In This Issue

Free Frogeye Leaf Spot Sampling Offered

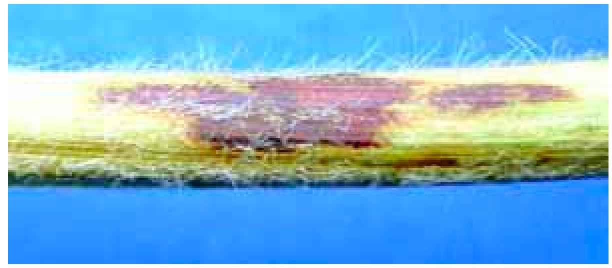
(Guohong Cai)

Frogeye leaf spot (FLS) is becoming a serious threat to soybean production in Indiana and surrounding states. Traditionally a southern disease, it can cause yield loss up to 60%. In recently years, FLS severity has been on the rise in the North Central region. It caused estimated yield loss worth $51 million in Indiana and $428 million in the North Central region in 2018.

FLS infection can occur at any stage of soybean development, but most often occurs after flowering. Initial symptoms are small, dark spots, which will eventually enlarge to a diameter of up to about ¼ inch. The centers of the lesions become gray to brown and have a reddish-purple margin.

Stems and pods can also be affected later in the season. Symptoms on stems are long narrow dark lesions with flattened centers. Pod lesions will be circular to elongate, slightly sunken and reddish-brown. Seed symptoms will appear as gray and brown areas on the seed and which can be blotches to specks on the seed coat. Infected seed can have cracked and flaking seed coats. Seed symptoms can be confusing with those caused by some other fungi.

Frogeye (*Photo Credit: Purdue Extension*)



Frogeye (*Photo Credit: Purdue Extension*)

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Frogeye (*Photo Credit: Purdue Extension*)

Dr. Guohong Cai, an USDA/ARS plant pathologist and an adjunct faculty at the Botany Department of Purdue University, has been funded by Indiana Soybean Alliance to conduct a survey of FLS in Indiana. Among other things, he will study the race, fungicide resistance and mating types of the causal pathogen, *Cercospora sojina*. Different sources of resistance can be used to counter different races of the pathogen. Fungicide has been used to control FLS, but QoI resistance has been reported in Indiana. Two mating types have been reported in this fungus, MAT1-1 and MAT1-2. Existence of both mating types in a field has the potential of leading to higher virulence.

If you have FLS problem in your fields, please consider sending samples to Purdue. Pick 5-10 pods or seeds suspected of being infected by FLS from each field and put them in a small envelope. Since it's late in the season, it may be difficult to find leaves and petiole infected by FLS, but if you can, leave and petiole samples are welcome too. Put the samples from each field in a separate envelope and label the field location. Dr. Cai will return to the race, QoI resistance and mating type information back to you when they become available. The collected pathogen isolates will also be used to screen soybean germplasm to identify new source of resistance for breeding effort.

The samples should be shipped to:

Dr. Guohong Cai
Purdue University
915 W. State Street
West Lafayette, Indiana 47907

Switchgrass Livestock And Wildlife Forage, Landscaping Plant And Potential Fuel For People

(Keith Johnson) & *(Brooke Stefancik, Sullivan County Extension Educator - Agriculture and Natural Resources)*

Switchgrass (*Panicum virgatum* L.) is a native perennial warm-season grass that is adapted as many ecotypes across North America. In Indiana, switchgrass was found in the Great Prairie when wildlife and the early settler's livestock in this region used it as a forage resource. In Indiana today, switchgrass is sometimes used a component of warm-season grass paddocks that complement a cool-season grass/legume pasture system. It is a versatile grass as it is used as a landscaping plant, too. Switchgrass is likely sold today as a potted plant in most Indiana landscaping greenhouses and switchgrass seed can be purchased through forage seed companies.

The versatility of this drought and winter tolerant grass has more recently been exploited as a future biofuel resource for the production of energy for people. While the incentive for entrepreneurial companies to invest in a high fiber to energy conversion business is not appealing today, it is interesting to reflect on how many corn grain to ethanol facilities dot Indiana today that were not part of the Indiana economy just a couple of decades ago. If fossil fuel prices increase and the world's fuel economy is unstable, high fiber (cellulosic) feedstocks may have potential in the future.

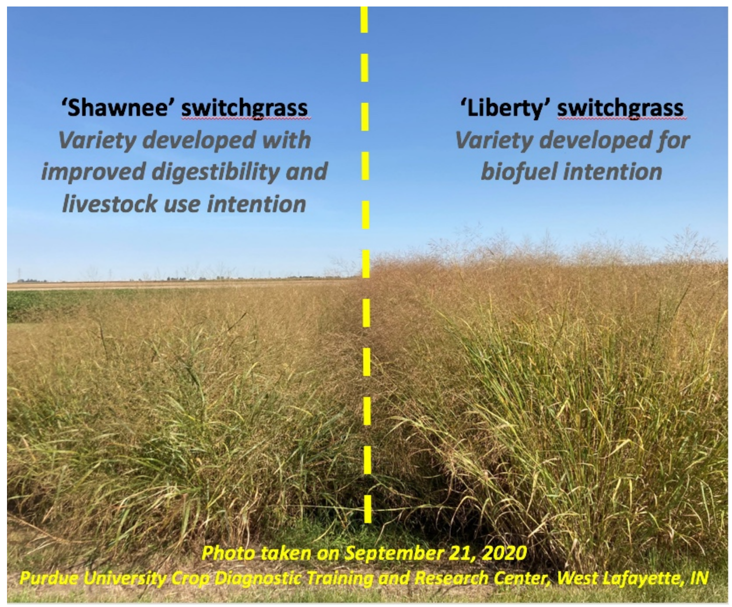
Research conducted at Purdue University evaluated the growth, development, quality, and yield of two diverse switchgrass varieties that received different rates of nitrogen (N) fertilizer. The varieties used were 'Shawnee', an upland variety that has improved digestibility and developed for livestock use, and 'Liberty' which is a variety that has both upland and lowland ecotype genetics. This combination of upland and lowland genetics was theorized to have more yield and adequate winterhardiness in the Midwest USA. 'Liberty' was the first variety to be released as a biofuel-purpose switchgrass.

