

Pest & Crop Newsletter

Purdue Cooperative Extension Service
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Woolly Bear Wanderlust And Winter Weather

(John Obermeyer)

While traveling a local county road this week, I was amazed at the number of woolly bear caterpillars I came across. At one particular location, they were crossing en masse from one weedy, unharvested soybean field to a grass pasture. Though I had experienced this phenomenon before, I did stop to enjoy and take some pictures! First, you've got to appreciate their determination, relative speed, and direct path in moving across the road. Sadly, many met their fate by car tire, never to experience the other side...paradise!? Why is the woolly bear caterpillar crossing the road...other than "to get to the other side!" The purpose, observers for many generations tell us, is to find the perfect over-wintering site, under leaf litter, fallen tree branches, rock crevices, etc. Within the last couple hundred years, they have also used our structures such as barns, outhouses, etc. Amazingly, because they are able to chemically alter their bodily fluids to much like anti-freeze, the shelter is probably more to protect them from predators, e.g., raccoons and birds, during this winter stasis.



Banded woolly bear caterpillars, *Pyrrharctia isabella*, are easily recognized for their brown and black coloration and gentle, fuzzy touch. (Photo Credit: John Obermeyer)



This woolly bear is determined to make it across the road, unlike his ill-fated buddy. (Photo Credit: John Obermeyer)

Folklore tells us that the woolly bear is able to predict how cold/mild the winter will be. As I write this, October 10, we are still waiting for our first frost, much less killing freeze ($\leq 28^{\circ}\text{F}$) with none forecasted in the near future. Spoiler alert, because these caterpillars are seeking over-wintering harborage, they are predicting it will freeze this winter! See...they can prognosticate future temperatures!

How about the whole winter season's temperatures? This is done by measuring the width of the brown band, the more the brown, the milder the winter, and vice versa for the black coloration. If you don't believe me, just "Google" it, amazing what you will find! If you are going to do your own local observations and measurements for a precise forecast, you must use the correct species of woolly bear, *Pyrrharctia isabella*, more commonly known as the banded woolly bear, or woolly worm. Using another species of caterpillar will throw the "science" off! Below, via pictures, I will share my results, I'll let you come to your own conclusion about this coming winter's weather, at least for Purdue University!



What does this random sampling of banded woolly worms tell us about the coming winter? (Photo Credit: John Obermeyer)



If they survive car tires, predators, parasites, and freezing, this is what they eventually transform into in the spring! (Photo Credit: John Obermeyer)



If you use this larger, black woolly bear caterpillar (giant leopard moth) in your "data," the winter would look ominous! (Photo Credit: John Obermeyer)



Measuring the brown-band width of these squirmy caterpillars is quite challenging! (Photo Credit: John Obermeyer)

Black Soybeans In Indiana. What Is Causing It And The Potential For Reduced Soybean Seed Quality

(Darcy Telenko), (Shaun Casteel), (John Bonkowski) & (Tom Creswell)

There have been many reports of black areas in soybean fields in Indiana this season. These areas have appeared after weather from hurricane Helene passed through the region. In the field that I have observed recently, a few things were contributing to this issue- first areas with black soybeans showed up in previous pockets of poor growth due to drought conditions (dry hill tops) and/or other disease issues caused plants to shut down earlier than the rest of the field. In Casteel trials that were side by side, an earlier maturing variety was more symptomatic with black appearance with hanging, dead leaves (drought conditions plus another causal agent) compared to a fuller variety that showed no black appearance. It is possible there is a planting date/maturity effect. Soybeans that were reaching maturity earlier and beginning to dry down (or shut down) when the hurricane weather went through are the areas that are most impacted. When affected soybeans are harvested the dust cloud is black. In general, what we are seeing in samples coming into the clinic is saprophytic fungi - secondary colonizers that are responsible for breaking down and recycling the dead plant material.



