

Southwest Michigan Field Crops Updates  
September 14, 2023

SCN Profit Checker Tool

Soybean cyst nematode (SCN) is the No. 1 yield-robbing pathogen of soybeans in North America, but do you have any idea how much it's costing you? The SCN Coalition's new [SCN Profit Checker tool](#) can give you an idea. Powered by data from 25,000+ university research plots, this tool estimates that economic toll, field by field, driving home the need for active SCN management.

You start by getting your soil tested for SCN. Fall is the best time to do that right after soybean harvest, and the [Soybean Checkoff](#) pays for this testing through the [MSU Plant and Pest Diagnostic Lab](#) for all Michigan soybean farmers. The number of SCN eggs found in the sample is given on the soil test report. You enter that number along with the percent sand in the major soil type for a field and the pH of the soil. The SCN female index on PI88788 is automatically filled in for Michigan residents. The website then calculates the percent yield loss due to SCN and the potential economic impact based on the yield estimate you enter.

For the example below, the soil sampled was given a very low risk rating based on the number of cysts and eggs found. The tool indicated that SCN caused a yield loss of 12.7% resulting in an economic loss of \$94/acre based on \$13.50/bushel soybeans. Note: the Profit Checker Tool only provides an estimate for yield loss due to SCN when planting soybean varieties with the PI88788 SCN resistance gene, not Peking or other sources of resistance. Current university recommendations include rotating between PI88788 and Peking varieties (not to continually plant Peking varieties) and to rotate out of soybeans as much as is feasible.



Michigan Soybean  
Promotion Committee  
The Soybean Checkoff  
michigansoybean.org



Michigan State University  
Plant & Pest Diagnostics

Funded by Soybean Checkoff Dollars

Nematodes	Soil <sup>1</sup>	Roots <sup>2</sup>	Risk <sup>3</sup>
Soybean Cyst	9 Cysts 780 Eggs 160 J2s	12s	1/2
Lesion	8		1
Root-Knot			
Lance			
Dagger			
Stunt			
Pin			
Spiral	22		0

1. Number per 100cm<sup>3</sup> soil
2. Number per 1.0g root tissue
3. Risk ratings: 0 = none; 1 = low; 2 = moderate; 3 = high

**SCN Profit Checker**  
The SCN Coalition™

SCN egg count per 100 CC	780
SCN female index on PI 88788	40
Sand %	50
Soil pH	6.3

**% SCN Yield Loss**  
**12.7**

Based on your expected yield of 55 bu./acre and your soybean price of \$13.50 per bu., your profit loss estimate is **\$94.30 per acre.**

The SCN Coalition encourages farmers to work with their trusted crop advisor to determine a plan to actively manage SCN.

[View state-specific recommendations](#) from university experts.

< Go back
Start over

Soil sampling for SCN is paid for by the Soybean Checkoff for all farmers who grow soybean (left). The SCN Profit Checker estimates the economic loss due to SCN for a given field (right).

Soybean cyst nematode infestation category based on number of SCN eggs detected in a soil sample. Table excerpted from the [Soybean Research and Information Network](#).

Infestation Category	Soybean Not Next Crop to be Grown	Soybean Next Crop to be Grown
No SCN eggs detected	0	0
Low	1 – 4,000	1 – 2,000
Moderate	4,001 – 16,000	2,001 – 12,000
High	16,000+	12,000+

## FAA Extends Drone Remote ID Enforcement Date Six Months

Those who fly unmanned aerial vehicles (UAV's, a.k.a. drones) for their business have experienced several changes since 2017 in how to get legal and stay legal. The bare minimum is to become certified with the Federal Aviation Administration (FAA), the governing body for all airspace-related issues, by passing the Part 107 Remote Pilot exam and then maintaining that license by engaging in free, online continuing education every two years.

A new rule was put in place in 2021 that all drones had to have remote identification capabilities by September 15, 2023. All drone manufacturers had to comply with a related standard a year ago, but an extension was made to give companies more time to comply.

Here is a recent announcement from FAA regarding Remote ID:

“Drone pilots who are unable to comply with the broadcast requirement of the [Remote ID Rule](#) will now have until March 16, 2024, to equip their aircraft. After that date, operators could face fines and suspension or revocation of pilot certificates.

“In making this decision, the FAA recognizes the unanticipated issues that some operators are experiencing finding some remote identification broadcast modules. Drone pilots can meet this deadline by purchasing a standard Remote ID equipped drone from a manufacturer or purchasing a Remote ID broadcast module [like [BlueMark DB120](#), [Drone Tag Beacon](#), and several others] which can be affixed to existing drones that do not have Remote ID equipment.

“Remote ID acts like a digital license plate and will help the FAA, law enforcement, and other federal agencies find the control station when a drone appears to be flying in an unsafe manner or where it is not allowed to fly. Learn more [here](#).”

## New Booklet on Financial Implications of Conservation Agriculture

An informational booklet has just been released called [The Financial Implications of Conservation Agriculture: Insights from Analyses of Farms in the Upper Midwest](#). This booklet aims to inform farmers' key partners—in particular, farm business management educators, agricultural lenders, and conservation

educators and professionals—about the financial costs and benefits of conservation agriculture practices to assist their work with farmers.

