PURDUE UNIVERSITY | Extension - Entomology

Pest&Crop newsletter

Issue: 2023.22
August 18, 2023

Purdue Cooperative Extension Service and USDA-NIFA Extension IPM Grant

This work is supported in part by Extension Implementation Grant 2017-70006-27140/ IND011460G4-1013877 from the USDA National Institute of Food and Agriculture.

In This Issue

When Hay Harvest Is Complete, Do The STAB

(Keith Johnson)

Hay harvest will soon be coming to a close for another year. It is important to now follow through and **S**ample, **T**est, **A**llocate, and **B**alance or **STAB** your hay. Doing the STAB is an important best management practice to keep your livestock healthy.

Probing a hay bale. (*Photo Credit: Keith Johnson*)

Sample – Hay from each harvest from a field should be sampled with a hay probe. Many Purdue Extension offices have a hay probe to loan to sample hay. The website foragetesting.org has a list of hay probes that can be purchased for sampling hay. Twenty probings comprise a sample. Ten large bales are sampled twice on opposite sides of the curvature of a round bale and each butt end of a rectangular bale. One probing is taken from one butt end of each of twenty small rectangular bales to comprise a sample. Probings should be placed in a clean plastic bag that can be sealed to retain moisture. Mark the plastic bag with the forage type(s), location harvested, and cutting number.

Test – Certified laboratories can be found at foragetesting.org. A basic test will suffice in most cases. A form from the laboratory should accompany the samples and it is likely available at the laboratory website. Minimally, request moisture, crude protein, adjusted crude protein, Neutral Detergent Fiber (predicts dry matter intake), and Acid Detergent Fiber (predicts digestibility). If the forage was harvested as baleage, request pH, too. Mineral analysis should be requested if a total mixed ration is fed to livestock. A test can be done by wet laboratory or Near Infrared Reflectance Spectroscopy (NIRS) methods. The advantage of NIRS analysis is it takes less time to process the sample and the test will cost less.

Allocate – Results received from the laboratory should be reviewed by a trained livestock nutritionist and you. Based on these results, each harvest will be allocated to the class of livestock that the analysis best meets nutritional needs. Growing livestock and females in early lactation will require the best quality hay harvested.

Balance – Utilize the service of the livestock nutritionist, or acquire the knowledge and ability, to balance rations to meet nutritional needs that the hay cannot provide alone. Purdue Extension Educators may know individuals that have the skill to balance rations to keep livestock in excellent health.

You have worked hard to get hay made and in storage this year. Follow through so it can be used to best advantage to keep your livestock in proper body condition so performance is not compromised.

Taking time to STAB hay is important to keep livestock in excellent health. (*Photo Credit: Keith Johnson*)

Silk Emergence, Silk Length, And Missing “Butt” Kernels

(Dan Quinn)

The process of pollination is one of the most critical periods for grain yield determination in corn and successful pollination is largely

determined by the successful synchronization between silk elongation, tassel emergence, and pollen shed. In certain conditions, poor pollination and kernel development can occur, which can result in significant reductions in kernel numbers and yield. Typically, one of the most common instances of poor pollination is due to delayed silk emergence, often caused by drought conditions, which can result in missing kernels at the tips of the ears. However, in certain instances the opposite can actually happen, where the silks emerge too early and missing kernels are observed at the base or "butt" of the ear.

Silk elongation in corn typically begins near the base of the ear and is initiated approximately during the V12 to V14 vegetative growth stages. The first silks to emerge from the husk are from the lower portion of the ear and silks will continue to emerge for approximately one week. Once silks have emerged from the husk, they will start to elongate at a rate of 1 – 2 inches per day and begin to slow over time. In addition, silks will cease growth once they have come in contact with pollen grains. Therefore, if pollen is not available, silks will continue to elongate for a period of about 9 days following emergence and can result in excessively long growth (Figure 1).