Figure 1. An example of black soybeans areas in a field. (Photo Credit: Abigail Heidenreich, Purdue Extension)

The black color on soybeans can be attributed to a number of different organisms from saprophytic fungi to *Diaporthe* stem blight (formally known as *Phomopsis*), *Anthraco* stem blight, or *Cercospora* spp. Some of these soybean diseases can greatly impact seed quality. In Indiana, the most common are *Diaporthe* seed decay (*Phomopsis*, caused by *Diaporthe* spp.), *Cercospora* purple seed stain *Cercospora kikuchii*;

Frogeye leaf spot (*Cercospora sojina*); Anthracnose (*Colletotrichum* spp.); downy mildew (*Peronospora manshurica*); Soybean viruses (bean pod mottle and soybean mosaic); and various other secondary fungal invaders of injured pods including *Alternaria*, *Fusarium*, *Claosporium*, and *Pencilium*.



Figure 2. An example of some black soybeans submitted to Purdue Plant Pest Diagnostic Lab (PPDL), there are multiple fungi infecting both the stems, pods and seeds.

The table below provides several descriptive characteristics to begin the diagnostic process and choose appropriate management recommendations. It is important to note, however, that although Purple Seed Stain is easily identified by the 'signature' purple symptom on the seed, accurate diagnosis of most of the fungal diseases on seed requires microscopic assistance offered by the Purdue Plant and Pest Diagnostic Laboratory (PPDL). The diversity of symptoms that can be observed on diseased soybean seed is shown in the example in Figure 3. In this image, all the seed are infected with the frogeye leaf spot pathogen *C. sojina*.



Figure 3. A diverse range of symptoms observed from *Cercospora sojina* (frogeye leaf spot) infection. (Photo Credit: Gail Ruhl, PPDL)

Disease infected seed can have reduced storability, decreased germination, loss of seed weight and reduced meal and oil quality.

Optimum storage conditions to limit fungal growth include

1. Free from fungi or other pests.
2. Clean seed without organic or other waste material.

3. Less than 12% moisture.
4. Cool uniform storage temperature.

Future management options to minimize diseases on soybean seed:

1. Start with clean seed (pathogen free) and use resistant varieties when available.
2. Fungicide options -
 1. Seed treatments can help reduced seed to seedling disease transfer.
 2. Foliar fungicides may help reduced pod and seed infection by reducing the disease epidemic in the field.
2. Tillage and crop rotation - bury the inoculum from disease-infested residue and further reduce the inoculum by planting a non-host the next season.
3. Control other pests such as bean leaf beetle, aphids and other insect vectors that injure the pod opening the door to fungal infection

Other Resources

Mueller, D. et al. An Overview of Pod and Stem Blight and Diaporthe Seed Decay. Crop Protection Network. CPN-1007.

<https://doi.org/10.31274/cpn-20190620-016>

Disease	Pathogen	Pod symptoms	Seed symptoms	Management Options Available					
				Seed-borne	Resistance	Rotation crops	Tillage	Fungicide	
Anthracnose	<i>Colletotrichum</i> spp.	Irregularly shaped, brown areas. Small black fruiting bodies (acervilli) that produce spines may also form on infected tissue	None to a brown staining or small, irregular gray areas with black specks!		Yes	No	Corn, non-legumes	Yes	Foliar fungicides
<i>Cercospora</i> blight/purple seed stain	<i>Cercospora kikuchii</i> and other spp.	Dark lesions, may not always be present	Pink to dark-purple discoloration of seed coat?		Yes	Yes, but only leaf blight not seed stain	Corn; small grain; alfalfa	Yes	Foliar for leaf blight stage
Frogeye leaf spot	<i>Cercospora sojina</i>	Circular to oval lesions that are red-brown to black	Reddish-brown lesions - often on ends of seed!		Yes	Yes	Corn, small grains	Yes	Seed treatment and foliar options
Downy mildew	<i>Peronospora manshurica</i>	No external symptoms, internal whitish, fluffy mass	Small and lighter seed, crusty fungal growth on seed; dull and white in appearance!		Yes	Yes, but many races	Yes	Yes	
Phomopsis seed decay	<i>Diaporthe</i> spp.	Black fungal specks (pycnidia) on infected tissue!	Cracked, shriveled, with chalky, white appearance!		Yes	Yes - early maturity greater risk	Corn; wheat	Yes	Seed treatment and foliar options
Table 2. Diseases that might lead to contaminated seed lots.									
Sclerotinia stem rot	<i>Sclerotinia sclerotiorum</i>	Water-soaked, tan to white bleached tissue	White to moldy appearance, presence of black sclerotia can contaminate seed!		Seed lot contamination	moderate	Corn; small grains for 2-3 years	Bury >8 inches	Foliar can reduce disease severity

