



NDSU FIELD DAYS SET

Inside this Issue...

NDSU Field Days Set.....	1
Degree Day Update for Leafy Spurge Flea Beetles	2
Wheat Midge Degree days & Trap Update	3
Wheat Stem Sawfly Emerging.....	4
Scout For Barley Thrips	4
European Corn Borer Emerging & trap Update	6
Will Recent Rains Increase White Mold Risk?	7
White Mold Risk in Canola Increasing	8
Fusarium Head Blight (FHB) Risk and Fungicide Questions	9
Soybean Entering THE Reproductive Phase.....	12
Check Labels for Pre-harvest Interval.....	13
Horntail Reports.....	14
North Central ND	15
Northeast ND	15
Northwest ND	18
South-Central/Southeast ND	19
Weather Forecast.....	20

NDSU Field Days provide an opportunity for farmers, ranchers and others to hear about the latest research and practices in animal science, agronomy and horticulture.

The North Dakota State University Research Extension Centers' annual field days are set. The events take place at the Research Extension Center sites across the state and feature speakers, presentations and tours covering a diverse array of topics. The field days are open to the public.

The dates and locations for the field days are:

- July 10 – Central Grasslands Research Extension Center – Streeter (10 a.m.-3 p.m. CDT)
- July 11 – Hettinger Research Extension Center (5-7 p.m. MDT followed by supper)
- July 12 and 13 – Dickinson Research Extension Center
 - July 12 – Livestock tour at Manning Ranch (9 a.m.-noon MDT followed by lunch)
 - July 13 – Horticulture tour (9 a.m.-noon MDT followed by lunch), agronomy tour (1:30-5 p.m.)
- July 12 and 13 – Williston Research Extension Center
 - July 12 – Main site agronomy and horticulture (4-8 p.m. CDT)
 - July 13 – Irrigated tour – Nesson Valley Irrigation Research and Development farm, located 23 miles east of Williston on Highway 1804 (8:30 a.m.-Noon CDT)
- July 17 – Agronomy Seed Farm – Casselton (5 p.m. CDT agronomy, 7 p.m. supper)
- July 18 – Carrington Research Extension Center – Carrington (9:15 a.m.-3:30 p.m. CDT)
- July 19 – North Central Research Extension Center – Minot (8:30 a.m.-Noon CDT)
- July 20 – Langdon Research Extension Center – Langdon (8:45 a.m.-Noon CDT)
- July 25 – Horticulture Research and Demonstration Gardens – Fargo (3-7 p.m. CDT plants, local foods and outdoor spaces)
- Aug. 3 – Carrington Research Extension Center’s Oakes Irrigation Research Site – Oakes (8:30 a.m.-noon CDT followed by lunch)
- Sept. 9 – NDSU Research Arboretum – Amenia (12:30 p.m.)



DEGREE DAY UPDATE FOR LEAFY SPURGE FLEA BEETLES

All areas of North Dakota have accumulated growing degree days that are **between 1,200 and 1,600 AGDD for North Dakota (Source: NDAWN)**. At these accumulated growing degree days, adult flea beetles can be collected easily with a 15-inch sweep net by sweeping multiple sites within a leafy spurge area.