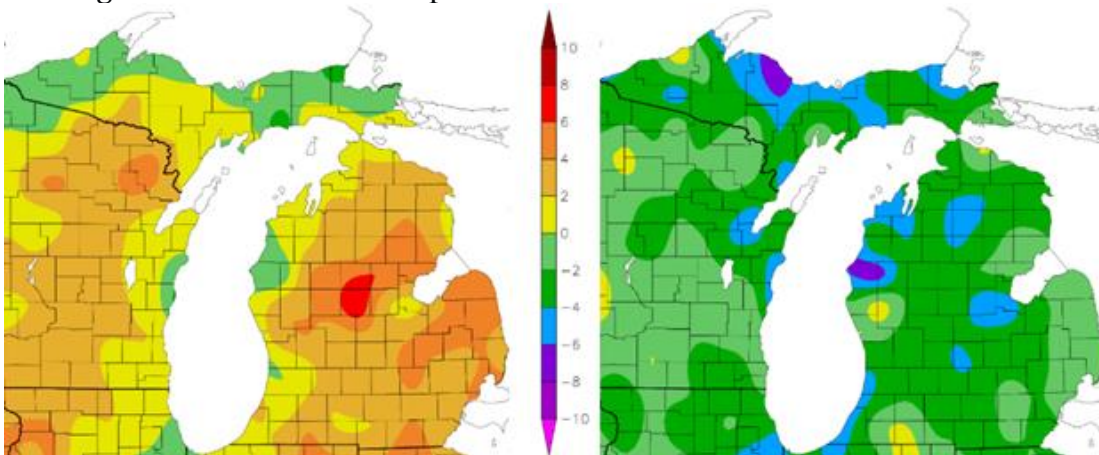
The booklet focuses on four common conservation practices: cover crops, reduced tillage, nutrient management, and managed grazing. The sections for each of these practices can also be used as separate fact sheets, which can also be found at the link above. The information included in this booklet was gathered through a review of existing research on the financial impacts of conservation practices on production systems in the Upper Midwest region.

The booklet is an outcome of a collaboration between the North Central Region Water Network, the University of Wisconsin–Madison Division of Extension, the University of Minnesota Water Resources Center, Environmental Defense Fund (EDF), Compeer Financial, and Croatan Institute. Our work is funded by North Central Sustainable Agriculture Research and Education (NC-SARE).