Figure 1. Excessive silk growth on corn ear due to lack of pollen availability in Central Indiana during the 2022 growing season. (*Photo Credit: Dan Quinn*)

In certain cases, silks can actually emerge from the husk multiple days prior to pollen shed. This response is often counterintuitive to what many of us have been taught, which is that the tassel always emerges before the silks. However, many modern hybrids have improved genetics which include improved drought tolerance. One way these genetic improvements combat drought stress is through quicker and more vigorous silk emergence, which helps reduce the risk of delayed silk emergence caused by drought conditions. Therefore, when growing conditions are more favorable, silk emergence can occur too quickly which results in the earliest emerging silks (connected to potential kernels at the base of the ear) to emerge and lose viability before pollen is shed, thus resulting in poor pollination and missing kernels at the base of the ear (Figure 2). In addition, favorable growing conditions, combined with cooler weather, sufficient soil moisture, and cloudy conditions can sustain silk growth and elongation, which causes silks to emerge too soon and also become excessively long, which can also cause pollination issues due to silk overlapping or shading.

Figure 2. Poor pollination and missing kernels at the base of the ear caused by silks emerging too early prior to tassel presence and pollen shed. (*Photo Credit: Brian Early, Indiana Pioneer Field Agronomist, 2023*)

Overall, it is always important to check pollination success and kernel development during the corn growing season. In addition, be sure to pay attention to silk development, elongation, and where the presence of missing kernels is on the ear to further understand where issues may have occurred.

Additional Resources:

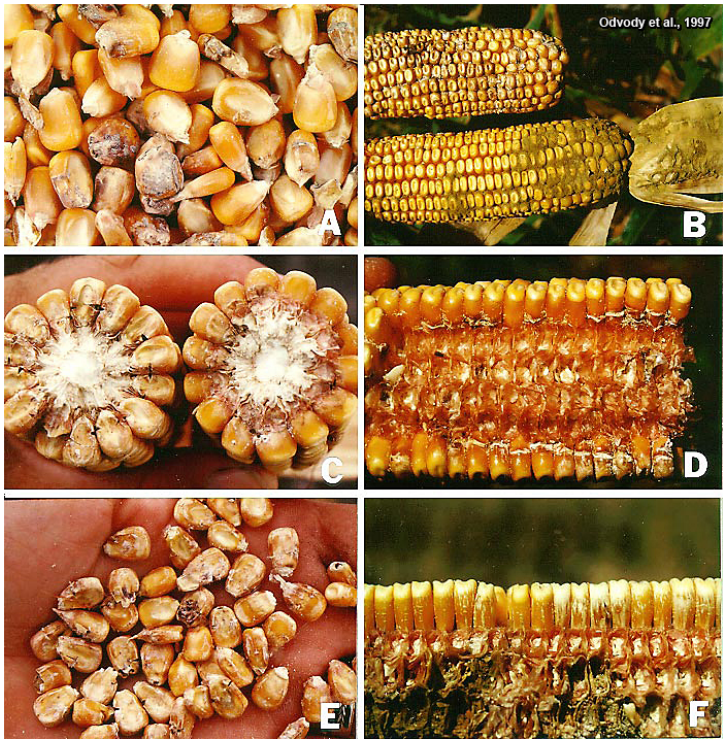
Nielsen, R.L. 2018. Unusually Long Silks in Corn. Corny News Network. Purdue Univ. Ext.
https://www.agry.purdue.edu/ext/corn/news/timeless/longsilks.html

Popped-Kernel And Silk-Cut Symptoms In Corn

(Bob Nielsen)

Among a number of corny oddities that appear from time to time is one that falls into the “kernel disorder” category. A crop consultant once reported on the occurrence of a symptom in a seed corn production field known as “popped-kernels”. In his words, “…the kernels appear diagonally sliced. Each sliced half is then folded back exposing the endosperm, which later receives the fungal attack.”

The “popped-kernel” symptom and the related “silk-cut” symptom are indeed corny oddities in that they rarely occur in commercial hybrids in Indiana but occasionally occur at significant levels in seed corn inbreds. Unfortunately, when the symptoms do occur, they predispose the affected kernels to attack by ear-rotting fungal organisms.



Silk cut symptoms on a commercial corn hybrid grown in Corpus Christi, Texas [Odvody et al., 1997].

‘Popped’ kernel symptom before invasion by fungi [photo courtesy Brian Frischmeyer].

“Popped” kernel symptoms on an inbred ear of corn, with subsequent colonalization by fungal organisms [photo courtesy Gene Matzat].

"Popped" kernel symptoms on an inbred ear of corn, with subsequent colonalization by fungal organisms [photo courtesy Gene Matzat].