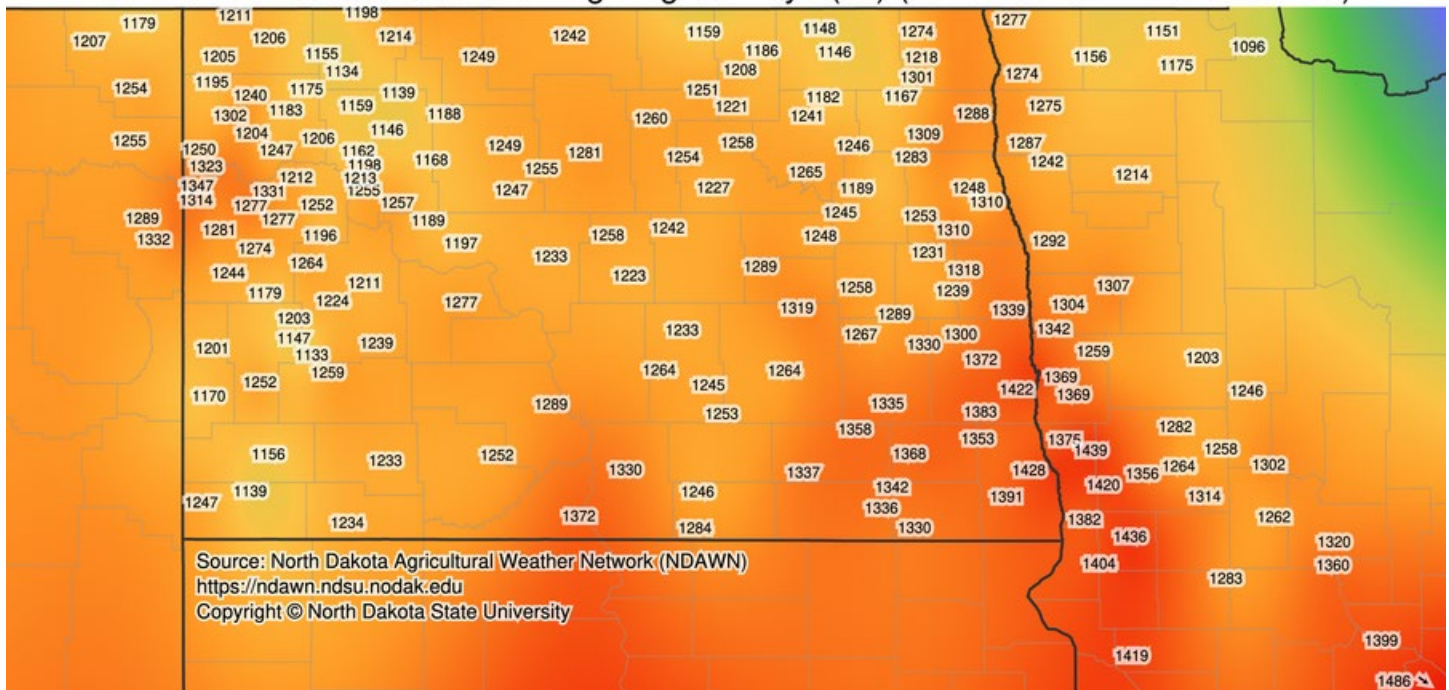
Use the [sunflower degree days/growth stage application](#) on NDAWN website. Select 'Map' and then enter "2023-03-01" for the planting date and select "degree day" for map type. See map below.

After late July (or 1,600 AGDD), flea beetles begin to lay eggs and should not be moved or collected. Leafy spurge flea beetles typically take three to five years to establish and impact leafy spurge infestations.

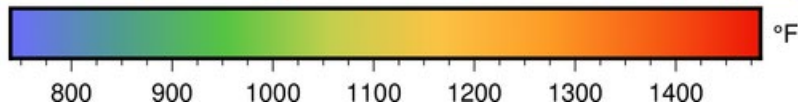
To find collecting sites for leafy spurge flea beetles, contact your local county weed office (number listed in local phone book or online). Leafy spurge flea beetles also are available commercially for purchase at [WeedBusters BioControl](#) in Montana. For more information, see the NDSU Extension publication on [Leafy Spurge Control Using Flea Beetles \(*Aphthona spp.*\)](#) W1183 (Revised).

Accumulated Growing Degree Days (AGDD) for sunflower (base of 44 F) is used to calculate when leafy spurge flea beetles are active (Source: [NDAWN Sunflower](#)).