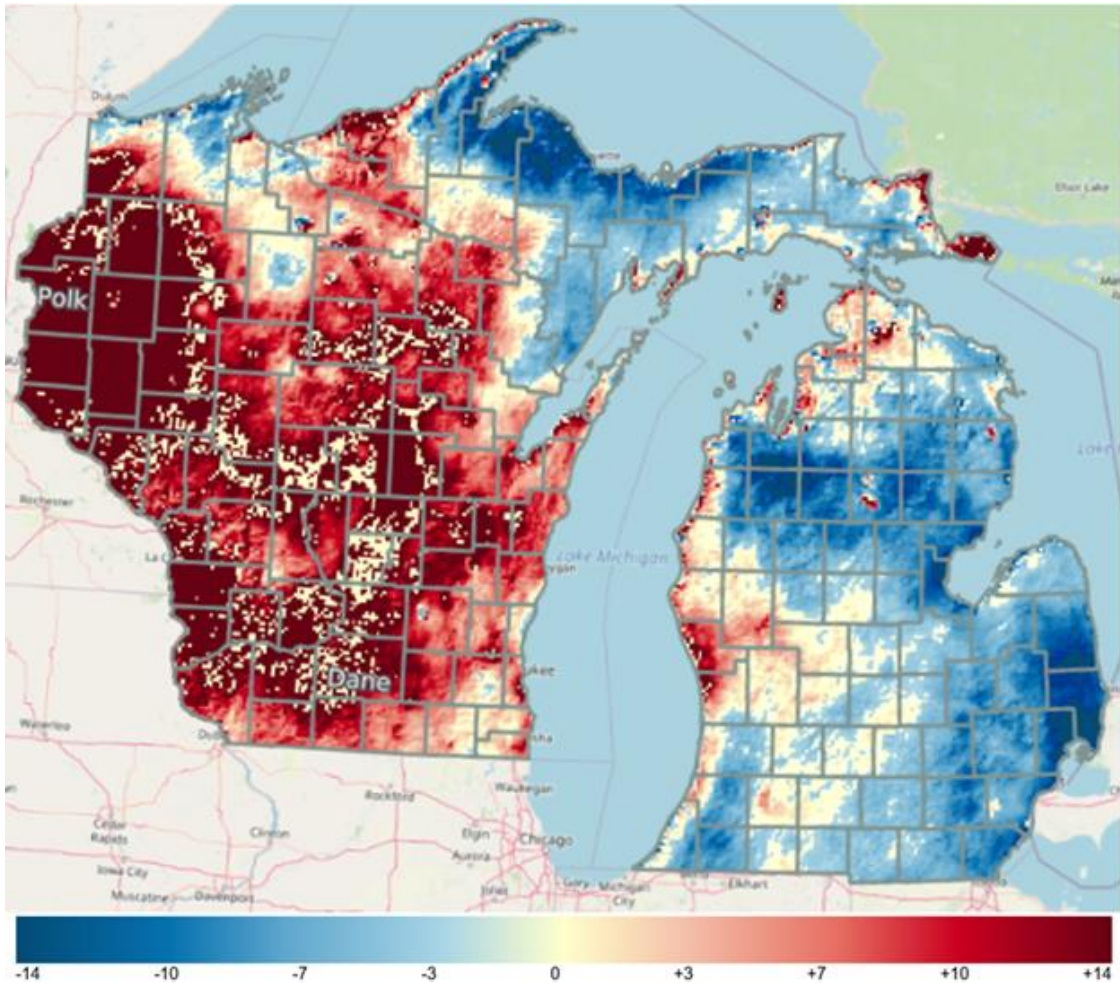
## Weather and Crop Update

### Weather

Temperatures last week were near normal on average with slightly warmer than normal nights and slightly cooler than normal days. We accumulated only 72 growing degree days (GDD base 50) which was nearly 20 units less than predicted. Much of the state is a week or more behind in heat units although some portions of southwest Michigan are near normal or even slightly ahead. MSU climatologist Jeff Andresen says an upper-air troughing feature will give way to a ridge that will bring warm and dry air to the Midwest and remain for the next 1-2 weeks or longer. The forecasted reference evapotranspiration rate (FRET) is roughly 0.9 inch for the week ending September 20 with daily rates ranging from a few hundredths of an inch below normal to a few hundredths above normal by next week. Only 76 GDD<sub>50</sub> are predicted for the coming week. Both the 6-10 and 8-14 day outlooks predict strong chances of above-normal temperatures heading into the last week of September.



Departure from normal for average minimum (left) and maximum (right) temperatures for the week ending September 13.



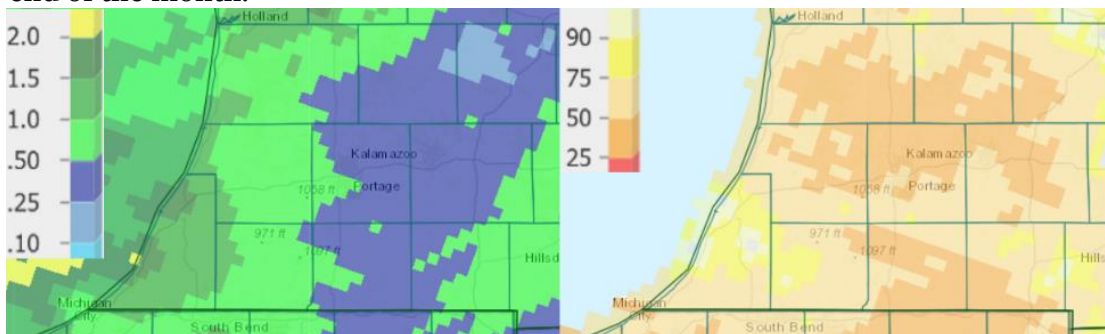
Growing degree day (base 50 degrees) departure from normal since March 1 according to MSU Enviroweather.



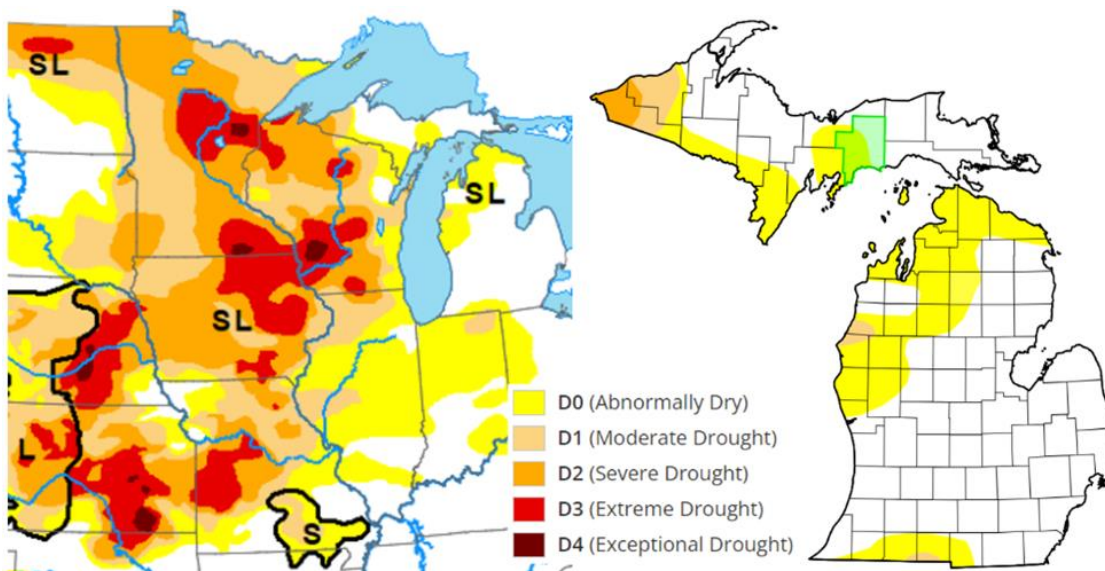
Total weekly forecasted reference evapotranspiration rate (FRET) for the week ending September 20.

