with her family and local farmer collaborators on heritage corn in a family plot for two years. A nearby GMO corn plot meant that Prieto had to track pollination timing to avoid GMO “contamination.” She had the seeds tested for the spread of GMOs or genetic material over two years. Genetic testing showed that her late planting strategy to avoid cross-pollination of adjacent fields of GMO corn kept Prieto’s seed at undetectable levels of GMO. These culturally significant, heritage corn seeds are important to their community, so intergenerational work and community engagement were integral to the project (Figure 2). This aspect of the project was important to Prieto, who said, “Encouraging farmers to hold space for cultural and ceremonial practices adds value and intention to our farming practices.” The entire report, with photos and details, can be found [here](#).



Figure 2. Seed Blessing Ceremony. (Photo by Gerardo Morales)

Resources

[Heritage Corn: Planting, Challenges and Educating from the Family Plot Perspective](#)

Natural Resources and Conservation Service (NRCS) News

(Petrus Langenhoven, plangenh@purdue.edu, (765) 496-7955)

The USDA published this news release in Indiana on May 3, 2023.

Indiana NRCS Announces First Sign-up Period for Organic Transition Initiative

USDA's Natural Resources Conservation Service's (NRCS) Acting State Conservationist, David Doctorian, announced today that Indiana is accepting applications for the first round of Organic Transition Initiative (OTI) funding through June 15. The initiative will help build new and better markets and income streams, strengthen local and regional food systems, and increase affordable food supply for more Indiana farmers, while promoting climate-smart agriculture and ensuring equity for all producers.

Under OTI, NRCS will help producers adopt the new organic management standard, which allows flexibility for producers to get the assistance and education they need, such as attending workshops or requesting help from experts or mentors. It supports conservation practices required for organic certification and may provide foregone income reimbursement for dips in production during the transition period. NRCS will dedicate OTI funding under the Environmental Quality Incentives Program (EQIP).

"NRCS can help organic producers develop a conservation plan that meets their goals and can often help with financial assistance to implement elements of the plan," said Doctorian. "We have a wide variety of materials and support available for agricultural producers who would like to transition to organic production."

Eligible producers include farmers and other producers beginning or in the process of transitioning to organic certification. Higher payment rates and other options are available for underserved producers, including socially disadvantaged, beginning, veteran and limited resource farmers.

While applications are accepted year-round, interested producers

should submit applications to their local NRCS office by June 15 to be considered for the current funding period. Applications received after June 15 will automatically be considered during the next funding cycle. To apply for funding through OTI contact your local district conservationist by visiting [Farmers.gov/service-locator](https://farmers.gov/service-locator).

For more information about Indiana NRCS and other technical and financial assistance available through conservation programs, visit www.nrcs.usda.gov/indiana.

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Source

<https://content.govdelivery.com/accounts/USDAFARMERS/bulletins/358705e>

SAVE THE DATE for Southwest Purdue Agricultural Center Field Day

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

We are excited to announce that the Southwest Purdue Agricultural Center Field Day is scheduled for June 28, 2023, at the Southwest Purdue Agricultural Center (SWPAC), 4669 N. Purdue Rd. Vincennes, IN.

Purdue researchers and NRCS representatives will present their current research and demonstration projects in fruit and vegetable production conducted at SWPAC. The topics include a cover crop demonstration, high tunnel tomato cultivar evaluation, high tunnel tomato and cucumber disease and insect management, benefits of companion plants, strawberry production, irrigation management, weed management in organic sweet potato, soil health and pepper production, the effect of cover crops on pest and beneficial insects in watermelon production and more! Don't miss the opportunity to learn from fruit and vegetable production experts.

More detailed information about the field day and registration will

be announced soon.

We are currently looking for sponsors for the field day. If you are interested, please get in touch with Barbara Joyner (joynerb@purdue.edu).

Purdue Fruit and Vegetable Field Day – Registration Now Open

(Petrus Langenhoven, plangenh@purdue.edu, (765) 496-7955)

We are happy to announce that Purdue Extension is presenting its annual Fruit and Vegetable Field Day on July 20, 2023, at the Throckmorton/Meigs Horticulture Farm, Lafayette, IN.

Registration is now open. To register your spot, visit <https://cvent.me/5zevYD>



The field day schedule is very exciting, something for everyone to look forward to.

Sweet corn pest management updates – Laura Ingwell

Dr. Ingwell will provide updates on the corn earworm trapping efforts and research evaluating the efficacy of a reduced spray program incorporating biopesticides. Water-sensitive cards will be available for demonstration to show you how to evaluate the coverage of your current spray equipment.