The Compendium of Corn Diseases (White, 1999) describes these two phenomenon quite well and I quote:
"Popped kernel and silk-cut, although common in breeders' nurseries, are rarely seen on commercial hybrids. It is assumed that this characteristic is inherited, and it is usually eliminated during the breeding and selection process. Popped kernel is an irregular break in the seed coat over the kernel crown. The kernel resembles a partially expanded popcorn kernel. This phenomenon is believed to result from irregular growth because it is most common during years with irregular rainfall, particularly when conditions are very hot and dry. Silk-cut is the embedment of silks in ruptured areas on tips of the kernel or occasionally in the sides of kernels between kernel rows. The exact cause of silk-cut is unknown, but it may be caused by irregular growth of the pericarp around unpollinated silks. Even on an ear that appears to be fully pollinated, as many as 10% of the ovules are not fertilized. Pollinated silks die and dry up, but silks attached to unpollinated ovules remain viable for an extended period of time. The viable silks push against the developing pericarp of kernels, causing the pericarp to rupture. Both popped kernel and silk-cut result in the rupture of the pericarp and allow infection by ear-rotting and saprophytic fungi."

There is not much research literature available that documents the cause(s) of the "popped-kernel" and "silk-cut" symptoms. Some research has documented that hybrids with short, loose husks tend to be more prone to the development of the "silk-cut" symptom (Farrar and Davis, 1991; Dowd, 1998). A report from Texas suggested that the "silk-cut" symptom occurs quite frequently in areas of south Texas prone to late-season drought stress (Odvody et al., 1997). Research in California and Hawaii suggested that "silk-cut" is associated with kernel pericarp damage from feeding activity by corn thrips (*Frankliniella williamsi*) on developing corn ears after pollination (Parsons and Munkvold, 2010). In that trial, insecticide applications significantly reduced the incidence of the "silk-cut" symptom.

Related Reading

Dowd P.F., 1998. Involvement of arthropods in the establishment of mycotoxigenic fungi under field conditions. In: Sinha KK, Bhatnagar D, eds. *Mycotoxins in Agriculture and Food Safety*. New York, USA: Marcel Dekker, Inc, 307–350.

Farrar J.J. and Davis R.M., 1991. Relationships among ear morphology, western flower thrips, and Fusarium ear rot of corn. Phytopathology 81: 661–666.

Odvody, G.N., N. Spencer, and J. Remmers. 1997. A Description of Silk Cut, a Stress-Related Loss of Kernel Integrity in Preharvest Maize. Plant Disease 81 (5):439-444. http://apsjournals.apsnet.org/doi/pdf/10.1094/PDIS.1997.81.5.439 [URL accessed August 2023].

Parsons, M.W. and G.P. Munkvold. 2010. Relationships of immature and adult thrips with silk-cut, fusarium ear rot and fumonisin B1 contamination of maize in California and Hawaii. Plant Pathology 59:1099-1106. https://doi.org/10.1111/j.1365-3059.2010.02339.x [URL accessed August 2023].

White, Donald G. (ed.). 1999. Noninfectious or Abiotic Diseases. in Compendium of Corn Diseases (3rd Edition). APS Press, The American Phytopathological Society.

Short-term Drought Relief, Forecast Turning Hot, Dry Again

(Austin Pearson)

Over the last 30 days (July 18-August 15), the state average temperature was 73.5°F, which was essentially normal. Average temperatures ranged from 0.9°F below normal in northwestern Indiana to 0.5°F above normal in southern Indiana (Figure 1). The heat was not missing, though, as July 26 through 28 was rather warm across the Midwest. Minimum temperatures ranged from 4 to 9°F above normal statewide during this period. There were 240 daily high maximum and minimum temperature records broken or tied across the Midwest in late July, with most of Indiana's broken records occurring as minimum temperatures (Figure 2). August temperatures were near normal until the last few days as cooler temperatures returned to the area. On Monday, August 14, I actually had to break down and buy a sweatshirt (8/14) as I forgot mine at home! Modified Growing Degree Days (MGDDs) have accumulated between 1500 and 2650 units in Indiana, which was near normal (Figure 3). MGDDs have accumulated as expected throughout the growing season.