Purdue University research results indicated that livestock producers interested in including switchgrass into their pasture rotations should consider 'Shawnee' over 'Liberty' as 'Shawnee' had lower fiber concentration and better digestibility.

It has been noted with past research that the best time to harvest switchgrass as a biofuel feedstock is after a killing freeze has occurred. The objective is to harvest a high yielding, low concentration N and high concentration fiber biofuel feedstock. The last harvest time in the Purdue research was late September.

Nitrogen-fertilized switchgrass in early May still had higher N composition at the last harvest. Switchgrass receiving no N fertilizer yielded as much as switchgrass receiving 60 pounds of N per acre. Switchgrass receiving N fertilizer was often falling down (lodged) before the final harvest, which creates harvest difficulties. 'Liberty' had higher fiber than 'Shawnee' at the final harvest. The low concentration of N and high concentration of fiber in switchgrass late season is ideal for conversion of switchgrass to biofuel products. 'Liberty' was 8.8 percent higher yielding in Indiana, and was standing better at each final harvest as compared to 'Shawnee'.

Switchgrass is a versatile forage that may become part of the Indiana bio-economy in the future. For more details about switchgrass and its use as a cellulosic fuel feedstock visit the CenUSA Bioenergy website at https://cenusa.iastate.edu/.Switchgrass – Shawnee and Liberty



The photo of 'Liberty' and 'Shawnee' switchgrass at the Purdue University Crop Diagnostic Training and Research Center illustrates the better yield potential and less lodging of 'Liberty as compared to 'Shawnee' switchgrass. (*Photo Credit: Keith Johnson*)

Purdue University Sullivan County Extension Educator Brooke Stefancik's Master's degree research provided much information about the yield and quality of switchgrass as livestock and biofuel resources. (*Photo Credit: Keith Johnson*)

Identify and Eliminate "Gremlins" From Yield Monitor Data

(Bob Nielsen)

Even if grain yield monitor calibration, adjustments, and operation are faithfully conducted (Luck & Fulton, 2014; Nielsen, 2020c), the resulting yield data sets almost always require some post-harvest processing and "cleaning" procedures to rid the data set of anomalies and "gremlins" (Luck et al., 2015; Nielsen, 2020a; Nielsen, 2020b). Failure to do so does not result in catastrophe, but contributes to errors in subsequent spatial analysis and interpretation of the data. Farmers can conduct these harvest data processing and "cleaning" procedures themselves with commercially available mapping software or outsource the tasks to a service provider.

Doing it yourself requires the software (an expense) and the knowledge to operate the software (time and talent). Commercially available mapping software programs vary in their processing and "cleaning" capabilities, flexibilities, and user-friendliness. Consequently, "doing it yourself" can be a rewarding challenge or a frustrating task.

Outsourcing the task involves some expense (up front or hidden in other service fees) and trust that the service provider knows what they are doing. Automatic, wireless uploads of yield data directly from the combine to a "cloud-based" service does not always include the assurance that the yield data will be further processed or "cleaned". The data may simply be stored and/or added to a larger aggregation of "big data" with no further processing or "cleaning".

Common post-harvest data processing steps include choosing correct settings for "dry" bushel moisture value, "dry" bushel weight, stop / start time delays (affect estimated total harvest area), grain flow lag (time from header to sensor, affects positional accuracy of point data), and GPS offsets (distance from GPS antenna to header, affects positional accuracy of point data). These various settings influence the accuracy of the estimates of "dry" bushels per acre and the spatial accuracy of the yield data points with respect to their geo-location within the field. When yield data are properly processed, patterns of spatial yield variability are often more clearly identified (Fig. 1 before processing vs. Fig. 2 after processing)

Some yield monitors (particularly newer models) allow these settings to be made in the monitor display prior to harvest. Others do not and so the yield data requires using mapping software to retroactively set the values and "reprocess" the data. Not all mapping software programs provide the same options for reprocessing of yield data. Not every proprietary yield file format lends itself to reprocessing.

Other anomalies and "gremlins" in yield data may literally be inaccurate point yield estimates caused by inadvertent quirks of the yield monitor system (e.g., sudden speed changes, incorrect auto-swath widths, imprecise DGPS signals, and the normal grain flow dynamics inside the combine). Yield data attributes like swath width, harvest speed, and DGPS signal quality can be displayed by your mapping program just like you do for yield itself. Mapping these attributes helps you more clearly visualize the location and extent of the anomalies.

Some "gremlins", like incorrect swath widths, can be corrected during the reprocessing steps of the mapping software so that bushels per acre are recalculated accurately (Nielsen, 2020). Other anomalies that do not directly impact yield estimates, such as incorrect assignment of hybrid labels to the yield data (Nielsen, 2014a), can be corrected with your mapping software by editing the yield file, manually selecting groups of yield data points, and replacing the hybrid label with the correct ones. True anomalies and "gremlins" (e.g., data points associated with sudden speed changes, inadvertent "header down" data points) should simply be deleted from the data set to avoid interference with your spatial interpretation of the data.

Cited references:

Luck, Joe and John Fulton. 2014. Best Management Practices for Collecting Accurate Yield Data and Avoiding Errors During Harvest. Univ. Nebraska Extension Circular EC2004. http://extensionpublications.unl.edu/assets/pdf/ec2004.pdf [accessed Oct 2020].