Silage Tarps for Weed Management in Potatoes – Josue Cerritos and Steve Meyers

Small farms have adopted silage tarps to create stale seedbeds and provide early-season weed control. But can they be used to provide weed control between potato planting and emergence, and can their use reduce the herbicide inputs throughout the potato production cycle? We'll share results comparing planting herbicides and silage tarping in an overall weed management program for potatoes.

Watermelon Weed Management – Emmanuel Cooper and Steve Meyers

Season-long weed management is difficult to achieve in vining crops, including watermelon. For those using chemical weed control, identifying the proper herbicide(s) and application timing(s) are critical. Most of the herbicides that are labeled on cucurbits are for preemergence (PRE) applications, with a limited offer of postemergence (POST) herbicides. The use of these POST herbicides can result in improved weed control, but timing could

be a determining factor. At this stop we'll explore the products available to watermelon growers and discuss the current research to integrate newly registered herbicides prior to transplanting and at layby to improve the spectrum and duration of weed control in plasticulture-grown triploid watermelons.

Summer 2023 collard insect management trial – Elizabeth Long

This demonstration will highlight the efficacy of organic and synthetic insecticides when used against common caterpillar, flea beetle, and thrips pests on collard varieties champion, top bunch, and flash. The insecticides tested in this trial can be purchased by growers who do not have a pesticide applicator's license. We will compare marketability and yield for each collard variety and untreated versus insecticide-treated plants at the end of the season.

Black soldier fly composting and specialty crop production – Milena Agila, Allison Zablah and Laura Ingwell

Black soldier flies are native to the neotropics and migrate into Indiana each year. The larvae are economically important as they can be grown for food and feed on a variety of organic waste streams. Additionally, the digestate created from their feeding and the pupal cases remaining after adult emergence show promise as a soil amendment. This work will demonstrate the effects of BSF-generated compost and the application of their pupal cases (a source of chitin) as soil amendments in the production of specialty crops. We will also discuss the rearing process and how you can use food waste and other organic waste streams to generate the flies and their by-products.

Two-year Plasticulture Strawberry Research Update – Jeanine Arana and Steve Meyers

Purdue Horticulture Crops Weed Science Lab members will discuss their research and findings from a USDA Specialty Crop Block Grant-funded plasticulture strawberry project. Topics include variety selection, black versus white plastic mulch, and chemical and non-chemical weed management methods.

High tunnel diversification and biological control – Leslie Aviles, Sam Willden and Laura Ingwell

Diversifying the plant community under high tunnels and integrating biological control into IPM programs are topics of great interest to high tunnel growers. Companion planting can diversify high tunnels while also supporting natural enemies and pollinators in many focal crops. However, like some weeds, companion plants may also be reservoirs for arthropod pests. In contrast, weeds could also serve as companion plants if they provide nectar, pollen, and supplemental prey that support diverse insect communities. The goal of this research is to determine the cost or benefit of common companion plants vs. weeds in terms of pollinator, natural enemy, and pest recruitment on high tunnel tomato. A second high tunnel project is aimed specifically at managing twospotted spider mites on high tunnel cucumber crops. This research will discuss the efficacy of a

variety of biopesticides and compatibility with predatory mites that are effective in high tunnel production systems.

Does increasing soil health improve pepper yield? – Petrus Langenhoven, Nathan Shoaf and Dennis Gustavo Toc Mo

What is the impact of soil management practices on soil health? Does increasing soil health mean reduced input, and does pepper variety performance differ according to soil health status? During this presentation, we will discuss the progress and results of an ongoing 4-year USDA-funded grant, Soil to Market, that was designed to help answer some of these questions

Unmanned aerial vehicle demonstration – Chloe Richard and Ashley Adair

Growers and researchers alike use drones for many purposes around the farm. In this demonstration, Ashley Adair, Organic Agriculture Specialist, and Chloe Richard, Horticulture Crops Research Manager, will fly different types of imaging and spray drones and discuss their purpose on the farm and in Purdue research.

Contact Lori Jolly-Brown ljollybr@purdue.edu or Petrus Langenhoven plangenh@purdue.edu if you have any questions.

Purdue Small Farm Education Field Day – Registration Now Open

(Petrus Langenhoven, plangenh@purdue.edu, (765) 496-7955)

The Purdue Small Farm Education Field Day is presented on July 27, 2023, at the [Purdue Student Farm](#) in West Lafayette, IN.

Registration for the field day is now open. To reserve your spot, visit <https://cvent.me/ewWN3b>.

Students register for free! Please get in touch with Lori Jolly-Brown to receive the discount code for student registration.



Educational topics for the 2023 field day include something for every grower.