Between 0.25 and 1.25 inches of rain fell across the region this past week with most areas receiving a half inch or so. Aside from Berrien County and portions of Cass County, the region has received 25-50% less rain than normal over the past month. The current release of the Drought Monitor shows the northern

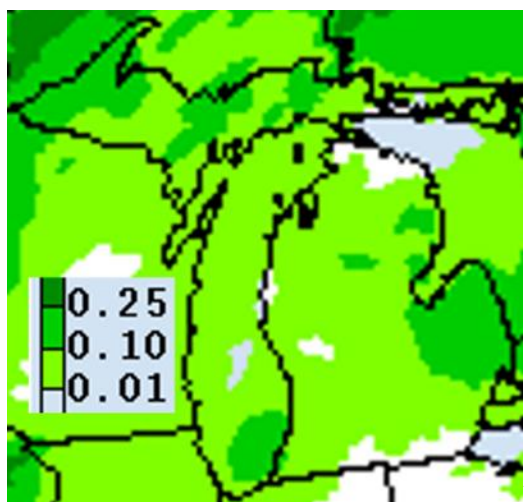
half of Indiana and a portion of southern Michigan being abnormally dry with D1 drought impacting a small pocket right along the state border. The precipitation forecast for the coming week predicts less than 0.25 inch for southwest Michigan, all of which is predicted for this weekend. Andresen says a weak frontal boundary currently over the central states will bring a chance of small amounts of rain Saturday into Sunday. The 6-10 day outlook calls for below-normal chances of precipitation while the 8-14 day outlook predicts near-normal chances although Andresen says it looks like warm and dry conditions will persist through the end of the month.



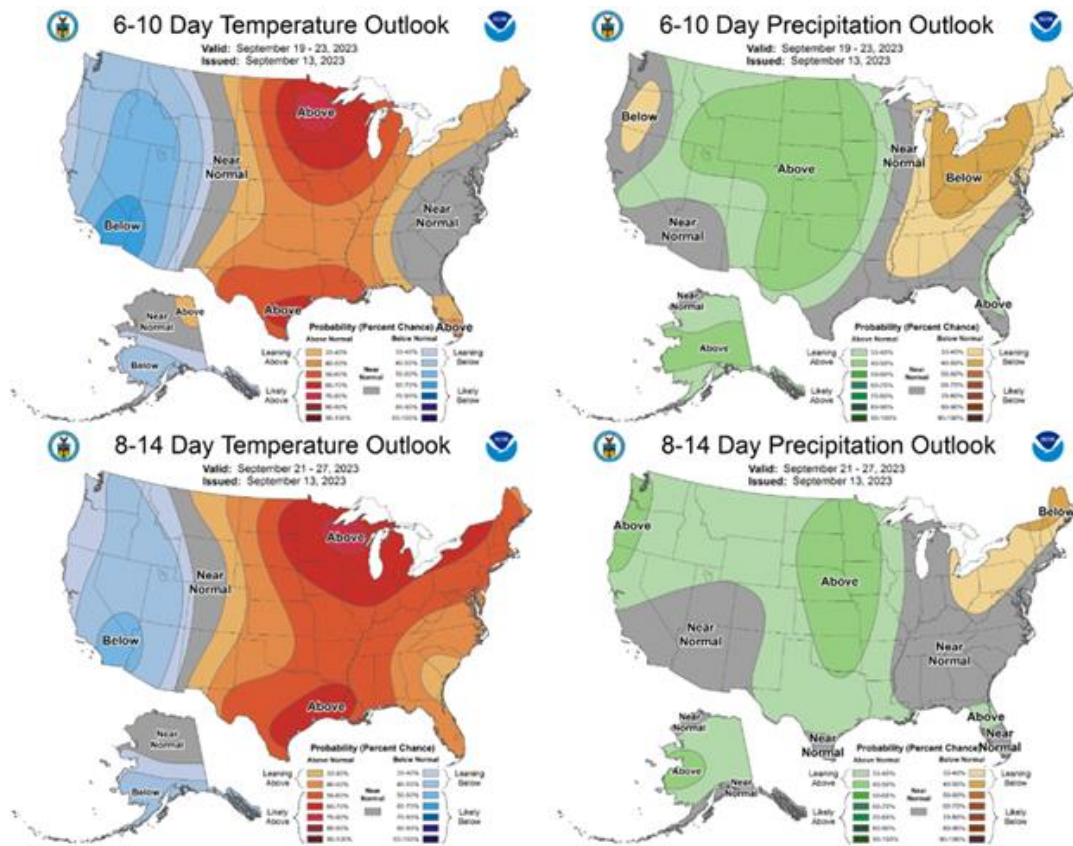
Precipitation totals from the past 7 days (left) and percent of normal for the past 30 days (right) as of September 13.



Drought monitor released September 14.



Precipitation forecast for September 14-21.



The 6-10 day (September 19-23, top) and 8-14 day (September 21-27, bottom) outlooks for temperature (left) and precipitation (right).