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

Indiana
7/18/2023 to 8/15/2023

cd	Temperature temp	norm	dev	Precipitation prcp	norm	dev	percent
1	71.8	72.6	-0.9	5.97	3.91	2.06	153
2	71.4	72.2	-0.8	5.39	3.81	1.58	142
3	71.3	71.9	-0.6	4.63	3.66	0.97	126
4	73.4	73.8	-0.4	4.95	4.15	0.80	119
5	73.0	73.3	-0.3	5.15	3.91	1.24	132
6	72.5	72.6	-0.1	4.34	3.67	0.67	118
7	76.6	76.2	0.4	5.19	3.83	1.36	135
8	76.0	75.5	0.5	5.09	4.05	1.04	126
9	75.1	74.8	0.2	5.02	3.89	1.13	129
State	73.5	73.7	-0.2	5.13	3.89	1.24	132

Midwestern Regional Climate Center
MRCC Applied Climate System
Generated at:
Wed Aug 16 08:55:05 EDT 2023

Figure 1: Climate Division data by state, between July 18 and August 15, 2023, which includes observed temperature and precipitation, normal temperature and precipitation, temperature deviation from normal and percent of normal precipitation.

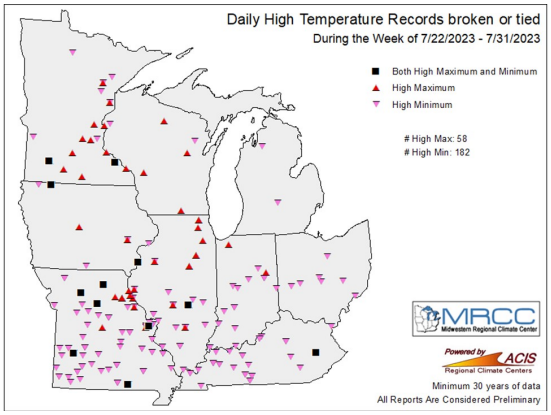


Figure 2: Daily high temperature records that were broken or tied during the last week of July 2023.

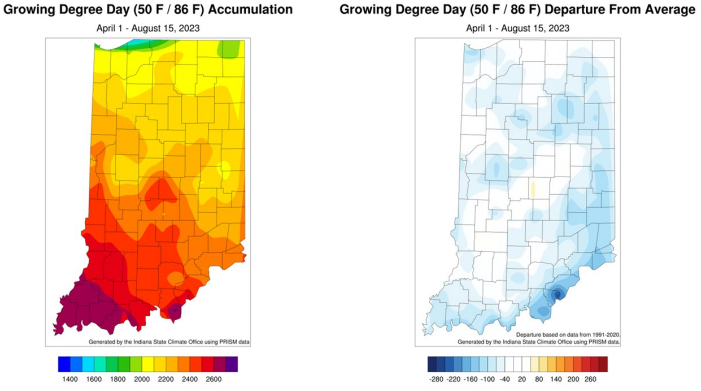


Figure 3: Total Accumulated Indiana Modified Growing Degree Days (MGDDs) April 1-August 15, 2023 (left) and Total Accumulated MGDDs represented as the departure from the 1991-2020 climatological normal (right).

The bigger story, though, has been the return of rain. It seemed at times this year that we could not buy a drop of rain. Since early July, though, we have had several storm systems bring broad precipitation across the state. Over the last 30 days (July 18-August 15), the state averaged 5.13 inches, which was 1.24 inches above normal or 132 percent of normal. Locally higher amounts occurred as strong storms resulted in heavy precipitation totals. Portions of Franklin and Putnam Counties had areas that received 8 to 10 inches of rainfall, which was more than 200 percent of normal (Figure 4). Flooding was observed in Franklin County and tragically resulted in a casualty.

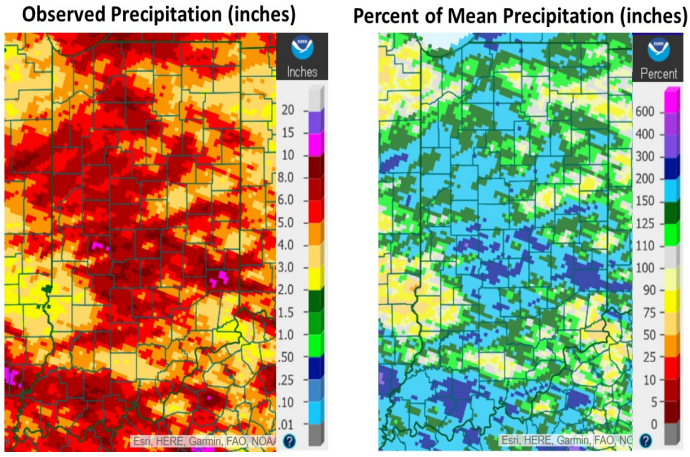


Figure 4: Observed precipitation and percent of mean precipitation for July 18-August 15, 2023 from the Advanced Hydrologic Prediction Service.