Luck, Joe, Nathan Mueller, and John Fulton. 2015. Improving Yield Map Quality by Reducing Errors through Yield Data File Post-Processing. Univ. of Nebraska Extension Circular EC2005. http://extensionpublications.unl.edu/assets/pdf/ec2005.pdf [accessed Oct 2020].

Nielsen, RL (Bob). 2014a. Wandering Hybrid Syndrome: Yield Monitor Errors. Corny News Network, Purdue Extension. https://www.kingcorn.org/news/timeless/AutoHybridErrors.html [URL accessed Oct 2020].

Nielsen, RL (Bob). 2020b. Wandering Swath Width Syndrome: Yield Monitor Errors. Corny News Network, Purdue Extension. http://www.kingcorn.org/news/timeless/AutoHeaderWidth.html [URL accessed Oct 2020].

Nielsen, R.L. (Bob). 2020c. Yield Monitor Calibration: Garbage In, Garbage Out. Corny News Network, Purdue Extension. http://www.kingcorn.org/news/timeless/YldMonCalibr.html [URL accessed Oct 2020].

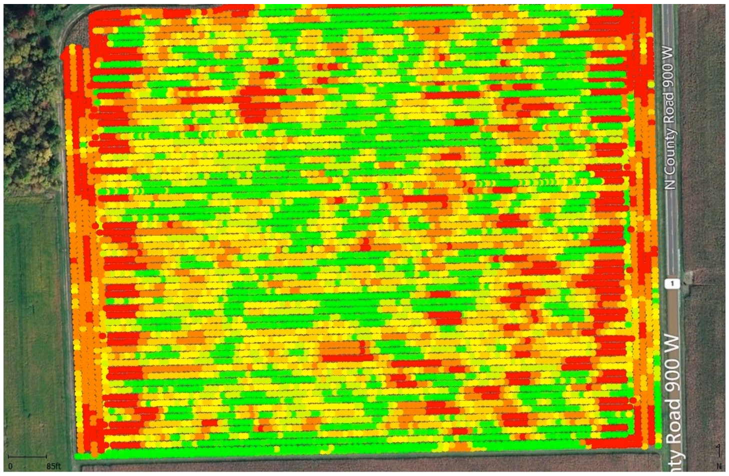


Fig. 1. Map of yield data incorrectly processed for start/stop delays and grain flow shift. Colors: Green = highest yields, Red = lowest yields. Davis-Purdue Ag Center, Field M1 (30-ac), 2015 corn harvest.

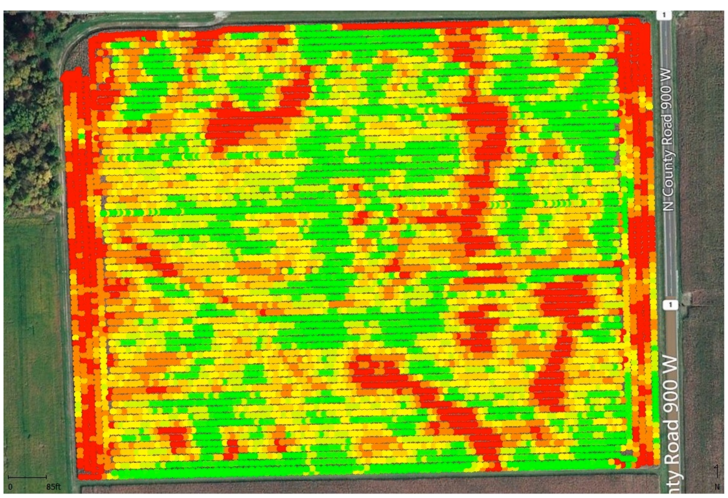


Fig. 2. Map of yield data correctly processed for start/stop delays and grain flow shift. Colors: Green = highest yields, Red = lowest yields. Davis-Purdue Ag Center, Field M1 (30-ac), 2015 corn harvest.

Wandering Hybrid Syndrome: Yield Monitor Errors

(Bob Nielsen)

Geo-positional inaccuracies in DGPS signals affect the accuracy of yield monitor data in various ways. Inaccurate DGPS signals can cause inaccurate automatic header width adjustments which, in turn, directly impact the accuracy of yield estimates themselves (Nielsen, 2020b). Another type of yield monitor error that is related to imprecise DGPS signal sources is one associated with the automatic hybrid labeling of yield data points during the harvest operation.

Some planter displays allow you to "track" what hybrids or varieties are being planted and record this information in a planting log for the field. If you are planting different hybrids in the two halves of the planter, the display can also log this spatial information in a coverage file during the planting operation (Fig. 1).

During harvest, the same display can use the logged planting information to automatically label yield data points with the appropriate hybrid identification by matching the combine's geo-position in the field during harvest with the logged geo-position of the planted hybrids. This capability to automatically "tag" yield data points with the identity of the planted hybrids enables you to easily summarize average yields by hybrid either on the display itself or later in your mapping software.

The Wandering Hybrid Syndrome

Inaccuracies in perceived geo-position can result in inaccurate hybrid labeling of yield data points during harvest. Figure 2 illustrates several harvest passes in a field that were planted with a 16-row planter that had different hybrids in the two 8-row halves of the planter and were harvested with an 8-row combine. Sections of three harvest passes of 8 rows of Hybrid B (blue) were mislabeled as being Hybrid A (red).

The DGPS signal source for the planting operation was RTK (1-inch accuracy) and that used for the harvest operation was WAAS (5 to 15-ft accuracy), which resulted in the occasional imprecise overlapping of logged planting and harvest passes in the field. In some areas of the field, the positional error in the overlapping of the planting and harvesting passes was great enough that it resulted in inaccurately labeled harvest data points.

Figure 3 illustrates an area of the field where the geo-positions of the two field operations overlapped precisely. The black data points represent the logged geo-position of the center of the 16-row planter (aka the planting coverage file). The red (Hybrid A) and blue (Hybrid B) yield data points represent the logged center of the 8-row combine, but also correspond to the center of each half of the planter when positioned correctly relative to the logged data points of the planting coverage file.