### Crops and Pests

**Corn** development continues to be near the 5-year average according to the most recent USDA Crop Update with 58% of corn in Michigan having reached the dent stage (61% average) and 10% having reached black layer (12% average). **Soybeans** on the other hand are behind with only 13% of the crop in Michigan dropping leaves compared with 27% for the 5-year average. However, as is the case with corn, soybean development in the region is highly varied with most fields still at full seed (R6) while a few more advanced fields visited are nearing full maturity (R8). Two recently-published MSU Extension articles—[“Harvest recommendations for soybean fields with variable maturity”](#) and [“Corn growth and maturity response to variable weather conditions”](#)—address late-season harvest issues associated with variable crop development within fields.



Soybean at beginning maturity in St. Joseph County. Photo courtesy of Eric Anderson.

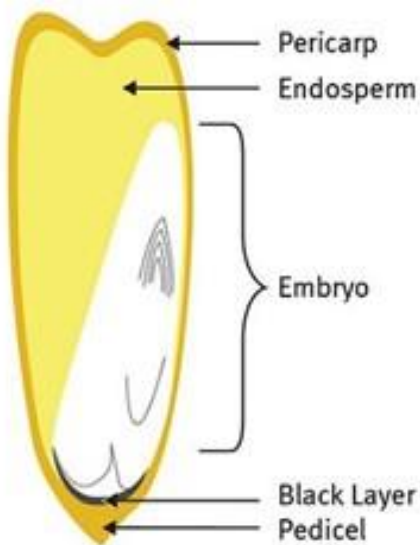
One corn field visited this week had just reached black layer (R6) while most others were still mid-dent (R5.5). To check for black layer, break the cob in half to see whether the milk line has reached the base of the kernels (i.e., no milk line visible). Then take several kernels and scrape the pedicel to look for a layer of tissue that is brown to black in color. Once physiological maturity has been reached, all grain dry down occurs through the kernels themselves and is dependent on weather (temperature, humidity, sunlight) and factors related to the plant itself (husk thickness, degree of husk openness, whether ears hang down and shed rainfall, kernel pericarp thickness, etc.).



Corn fields nearing physiological maturity (black layer) will have some ears hanging. Photo courtesy of Eric Anderson.



Corn that has reached physiological maturity, or black layer (R6). Photo courtesy of Eric Anderson.

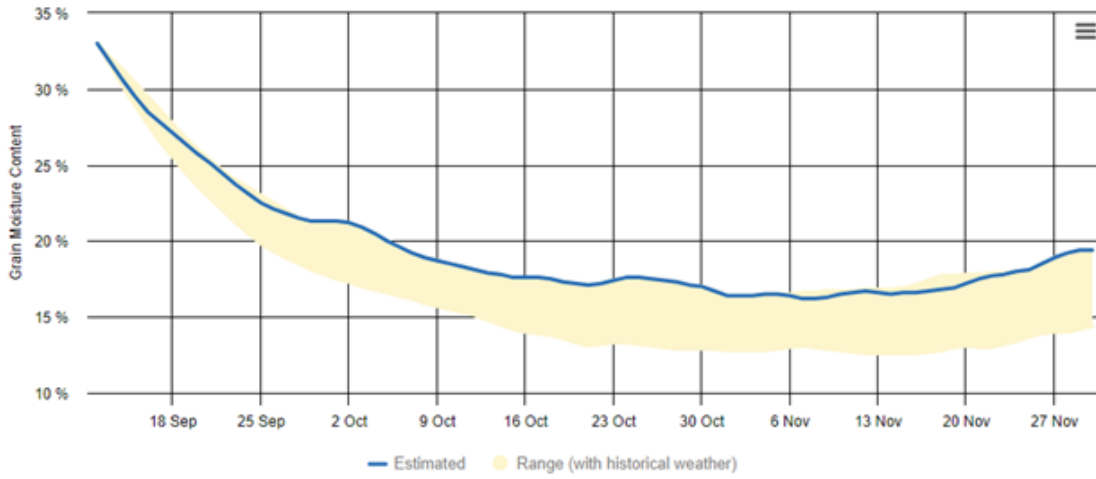


Anatomy of a corn kernel identifying the pedicel and black layer. Drawing courtesy of [Pioneer Seeds](#).

Knowing potential in-field dry down rates is helpful for planning harvest timing and bin drying. Below are research results and tools from several sources to help with estimating dry down rates for corn and soybean.