Image credit: University of Missouri Extension. *Purdue Plant Pest Diagnostic Lab. †Nancy Telenko, Purdue University. ‡Courtesy J. B. Sinclair - ©APS. Reproduce, by permission, from Hartman, G. L. et al. eds. 2015. Compendium of Soybean Diseases and Pests, 5th ed. American Phytopathological Society, St. Paul, MN. †Albert Tenuta. Reproduced, by permission, from Mueller, D. et al. eds. 2016. A Farmer's Guide to Soybean Diseases. American Phytopathological Society, St. Paul, MN.

A Chill Is In The Air - Online Tools For Monitoring And Climatology

(Beth Hall)

While our daytime highs across the state were in the upper 70's, our nighttime lows have been in the 30s (even into the upper 20's) in some places. This could get us thinking about the timing of the first frost and freeze events of the season, when the 7-day average 4-inch soil temperature falls before 50°F, and the viability of our home's furnace. The [Midwestern Regional Climate Center](#) (MRCC) can help provide historical climatologies of the first two of those three. It keeps a positive thought for the third item!

The typical date of the first freeze event in your area can be explored using the [MRCC's Freeze Date Tool](#) (Figure 1). This tool uses county data to illustrate the earliest, average, latest, and other climatological timing of the first fall and last spring dates of when temperature fell below or above certain temperatures thresholds, respectively. Users can choose temperature values ranging from 20°F to 40°F and then mouse over their county of interest to see historically when those

temperature thresholds were crossed. Clicking on a county will take the user to a new screen that will show the historical dates from 1950-2023 for all temperature threshold options. Since the date of the last spring freeze and first fall freeze can often be used to define the length of the growing season, users can select the "Growing Season Length" tab of the tool to see how the growing season length has varied for their location over the years using user-defined temperature thresholds.

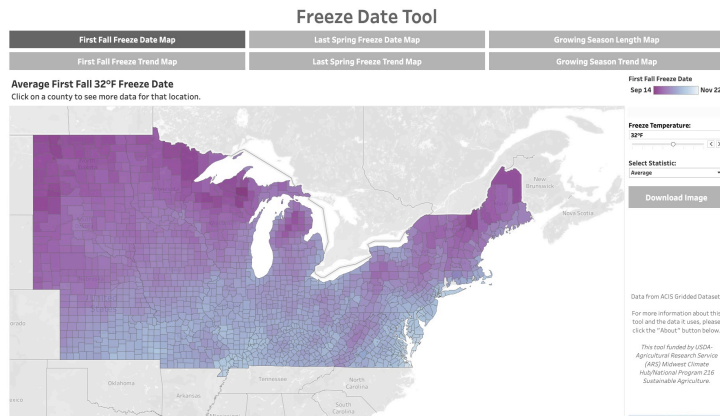


Figure 1. Screenshot of MRCC's Freeze Date Tool main page.