Fortunately, Indiana is essentially drought-free with the release of the August 15 US Drought Monitor (Figure 5). Lingering abnormally dry (D0) conditions exist in west-central Indiana, which signals going out of drought and is not technically considered drought. Compared to last week, there was a 6.31% decrease in areas of Indiana in Moderate Drought (D1).

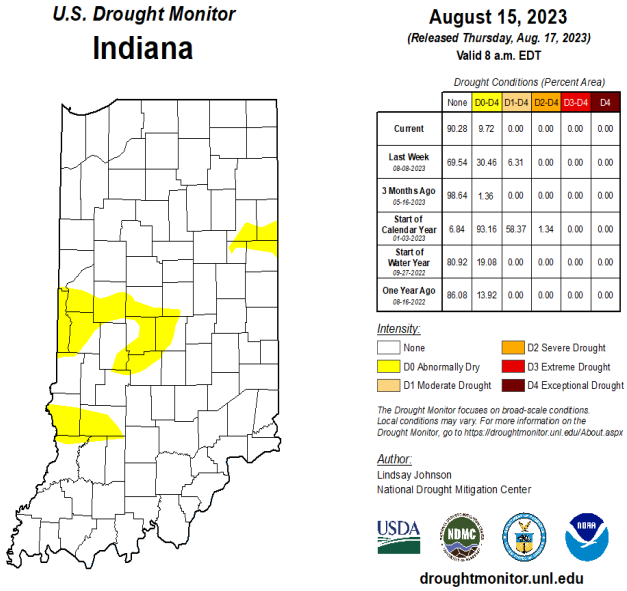


Figure 5: August 15, 2023, US Drought Monitor. The US Drought Monitor is released every Thursday morning by 8:30 AM.

The Climate Prediction Center (CPC) has elevated confidence in above-normal temperatures and below-normal precipitation for the next two weeks (Figure 6). The CPC also has a slight risk for excessive heat next week, as modeled temperatures show heat in the mid to upper 90s (Figure 7). I would not be surprised to see temperatures breaching 100°F in southern Indiana, which, coupled with the lack of precipitation, may escalate drought concerns by the end of August.

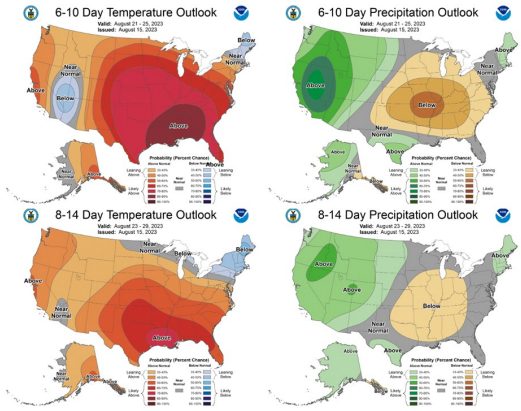


Figure 6: CPC 6-10 day temperature and precipitation outlooks for the United States, valid August 21-25, 2023 (top). CPC 8-14 day temperature and precipitation outlooks for the United States, valid August 23-29, 2023 (bottom).

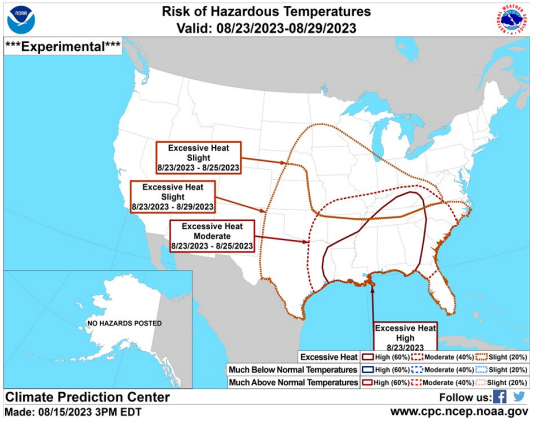


Figure 7: CPC Risk of Hazardous temperatures for August 23-25, 2023.

Pest&Crop newsletter © Purdue University - extension.entm.purdue.edu/newsletters/pestandcrop
Editor: Tammy Luck | Department of Entomology, Purdue University, 901 W. State St., West Lafayette, IN 47907