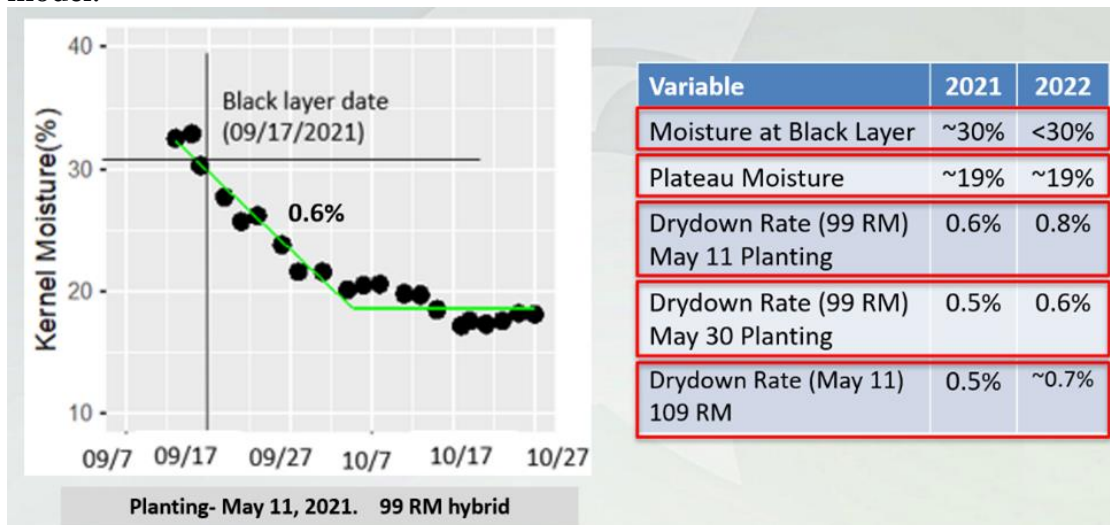


“On average, typical seasonal drying rates range from 0.4 to 0.8% moisture loss per day. If the fall months vary from normal in terms of temperature or moisture, the rate of dry down will differ. For example, wet and cool weather will delay drying. We’ve recorded seasonal dry down rates less than 0.3% per day. On the other hand, warm dry weather speeds drying rates. Kernels could lose up to 1.0% moisture per day. Considering that corn at maturity has about 30% moisture content it could easily take 2 to 4 weeks for grain moisture to drop to 15%.” [Iowa State University Extension](#)

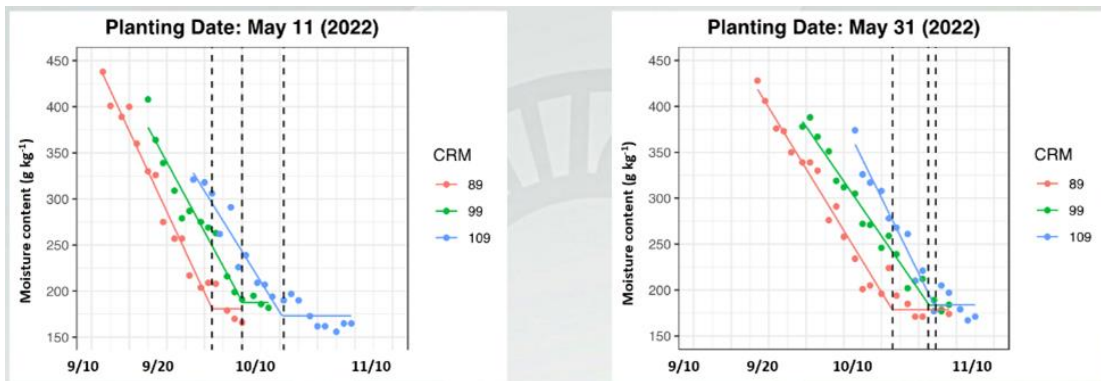


Today's date	9/12/2023	
Estimated grain moisture today	33.0 %	
Expected grain moisture		
	5 days from today	10 days from today
Worst case	28.6 %	24.6 %
Median prediction	27.8 %	24.4 %
Best case	26.5 %	22.0 %

Estimated rate of corn dry down based on historical weather from Iowa State University Extension’s [Corn Drydown Calculator](#). Note: you need to have an estimate for the current grain moisture content to run the model.



Corn dry down rate based on MSU research data from 2021 and 2022. Graphic courtesy of Manni Singh.



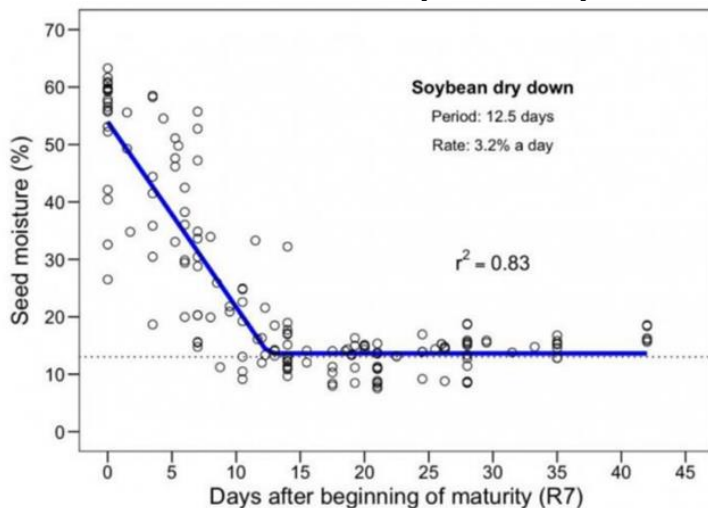
Corn dry down rates for three corn hybrids (RM 89, 99, 109) at two planting dates (May 11, left, and May 31, right) based on MSU research data from 2022. Graphics courtesy of Benjamin Agyei. Note: dividing values on the y-axis by 10 will result in moisture content in percent moisture.

We don't often talk about rate of soybean dry down, mainly because it occurs so much faster than with corn and is seldom a problem with harvest timing. The following comments and research results come from [Iowa State University Extension](#) regarding soybean dry down.