Sunflower Accumulated Growing Degree Days (°F) (2023-03-02 – 2023-06-26)



Source: North Dakota Agricultural Weather Network (NDAWN)
<https://ndawn.ndsu.nodak.edu>
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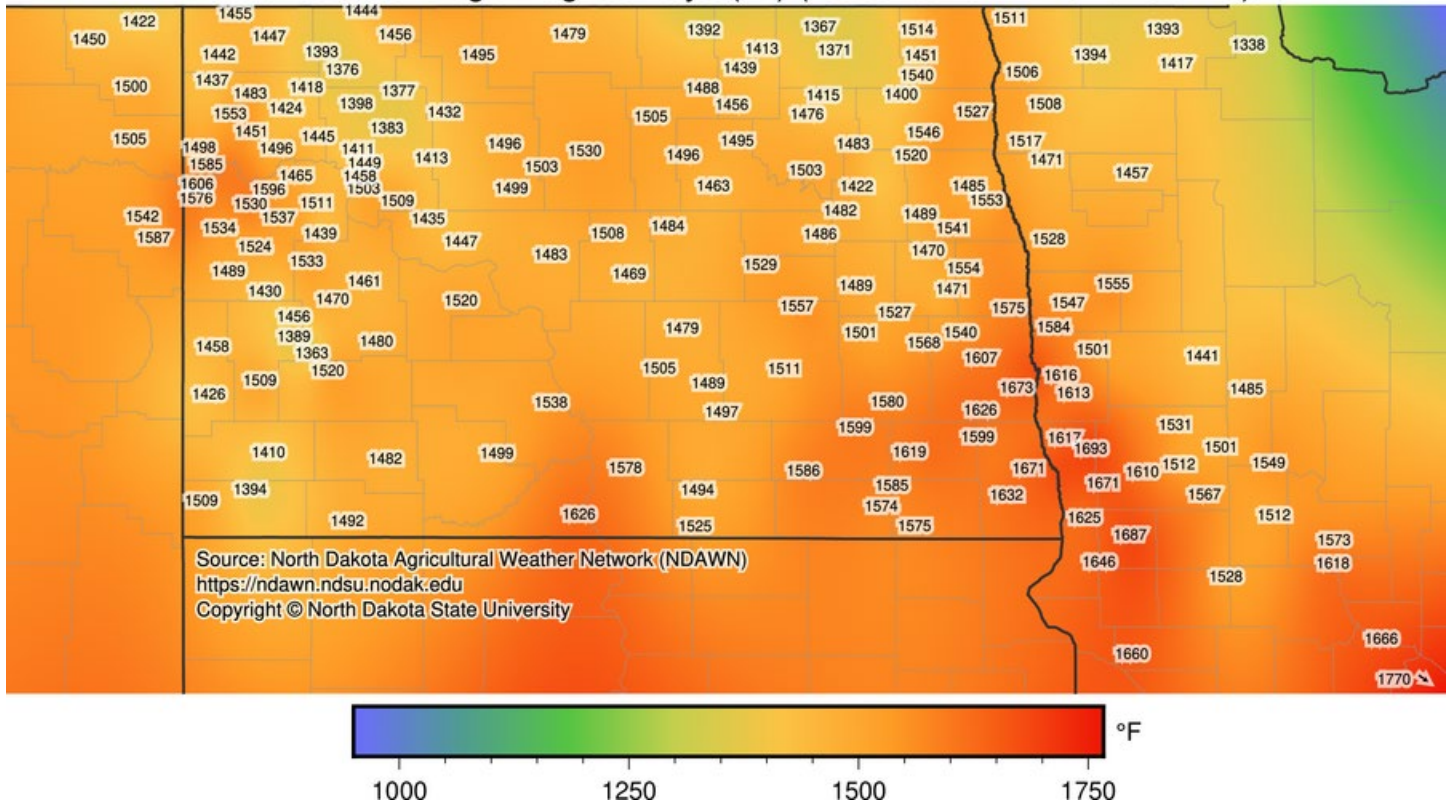


WHEAT MIDGE DEGREE DAYS & TRAP UPDATE

Female wheat midge emergence is near 1300 to 1400 Degree Days or 10-30 percent of females emerged in northern North Dakota, where most of the economic populations occur. Since conditions have changed to moist with the recent rains, larvae are likely to develop into adult flies rather than go into diapause for another year. See NDAWN wheat midge AGDD map below. Scouting is critical up to the 1,800-degree days when wheat midge naturally die.