Figure 4 illustrates an area of the field where the geo-positions of the two field operations do not overlap precisely. The yield monitor occasionally senses (incorrectly) that the path of the combine has drifted far enough into the other hybrid's logged geo-position that it incorrectly labels those yield data points as being the other hybrid.

In contrast to auto swath width errors where the cause is only related to pass-to-pass geo-positional inaccuracies during the harvest operation itself, errors in automatic hybrid labeling may be compounded if geo-position inaccuracies occur during both planting and harvesting. The most likely scenario for this would be if WAAS (5 to 15-ft accuracy) were used as the DGPS signal source for both planting and harvesting.

Consequences of Wandering Hybrid Syndrome?

Recognize that the consequence of inadvertently erroneous hybrid labels on the accuracy of yield estimates per se is.... nothing. That is because, contrary to incorrect swath widths, hybrid labels have nothing to do with the yield monitor's estimation of yield for each data point.

The primary consequence of inadvertent erroneous hybrid labeling of yield data points is that it leads to mistakes "down the road" if those hybrid labels are then used to filter and analyze the yield data. Several scenarios can be considered and the probability of each is unpredictable.

Let's consider two hybrids, A and B, with different yields. Let's say that the actual average yield for Hybrid A is 200 bu/ac and that of Hybrid B is 180 bu/ac.

1. If some proportion of Hybrid A's data points (200 bu potential) are mislabeled as Hybrid B, but none of Hybrid B's data points (180 bu potential) are mislabeled, then the apparent yield of Hybrid B will be inflated.
2. The consequence would be reversed if some percentage of Hybrid B's are mislabeled as Hybrid A but none of Hybrid A's are mislabeled.
3. If equal proportions of Hybrid A's and Hybrid B's data point are mislabeled, then there may be no consequence later summaries of the yield data by hybrid.

So, how can you tell whether your yield data is afflicted with Wandering Hybrid Syndrome?

- If you use auto-steer on your combine, I suppose you could keep your eyes glued to the display monitor and watch the hybrid names change as you harvest the field :-).
- Some, but not all, mapping software programs allow you to visually display the logged yield data by their assigned hybrid names. That allows you to visualize the hybrid name changes throughout the field as illustrated in Fig. 2.
    - Unfortunately, this diagnostic occurs after the "cows have broken through the fence" and only points you in the right direction for future harvesting.

So, what can be done to prevent or minimize the occurrence of Wandering Hybrid Syndrome?

- Equip both your planter tractor and combine with precise DGPS signal sources, such as RTK, so that the both field operations log geo-position precisely (within inches) and repeatably.

So, what can be done once the problem has occurred and you are stuck with a bunch of yield files containing incorrect hybrid attributes?

- Some mapping software programs allow you to highlight / select groups of data points and then edit their "properties" or "attributes". For small areas of fields where the data mapped by "hybrid" indicates mistakes in hybrid assignment, you could then edit and correct the hybrid names. For large and/or numerous areas of fields with incorrect hybrid name assignments to the yield data, you may simply choose to "live" with the mistakes.

"We made too many wrong mistakes." — Yogi Berra

Related reading

Luck, Joe and John Fulton. 2014. Best Management Practices for Collecting Accurate Yield Data and Avoiding Errors During Harvest. Univ. of Nebraska Extension publication EC2004. https://extensionpublications.unl.edu/assets/pdf/ec2004.pdf [URL accessed Oct 2020].

Nielsen, R.L. (Bob) Nielsen. 2020a. Identify and Eliminate "Gremlins" From Yield Monitor Data. Corny News Network, Purdue Extension. http://www.kingcorn.org/news/timeless/CleaningYieldData.html [URL accessed Oct 2020].

Nielsen, RL (Bob). 2020b. Wandering Swath Width Syndrome: Yield Monitor Errors. Corny News Network, Purdue Extension. http://www.kingcorn.org/news/timeless/AutoHeaderWidth.html [URL accessed Oct 2020].

Nielsen, RL (Bob). 2020c. Yield Monitor Calibration: Garbage In, Garbage Out. Corny News Network, Purdue Extension. http://www.kingcorn.org/news/timeless/YldMonCalibr.html [URL accessed Oct 2020].

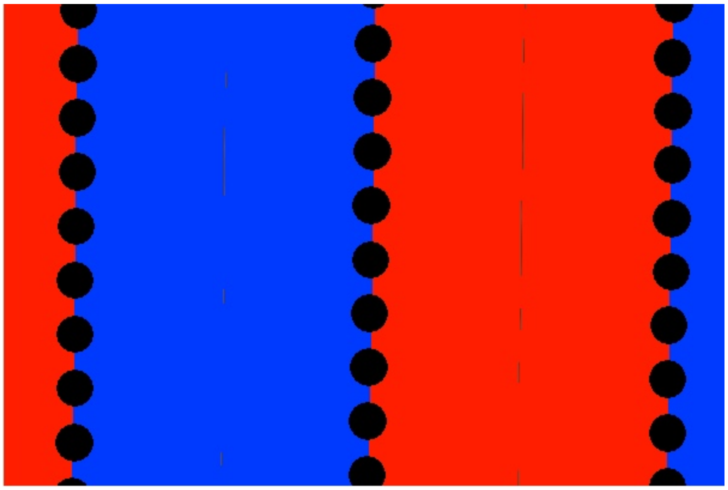


Fig. 1. Example of logged planter data (black circles = planter center) and the planter coverage file for a field planted with different hybrids in each half of the planter (red = Hybrid A, blue = Hybrid B).