High Tunnel Table Grape Production – Miranda Purcell

This study tests the feasibility of growing two table grape varieties (Mars and Canadice) under a high tunnel in Indiana. A similar study done by the University of Arkansas showed promising results, including significant yield increases, a reduction in disease pressure, and vines that come into bearing

one to two years earlier than vines grown in the field. Results from this study will be used to determine if high tunnel table grape production is feasible in Indiana.

High Tunnel Pepper Production and Variety Selection – Petrus Langenhoven and Dennis Gustavo Toc Mo

Sweet pepper high tunnel variety trials have been conducted since 2018 at the Purdue Student Farm. Production techniques, variety selection, and variety performance will be discussed.

Growing Grains on the Small Farm – Dry Edible Bean Variety Trial – Wil Brown-Grimm and Ashley Adair

Heirloom varieties of many food-grade crops, including dry beans, may have a special niche on small and diversified farms in Indiana. Dry beans represent an opportunity to sell beans you don't otherwise find at the grocery store. They also provide the farmer with more crop rotation flexibility as a relatively short-season crop. We are growing four heirloom varieties of dry edible beans in a trial at the Student Farm, as well as 2 additional varieties for demonstration. See these 6 dry edible bean varieties in action: Black Coco, Calypso, Jacob's Cattle, Tiger's Eye, Hidatsa Red Indian, and Lina Cisco's Bird Egg. This demonstration will highlight some of the challenges and opportunities of dry edible bean production on a small scale.

Predator-prey dynamics in high tunnel crop production – Sam Willden

We will discuss the temporal variation in insect pests and natural enemies in high tunnel production systems and discuss the role that weeds play in relation to harboring potential pests or providing habitat for natural enemies. We will talk about how these dynamics change throughout the season and provide recommendations for pest management.

Biorational pesticide efficacy for controlling caterpillars and flea beetles in crucifer crop production – Laura Ingwell

Product selection, application and efficacy of control for caterpillar pests and flea beetles on cruciferous crops, with implications for other crop types, will be presented. The products being evaluated and discussed include bacterial, fungal pesticides, and plant-derived insecticides. We will discuss how their efficacy compares to the use of exclusion netting for pest management.

Black soldier fly composting and specialty crop production – Milena Agila and Laura Ingwell

Black soldier flies are native to the neotropics and migrate into Indiana each year. The larvae are economically important as they can be grown for food and feed on a variety of organic waste streams. Additionally, the digestate created from their feeding and the pupal cases remaining after adult emergence show promise as a soil amendment. This presentation will demonstrate the process of composting with black soldier flies. Specifically, we will discuss the various waste products that can be incorporated, the maintenance of moisture, and the potential benefits of harvesting both the flies and their digestate in the application of

small farms.

Raised Garden Beds for Vegetable Production – Amy Thompson and Nathan Shoaf

Raised beds are commonly used by homeowners, backyard gardeners, and urban farmers if their soil type is not optimal. If soil is compacted with poor drainage, infested with pests, or if contaminants are present, installing raised beds can help improve vegetable production for your garden and may mitigate contaminant exposure. This talk will cover the advantages and challenges of growing in raised ground beds and supported raised beds, as well as considerations for site preparation, growing medium, and irrigation.

Postharvest food safety demonstration – Scott Monroe and Amanda Deering

Food safety is a necessary consideration in the production of fresh fruits and vegetables. During postharvest operations, due to the concentration of product, there is a potential for large portions of the crop to be contaminated with a human pathogen if food safety measures are not taken. Consequently, implementation of postharvest food safety measures is critical to the success of any on-farm food safety program. During this demonstration, members of the Safe Produce Indiana team will discuss and demonstrate postharvest good agricultural practices (GAPs). The packing room at the Student Farm will be used as a backdrop for

this discussion. Topics will include washing, product flow, and storage of fresh fruits and vegetables.

Silage tarps and their potential uses on small farms – Steve Meyers and Josue Cerritos

In recent years, silage tarps have become a popular way for small farms to terminate cover crops, create stale seed beds, and facilitate more rapid and uniform germination of carrots. At this stop, we'll discuss the possible uses of these tarps and demonstrate the ways they have been used on the Student Farm.

Choosing fertilizer injectors for drip irrigation for small plots – Wenjing Guan

Irrigation and nutrition are two essential parts of crop production. Combining nutrition and irrigation is a common practice in high-value specialty crop production. Injectors are the principal tools to apply water and nutrients directly to the root zone, readily for plant uptake. There are many types of injectors in the market. Understanding their usage in various scenarios may be overwhelming for beginning farmers. This demonstration aims to help small and beginning farmers choose desirable injectors for their systems and understand the pros and cons of the different injectors.

Contact Lori Jolly-Brown ljollybr@purdue.edu or Petrus Langenhoven plangenh@purdue.edu if you have any questions.

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