Another online tool users may find interesting is the MRCC's Soil Temperature Climatology Tool. (Figure 2). Using gridded data from 1991-2020, users can identify dates when the 7-day average 4-inch soil temperature either cools below (e.g., late fall) or warms above (e.g., spring) particular temperature thresholds. Knowing the climatology of these dates can provide decision support for agricultural activities such as planting and nutrient applications as well as other soil temperature-dependent events. Users can also leverage this tool to explore the typical 4-inch soil temperature values on a particular date. Temperature thresholds that users can select range from 30°F to 60°F.

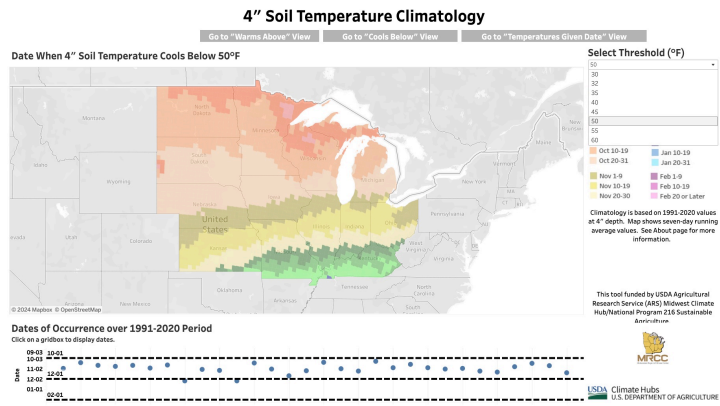


Figure 2. Screenshot of MRCC's 4-inch Soil Temperature Climatology Tool main page.

Indiana seems to be back in a relatively dry pattern and unfortunately things look like they'll stay that way for a while. This has led to the majority of Indiana being classified as at least Abnormally Dry (D0) to some areas in northwest Indiana in Severe Drought (D2) according to the U.S. Drought Monitor (Figure 3). The 7-day precipitation forecast (through October 24th) is predicting little-to-no rain whereas the 8-to-14-day climate outlooks (October 24th-30th) are slightly favoring above-normal precipitation — which is more likely to occur near the end of that period (e.g., end of October) rather than earlier. Temperatures are expected to warm up soon and stay above-normal for the next few weeks.

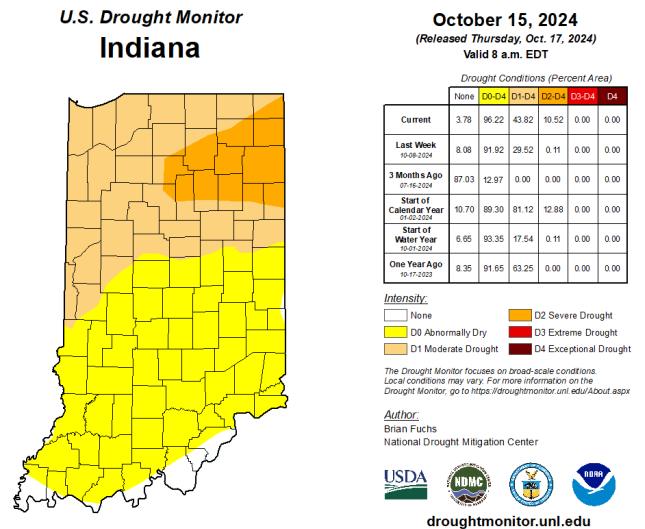


Figure 3. U.S. Drought Monitor conditions through October 15, 2024.

Pest&Crop 2024 Survey

(John Obermeyer)

Dear Pest&Crop Readers:

Hope you have enjoyed the Pest&Crop newsletter this year. The following is a link to a simple, short online survey. Please consider doing this right now, as we need your evaluation of this newsletter. Too, we need to show our funding agencies whether or not this information from Purdue specialists throughout the season is meaningful to you and the industry. Thanks in advance for your support!

https://purdue.ca1.qualtrics.com/jfe/form/SV_aVShsox5SftHt9I

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