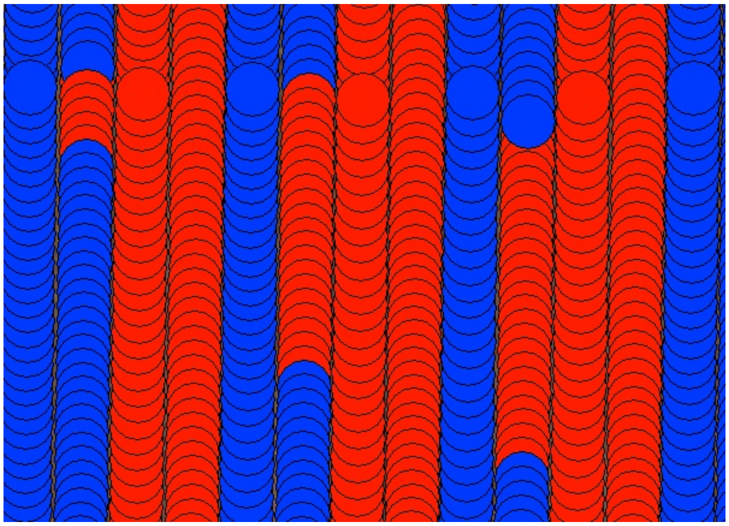


Fig. 2. Example of errors in automatically labeling yield data points with previously logged hybrid information (red = Hybrid A, blue = Hybrid B). NOTE: This view is "zoomed out" farther than that shown in Fig 1.

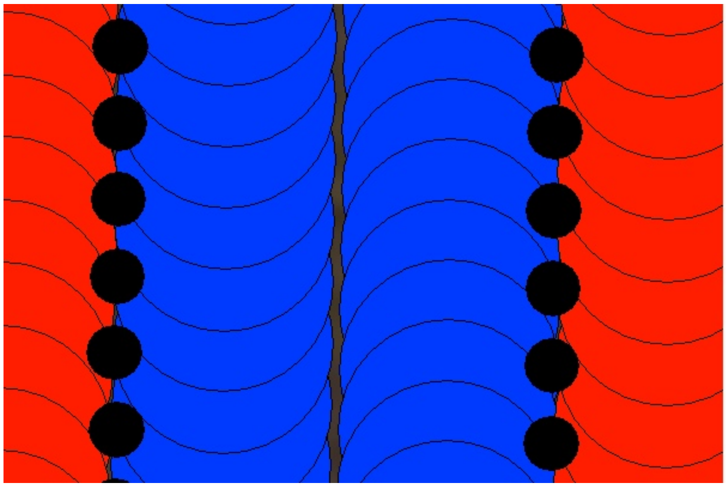


Fig. 3. Precisely overlapped geo-positions of logged 16-row planting data (black = planter center) and 8-row harvest data (combine center), resulting in accurate assignment of hybrids to yield data points (red = Hybrid A, blue = Hybrid B).

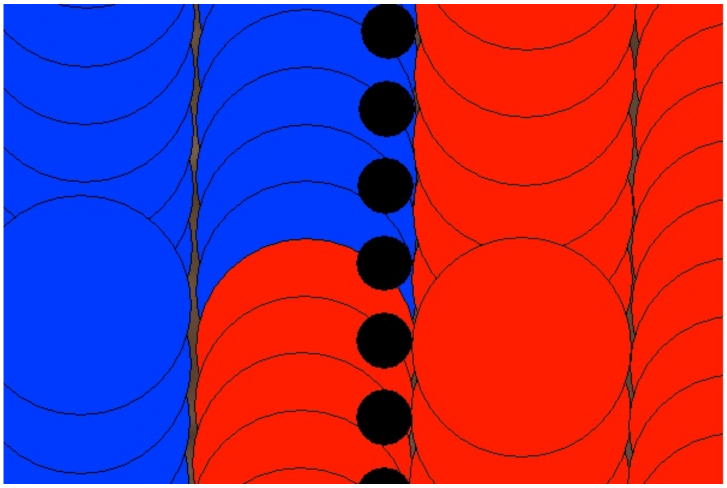


Fig. 4. Less than precise overlapping of logged 16-row planting data geo-positions (black = planter center) and 8-row harvest data (combine center), resulting in inaccurate assignment of hybrids to yield data points (red = Hybrid A, blue = Hybrid B).

Wandering Swath Width Syndrome: Yield Monitor Errors

(Bob Nielsen)

While we often focus on the importance of yield monitor calibration relative to logging accurate yield estimates during grain harvest, there are other yield monitor settings that can inadvertently influence yield estimates. One of these is the option in certain displays to automatically adjust harvest header or swath width based on the harvested "coverage map" and the estimated current geo-position of the combine in the field. Header or swath width, of course, is used by the yield monitor to estimate the harvested area and the calculation of yield per acre for individual data points. Not surprisingly, accurate header widths are important to ensure accurate yield estimates by the yield monitor.

When set to automatically adjust header width, the yield monitor will automatically decrease the logged header width if it perceives that one or more rows of the combine head are overlapping a previously harvested area. When the estimated geo-position of the combine is accurate (e.g., when the GPS signal source is RTK), this automatic header width adjustment is great when harvesting point rows or field edges in corn or when harvesting soybeans in general. However, when the estimated geo-position of the combine is not accurate, the yield monitor may erroneously change header widths in the middle of the field where, in fact, the combine is NOT overlapping a harvested area. This is most likely to occur when the combine is using DGPS signals from WAAS or similar signal sources whose positional accuracies range from 5 to 15 feet horizontally.

The consequence on yield estimates from inadvertent and erroneous changes in the logged header widths can be quite significant. Figure 1 illustrates a small section of a field where the yield monitor erroneously decreased the header width value from the full 20 feet (eight 30-inch rows of corn) to 17.5 feet (seven 30-inch rows) for a short distance.