Wheat Midge Degree Days (base temperature of 40° F)	
Degree Day Accumulations	Wheat Midge Emergence
1,100	Male wheat midge emerging
1,300	10 percent of females emerged
1,475	50 percent of females emerged
1,600	90 percent of females emerged

Accumulated Midge Degree Days (°F) (2023-03-01 – 2023-06-26)



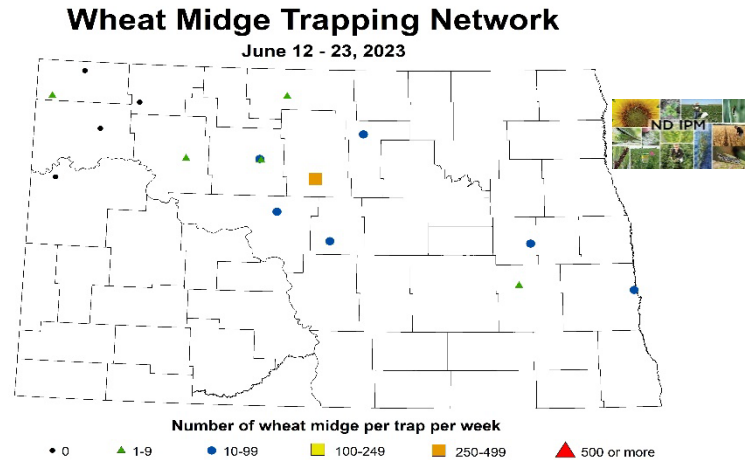
Wheat midge pheromone trapping has started for the male fly. While pheromone traps can indicate whether or not wheat midge adult emergence has occurred, their use is generally considered as an **‘early warning’** system to trigger field scouting. Scouting is most critical during the crop’s susceptible stage of heading to mid-flowering. If more than 10 midge per trap are observed then scouting should be initiated to determine if a field is at an economic threshold for wheat midge. Trapping can help growers know when to scout and when to use IPM strategies (E.T.), as well as determine the distribution of the wheat midge and parasitoids.



Green spray-painted delta pheromone trap used for monitoring wheat midge.

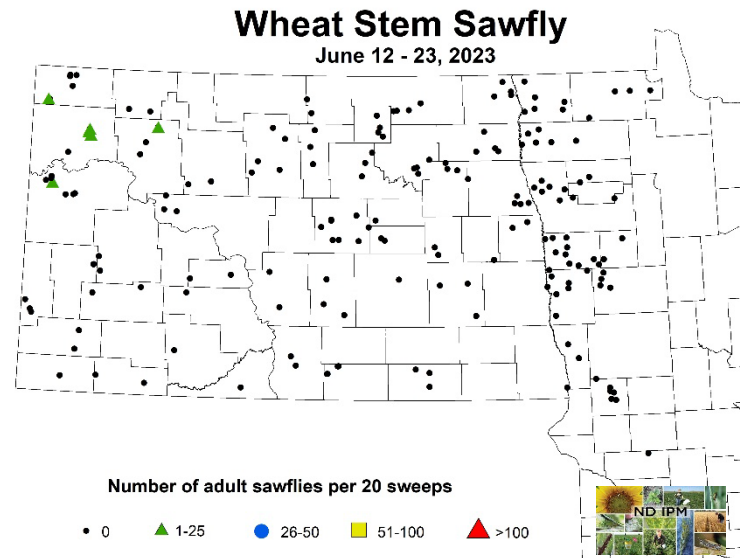
Overall, the trapping results for wheat midge indicate zero to low numbers of wheat midge captured (green triangle) with higher numbers in the central part of state. See NDSU Extension IPM map below.