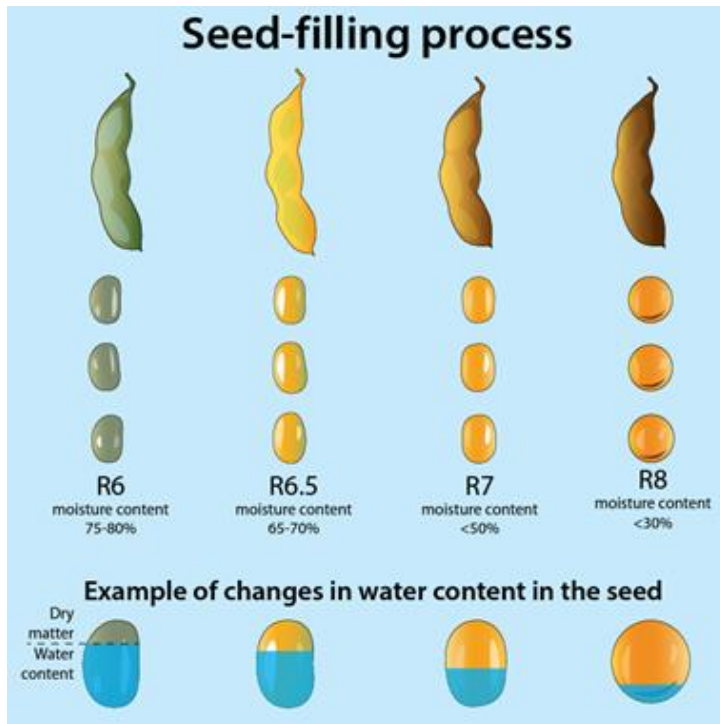
“During senescence carbohydrates are converted into oils. Soybean seed moisture changes very little, remaining near 60 percent during the de-greening period. As the pods turn to mature color at the beginning of maturity stage (R7), seed dry matter accumulation is complete and seed moisture rapidly decreases.

“To quantify the rate of soybean dry down and investigate how planting date and maturity group affect the dry down rate we utilized a field experiment near Ames, IA. The experiment contained four planting dates and four maturity groups over three years. Soybean pods were collected to determine soybean grain moisture from September through October. Dry down rate was affected by maturity group selection, planting date, and year (data not shown).

“During the first 12 days after maturity, the average dry down rate was 3.2% per day, which is about five times faster than that of corn. After that period, the dry down rate significantly slows down or stops completely, stabilizing at about 13% moisture....However, if weather conditions are conducive, grain dry down can be achieved in as early as nine days after maturity.”



Average seed moisture dry down (blue line) across four soybean varieties representing a range of maturity groups at four planting dates from 2014 through 2016 near Ames, IA. Graph courtesy of Iowa State University Extension.



Soybean seed-filling process and related moisture content as maturity approaches. Graphic courtesy of [Kansas State University Extension](#).

**Irrigation.** A summary of crop coefficients and water needs for corn and soybean in the coming week is found in the table below with an estimated weekly FRET value of 0.9 inch. Irrigation is recommended to continue until black layer in corn and until half of a soybean field has turned yellow. Note that tapering off irrigation at the end of the season does not take into account a cover crop that may need additional moisture to make the most of the investment.

Summary of crop water need for corn and soybean given a weekly evapotranspiration rate of 0.9 inch.

Crop stage	Crop coefficient (Kc)	% of Growing season	Water needed this week (in)
<b>Corn</b>			
Beginning dent	1.2	80	1.8
Full dnt	1.0	85	1.50
Black layer	0.66	90	0.59
Full maturity	0.11	100	-
<b>Soybean</b>			
Full seed(R6)	1.2	80	1.08
Beginning maturity (R7)	1.0	89	1.50
Maturity (R8)	0.2	100	-

**“Monitoring Nematode Resistance in Soybeans”** was the topic of this week’s [MSU Extension Field Crops Virtual Breakfast](#) with MSU Extension nematologist Marisol Quintanilla. Soybean cyst nematode (SCN, *Heterodera glycines*) is the #1 yield-reducing pathogen of soybeans in North America. It infects soybean roots where juveniles penetrate the root and develop to adulthood. The bodies of adult females fill with eggs, some of which are released outside the body and can hatch immediately while most remain inside the female’s body which dies, hardens and becomes a cyst that can persist for a decade or longer. The cysts appear as small grains attached to soybean roots (much smaller than nodules containing nitrogen-fixing rhizobium) that turn from white to yellow to tan over time.



Soybean cyst nematode cysts on soybean roots. Photo courtesy of Sita Thapa, MSU.

Above-ground symptoms include stunted and yellowing plants, although symptoms may not occur even though SCN are impacting yield. Below-ground symptoms include the SCN cysts themselves, stunted roots, and reduced nodules. There is some link between SCN damage and sudden death syndrome (SDS) severity, but more needs to be learned about this relationship.

The first line of defense against SCN is selecting varieties that are less susceptible. The two most common sources of genetic resistance are PI88788, which is found in the overwhelming majority of modern soybean varieties, and Peking. Quintanilla recommends rotating between planting soybeans with these sources of resistance with two years of planting PI88788 varieties and one year of Peking varieties. She also recommends rotating to non-host crops as often as possible, and new research findings suggest that including wheat in the rotation may serve to reduce SCN egg numbers. Seed treatments (e.g. iLevo, Saltro) are also available that are thought to suppress SCN.