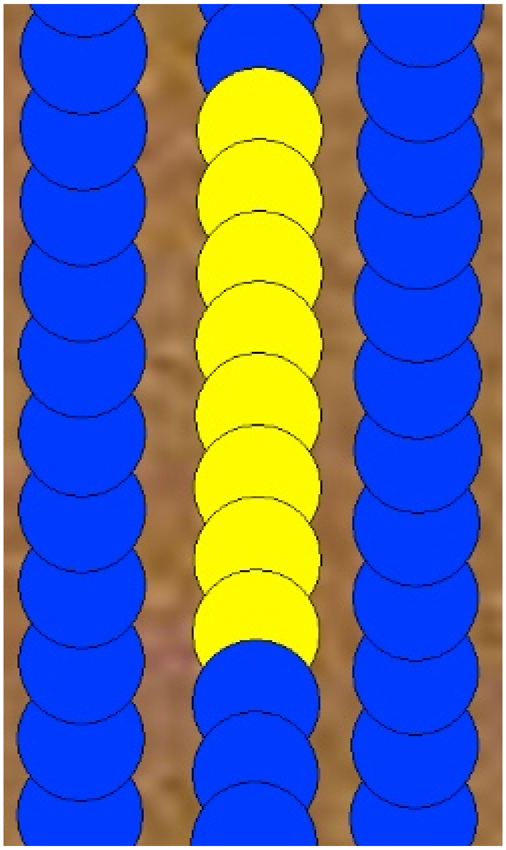


Fig. 1. Closeup view of yield data points depicting full (20ft) header widths (blue) and incorrect partial 17.5ft header widths (yellow).

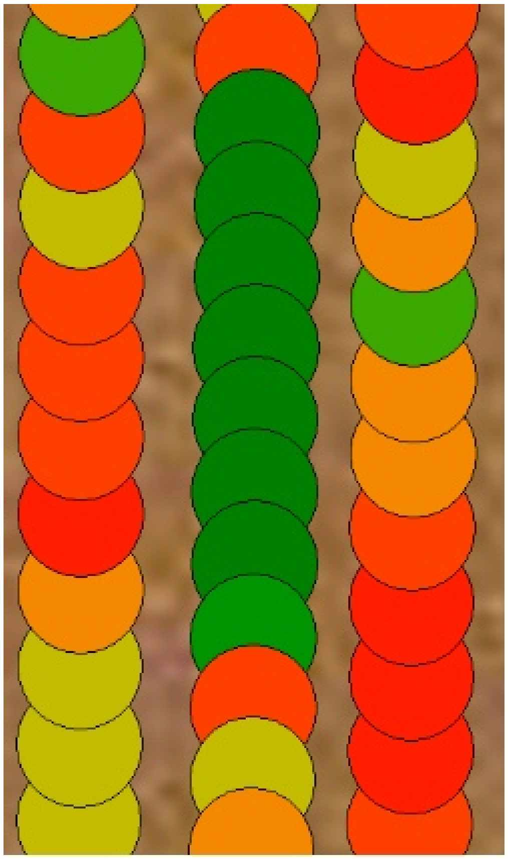


Fig. 2. Closeup view of same yield data points as Fig 1, depicting estimated yields. Average yield for the 17.5ft header width points was 263 bu/ac while the average yield for the surrounding normal 20ft header widths was 223 bu/ac.

The incorrect reduction in header width for those data points caused the yield monitor to overestimate yield per acre for the affected data points because the estimated harvested area for those points was erroneously smaller. Figure 2 illustrates the estimated yields for the same individual data points shown in Fig. 1. The average estimated yield for the 8 data points with incorrect header width values was 263 bu/ac. The average estimated yield for the surrounding data points with the correct 20ft header width values was 223 bu/ac. The data points were logged every second at an average speed of 5.7 mph and so are approximately 8 feet apart, meaning that there is approximately 64 feet of incorrect header width values and, subsequently, incorrect yield data.

Clearly, the impact of such random and incorrect automatic header width changes on yield estimates can be significant depending on the percentage of the field affected. Recognize that such yield estimate errors are far larger than those resulting from simpler calibration issues and, thus, deserve your attention if your goal is to end up with an accurate yield map.

So, how can you tell whether your yield data is afflicted with Wandering Swath Width Syndrome (WSWS)?

- If you use auto-steer on your combine, I suppose you could keep your eyes glued to the display monitor and watch the header width values as you harvest the field :-).
- Some, but not all, mapping software programs allow you to map the logged data by their header / swath width values. That allows you to visualize the header width changes throughout the field as illustrated in Fig. 1.
  - Unfortunately, this diagnostic occurs after the "cows have broken through the fence" and only points you in the right direction for future harvesting.

So, what can be done to prevent or minimize the occurrence of WSWS?

- Equip your combine with more precise DGPS signal sources, such as RTK, so that the combine's estimated geo-position is more precise (within inches) and, thus, the estimated harvest coverage map will be more precise.
- Turn off the automatic header width setting in the yield monitor display and manually change header widths when harvesting point rows or other partial header widths.

So, what can be done once the problem has occurred and you are stuck with a bunch of yield files containing incorrect header widths and consequently incorrect yield estimates?

- Some yield data processing software allows you to "re-process" yield data during or after it has been imported by the software. Often there will be an option to force the use of a single header / swath width when processing the data. Selecting this would override the logged header / swath widths in the data file and result in correct yield estimates.
  - However, be aware that this processing option means that yield estimates will not be accurate for point rows or anywhere else in the field where the number of rows harvested actually did decrease.
- If the software you use to process yield files does not allow you to force a single manual header / swath width during the yield processing step, then you are basically stuck with the yield estimation errors.
  - Unless.... you are savvy enough to save / export the yield data to a "shape" file, and then...
  - Edit the "shape" file to add a new "yield" variable and recalculate yields yourself using the logged values for grain flow, logging interval, grain moisture, distance traveled, and your single value for header / swath width (see formula in Luck & Fulton, 2014).
  - Such editing of a yield data file is doable with open-source GIS programs like QGIS, but not with many of the other "off-the-shelf" mapping programs.