Cumulative midge counts are also posted each week on the Montana State University [PestWeb System](https://pestweb.montana.edu/Owbm/Home/Index) for North Dakota and Montana at: <https://pestweb.montana.edu/Owbm/Home/Index>



WHEAT STEM SAWFLY EMERGING

Thanks to the support of the North Dakota Wheat Council and the USDA NIFA CPPM EIP, we are scouting for emergence of adult wheat stem sawfly using 15-inch sweep nets. This past week, low numbers of wheat stem sawflies were collected in sweep net samples in northwestern North Dakota. [South Dakota State University entomologists](#) also reported wheat stem sawfly present in northwestern South Dakota. In areas with high populations, it is important to consider the following IPM practices for the next growing season: use of solid-stemmed wheat varieties, crop rotation with non-host crops (broadleaf crops), late planting date after May 20th, and conservation of biological control by parasitoids. If more than 15 percent of stems are infested by sawflies, producers should swath or use a stripper header on the wheat crop when kernel moisture drops to <40% to avoid sawfly losses from lodging in late summer/fall. If using a stripper header, cut high (>2/3 of stem) to conserve overwintering parasitoids in wheat stems. Insecticides have not been effective against the wheat stem sawfly, since the egg, larva and pupae are well-protected inside the plant stem.



SCOUT FOR BARLEY THRIPS

Increasing numbers of barley thrips have been observed in some dry areas of North Dakota, such as central/eastern areas of Rolette County, and Rugby (Pierce County). Most fields are not at the economic threshold levels for barley thrips (>6-11 thrips per stem depending on insecticide + application costs). Typically, hot dry weather conditions favor barley thrips development that may result in economic loss in barley, spring wheat and durum wheat.

Barley thrips are small dark brown to black insects about 1-2 mm long. Females have feathery wings while males are wingless. Immature larvae are wingless, pale yellow, white or green with red eyespots. Larvae are difficult to see due to their light, almost transparent color and extremely small size. Adult and immature thrips have a long, narrow body shape.

Female thrips overwinter as adults in debris in fields and shelterbelts. Thrips emerge in late May and early June and move into winter wheat/rye and eventually to early seeded barley (preferred host). Occasionally, barley thrips will feed on hard red spring wheat and durum. There is one generation per year.



Adult barley thrips
(Patrick Beauzay, NDSU)



Barley thrips injury – bleached stem and head
(Janet Knodel, NDSU)

Adult and immature thrips cause damage by feeding on succulent plant tissues. Feeding injury symptoms are a whitened or bleached appearance with gooseneck-shaped stems and heads under severe pressures. Intensive feeding at the beginning of head formation produces small, shriveled grains. Often there is no seed development at the top and bottom of the head and intermediate grains are shriveled. When thrips feeding is severe on the flag leaf, kernels do not fill properly and seed weight is reduced. One thrips per stem results in a 0.4 bushel per acre loss.



Immature barley thrips inside of unrolled flag leaf
(Justin Knott, Arthur Company)

Threshold For Thrips: Treat when thrips are equal to or greater than the number calculated by

$$\text{Threshold (Thrips/stem)} = \frac{\text{Cost of Control} \div \text{Expected \$ value per bushel}}{0.4}$$

The 2023 calculated economic thresholds using the cost of control as \$10-15/acres (insecticide + application cost) are:

- Malt barley \$6.00/bu = **5-7.5 thrips per stem**
- Feed barley \$5.00/bu = **4.2-6.3 thrips per stem**

Scout for barley thrips from flag leaf to heading. Barley thrips can be found by unrolling the flag leaf away from the stem. Remember, populations will probably be higher at the field edges, so check at least 5 locations and 10 plants per location by walking a W pattern in field.