Quintanilla’s lab has performed research investigating the impacts of different cover crops on SCN populations. One finding suggests that a combination of cereal rye, “trap crop” soybeans, and white mustard proved effective at reducing SCN numbers. Other studies looked at the impact of various manure applications on SCN numbers. One study showed that layer chicken manure and a layer ash blend both significantly reduced SCN numbers while an application of a high-carbon dairy manure resulted in significantly higher numbers of eggs hatched. Quintanilla suggested that one strategy in managing SCN could be to apply certain types of manure, such as the high-carbon dairy manure, to corn in the rotation to induce the SCN eggs to hatch on a “suicide mission,” reducing egg numbers for when soybean is planted.

Sampling your soils is the best way to verify what extent SCN may be causing problems in your fields. The best time to take soil samples is right after soybean harvest, pulling soil cores from within the root zone. The [Soybean Checkoff](#) pays for processing SCN soil samples through the [MSU Plant and Pest Diagnostic Lab](#) for all Michigan soybean farmers.

Quintanilla says her lab continues to conduct research with SCN management, and they will be conducting a survey this fall to assess SCN populations, distribution throughout Michigan, HG types, and factors influencing their presence. If you would like to take part in that survey, please send an email to [marisol@msu.edu](mailto:marisol@msu.edu). More information about SCN can be found by visiting the [SCN Coalition](#) and the [Soybean Research and Information Network](#) websites.

If you were not able to join the session, the recordings will be closed-captioned and available at the [Field Crops Virtual Breakfast](#) webpage and the MSU Extension Field Crops Team social media platforms: [Facebook](#), [Spotify](#), [YouTube](#), [Apple Podcasts](#) and [Twitter](#).

## Calendar

(Note: Titles are clickable links to online content when highlighted and underlined.)

**Sep 15 [KBS LTAR Field Day](#)**. 10am-2pm. Kellogg Biological Station, 9693 N 40th St., Hickory Corners, MI. First annual Long-Term Agroecosystem Research Field Day featuring sustainable cropping solutions for the future. Cost is free, includes lunch, register online.

**Sep 21 [Virtual Breakfast - Fall Weed Control with Christy Sprague](#)**. 7-8am. Register online once for the entire series.

**Sep 22 [Virtual Breakfast - Fall Weed Control with Christy Sprague](#)**. 7-8am. Register online once for the entire series.

**Sep 22 [MiAA Fall Field Day](#)**. Managing Crop Diversity: Strategies and Benefits. 1-4pm. JD Layman Farms, 7850 Lake Rd, Berrien Center MI. Learn about the latest research in cover crops, nutrient cycling and crop rotation diversity. Cost is free, register online. Contact [herricke@umich.edu](mailto:herricke@umich.edu) or [julie@miagadvance.org](mailto:julie@miagadvance.org) with questions.

**Sep 29 [RESCHEDULED 2023 Soybean Harvest Equipment Field Day](#)**. 11:30 am to 3:30 pm. 7875 Kilgore Road, Yale, MI in Sanilac County. Cost is free, includes lunch, register by calling 269-673-0370 ext. 2562 before noon on Friday, Sept. 22.

**Dec 19 [Integrated Crop and Pest Management Update](#)**. MSU Livestock Pavilion. Save the date, details to come soon.

## MSU Extension Digest Briefs

[SUSPECT HERBICIDE RESISTANCE? SUBMIT WEED SEEDS FOR SCREENING](#)

PUBLISHED ON SEPTEMBER 14, 2023

Collect weed seeds September-October to submit for herbicide resistance screening.

[MSU LAUNCHES THE FARM POLICY AND RISK MANAGEMENT SERIES](#)

PUBLISHED ON SEPTEMBER 13, 2023

A new webinar program from Michigan State University Extension.

[CORN GROWTH AND MATURITY RESPONSE TO VARIABLE WEATHER CONDITIONS](#)

PUBLISHED ON SEPTEMBER 12, 2023

Uneven emergence and early season drought can prolong corn vegetative phase, delay maturity, and might impact grain yield and in-field moisture drydown.

[HARVEST RECOMMENDATIONS FOR SOYBEAN FIELDS WITH VARIABLE MATURITY](#)

PUBLISHED ON SEPTEMBER 12, 2023

Learn the risks and benefits of the options for harvesting soybean fields with variable maturity and how to select the best option for your farm.

**2023 SOYBEAN HARVEST EQUIPMENT FIELD DAY RESCHEDULED FOR SEPTEMBER 29**  
**PUBLISHED ON SEPTEMBER 11, 2023**

Participants will improve farm income by learning where soybean harvest losses occur and how to measure and reduce them at this field day that has been rescheduled from Thursday, September 14, to Friday, September 29.

**WHAT'S IN YOUR SOIL?**

**PUBLISHED ON SEPTEMBER 1, 2023**

Advanced soil testing methods improve farm management decisions. Five minutes of your time can make a difference!

**A CENTURY OF SOIL TESTING IN MICHIGAN**

**PUBLISHED ON AUGUST 31, 2023**

Jon Dahl discusses the changes and challenges of soil testing in Michigan for almost a century.

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