Related reading

Luck, Joe and John Fulton. 2014. Best Management Practices for Collecting Accurate Yield Data and Avoiding Errors During Harvest. Univ. of Nebraska Extension publication EC2004. https://extensionpublications.unl.edu/assets/pdf/ec2004.pdf [URL accessed Oct 2020].

Nielsen, R.L. (Bob) Nielsen. 2020a. Identify and Eliminate "Gremlins" From Yield Monitor Data. Corny News Network, Purdue Extension. http://www.kingcorn.org/news/timeless/CleaningYieldData.html [URL accessed Oct 2020].

Nielsen, R.L. (Bob). 2020b. Wandering Hybrid Syndrome: Yield Monitor Errors. Corny News Network, Purdue Extension. http://www.kingcorn.org/news/timeless/AutoHybridErrors.html [URL accessed Oct 2020].

Nielsen, R.L. (Bob). 2020c. Yield Monitor Calibration: Garbage In, Garbage Out. Corny News Network, Purdue Extension. http://www.kingcorn.org/news/timeless/YldMonCalibr.html [URL accessed Oct 2020].

2021 Crop Management Workshop

(John Obermeyer)

All programs/events are being tweaked during this new "normal," hoping you will join us for the virtual 2021 Crop Management Workshop. Here is the necessary meeting information, further details for registration are forthcoming. For over 30 years, Purdue's Field Crop Extension Specialists, are appreciative of your support of this meeting!

Save the Date:

Thursday, January 28, 2021

Purdue's Crop Management Workshop

Due to the COVID-19 pandemic, this year's conference will be streamed live from the Beck Agriculture Center (West Lafayette)

Time: 8:00 am to 12:35 pm

Where/How: Livestreamed from the Beck Ag Center (West Lafayette)
- livestream link emailed to those registered
- limited seating, with covid-19 restrictions, available on-site

Purdue Speakers Include:

Joe Becovitz (OISC)
Jim Camberato (soil fertility)
Bill Johnson (weed control)
Darcy Telenko (plant diseases)
Christian Krupke (insect pests)
Bob Nielsen (corn agronomics)
Shaun Casteel (soybean agronomics)
Fred Whitford (pesticide safety)

Credits (awarded for complete meeting attendance):
- Indiana commercial pesticide applicators (CCHs)
- Certified Crop Advisors (CEUs)

Registration and further details are forthcoming.
Join Us There!

Recent Freeze Event May Have Marked End To Growing Season

(Beth Hall)

Overnight low temperatures the morning of October 16th reached into the low 30s (Fahrenheit), bringing an end to the growing season for a lot of vegetation across Indiana (Figure 1). Temperatures should warm up again with overnight lows more in the mid-40s over the next weeks with temperatures dropping near freezing for the last week of the month. The most recent climate outlook for the rest of October is indicating significant probabilities for above-normal temperatures, keeping in mind that the average low temperature for the last two weeks in Indiana is typically in the low-to-mid 40s in the northern counties to the mid-to-upper 50s in the southern counties.

Date of Most Recent 32°F Freeze

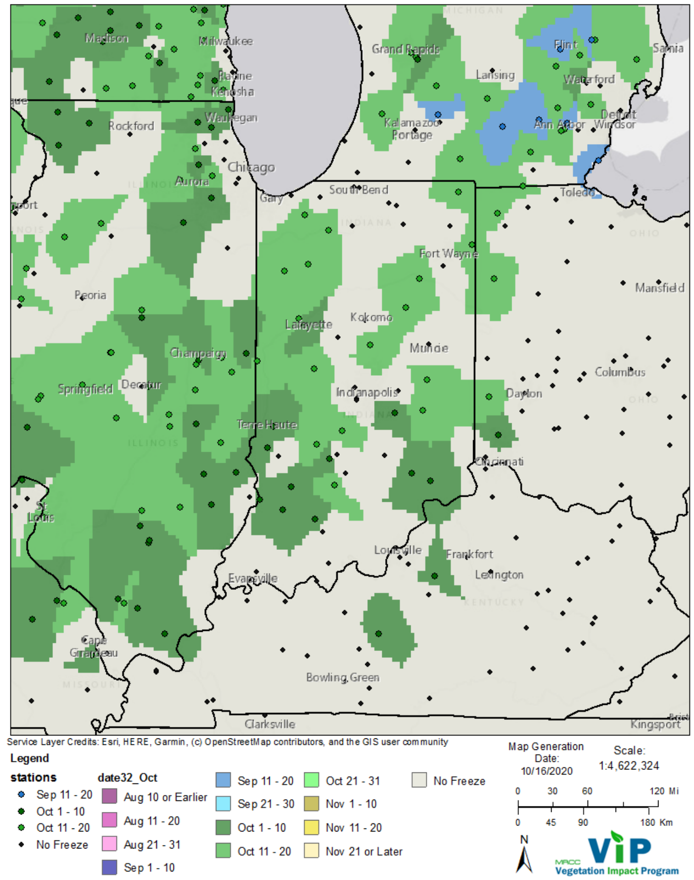


Figure 1. The date of the most recent 32°F freeze even as of October 16, 2020.

Precipitation is predicted to be above normal for the rest of the month, which should help relieve some of the drought stress that the state has been facing (Figure 2). Reports around the state have indicated low pond and stream levels in addition to county burn bans and local fires. Be sure to check if your county is under a current burn ban (https://www.in.gov/dhs/burnban/) in order to help minimize out-of-control wildfires that could strain fire control resources.

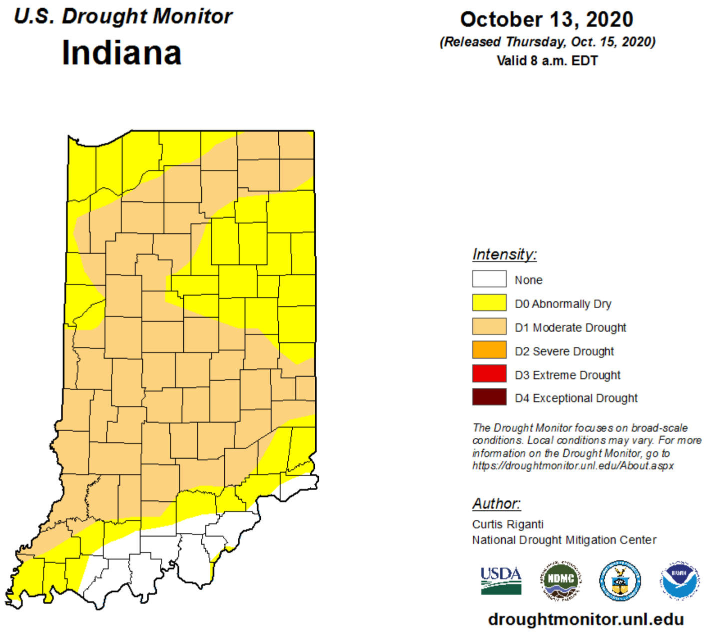


Figure 2. United States Drought Monitor map for Indiana representing conditions as of Tuesday, October 13, 2020.

With the 2020 growing season ending, Figures 3 and 4 show the seasonal accumulation of modified growing degree days in addition to the 2020 comparison to recent past years.

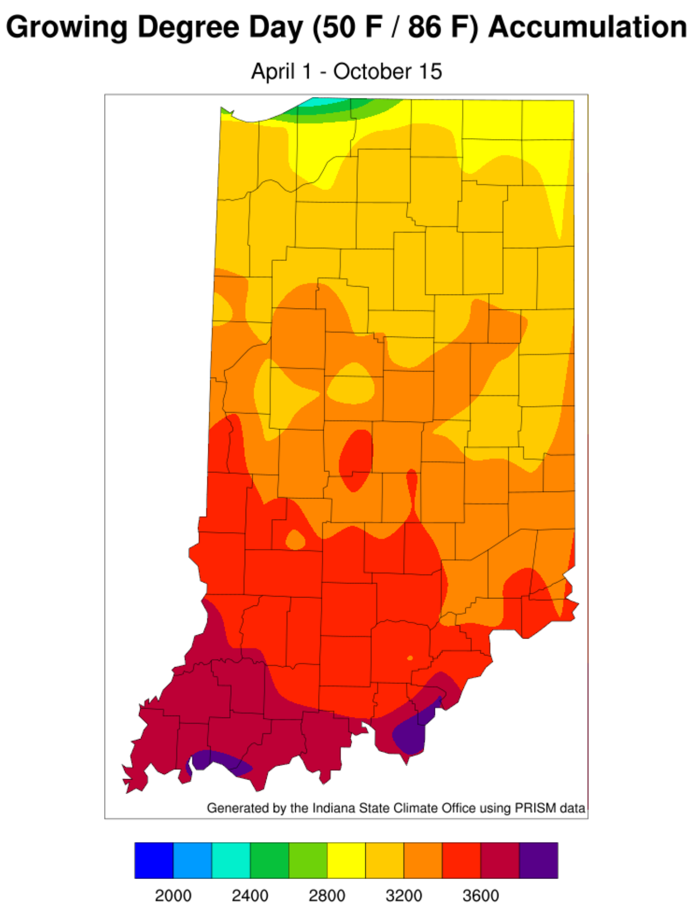


Figure 3. Modified accumulated growing degree-day units for April 1 – October 15, 2020.

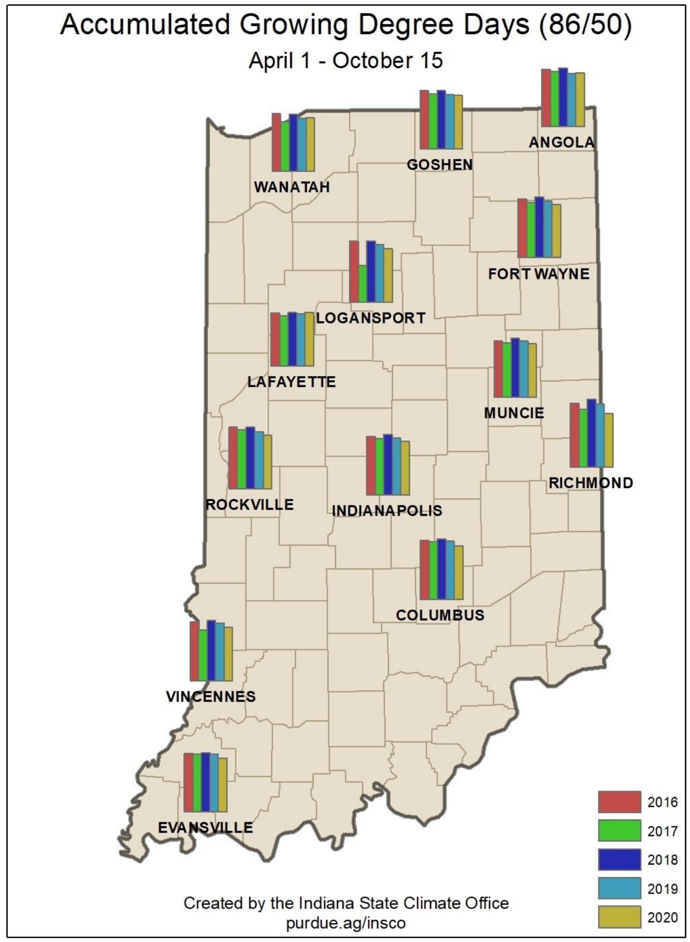


Figure 4. Comparison of accumulated modified growing degree days for April 1 through October 15 for 2016 through 2020.

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