After the barley head emerges, the insect damage is done and NO insecticide treatment is advised. Most insecticides approved for use on barley do NOT have 'barley thrips' listed on the label, such as Warrior II / generics (lambda-cyhalothrin), Baythroid XL (beta-cyfluthrin), Mustang Max (zeta-cypermethrin) and malathion. However, it is legal to apply an insecticide if it is labeled for use in the crop. If the target pest is not listed for that crop, efficacy is not implied by the manufacturer and growers who choose to use the product assume their own liability for any unsatisfactory performance.

Although many growers want to wait to tank-mix the insecticide with a fungicide for scab control at Feekes 10.5 (head fully emerged). NDSU Extension Entomology does NOT recommend waiting for the insecticide application to coincide with the optimal timing of a fungicide application for scab control. This is too late for effective barley thrips control and the damage/yield loss is already done by then.

Janet J. Knodel, Extension Entomologist

EUROPEAN CORN BORER EMERGING & TRAP UPDATE



European corn borer moth (V. Calles Torrez)

Thanks to the support of the North Dakota Corn Council, we are monitoring a trapping network for flights of European corn borer (ECB) in conventional non-Bt and Bt corn fields again this year. A modified Hartstack trap is being used for trapping ECB moths in grassy field ditches of corn fields. We have six trap sites in five counties of North Dakota (Barnes, Cass, Sargent, Ransom, and Richland). The Z-race ECB is just starting to emerge near Gwinner (Sargent County), Shenford (Ransom County), and Antelope (Richland County). This Z-race ECB population is the most common in North Dakota. The E-race ECB has not been detected in traps yet. We will be posting and reporting weekly trapping results for European corn borer moths on the [IPM website](#) and the [NDSU Extension Crop & Pest Report](#).

Area	County	Nearest town	ECB Z-race moths					ECB E-race moths				
			June 13-19	June 20-26	June 27-July 3	July 4-10	Total trap	June 13-19	June 20-26	June 27-July 3	July 4-10	Total trap
EC	Barnes	Cuba	0	0			0	0	0			0
EC	Cass	Mapleton	0	0			0	0	0			0
SE	Sargent	Gwinner	0	1			1	0	0			0
SE	Ransom	Shenford	0	14			14	0	0			0
SE	Ransom	Sheldon	0	0			0	0	0			0
SE	Richland	Antelope	0	1			1	0	0			0
Total moths			0	16	0	0	16	0	0	0	0	0

How to scout for ECB: corn should be monitored weekly for corn borers for *at least five weeks* (from mid-June to mid-August) once plants exceed an extended leaf height of 17 inches. Inspect plants for the presence of egg masses, whorl feeding, and active larvae.

Scouting for univoltine ECB: scout corn field from mid-June through late July.

Scouting for bivoltine ECB:

- 1st generation of bivoltine ECB: scout when plants are at whorl stage (V6), and inspect plants for shot-holing in the whorl and for active larvae.
- 2nd generation of bivoltine ECB: scout when plants are tasseling to silking (VT-R1 stages) and older stages, and inspect plants for the presence of egg masses and larvae in ears.

Additionally, a degree day model has been developed to forecast the emergence of the univoltine ECB moths (Table 1). Go to the NDAWN, select Applications, and then select 'Insect DD' and the nearest town; or select 'map' for the whole state of North Dakota and use a base temperature of '50° F'.

Accumulate Degree Days	Proportion of Emerged Moths
911	10%
986	25%
1078	50%
1177	75%
1274	90%

Veronica Calles-Torrez
Post-doctoral Scientist

Janet J. Knodel
Extension Entomologist



plant pathology

WILL RECENT RAINS INCREASE WHITE MOLD RISK?

The short answer is, yes. The longer answer is a bit more nuanced.

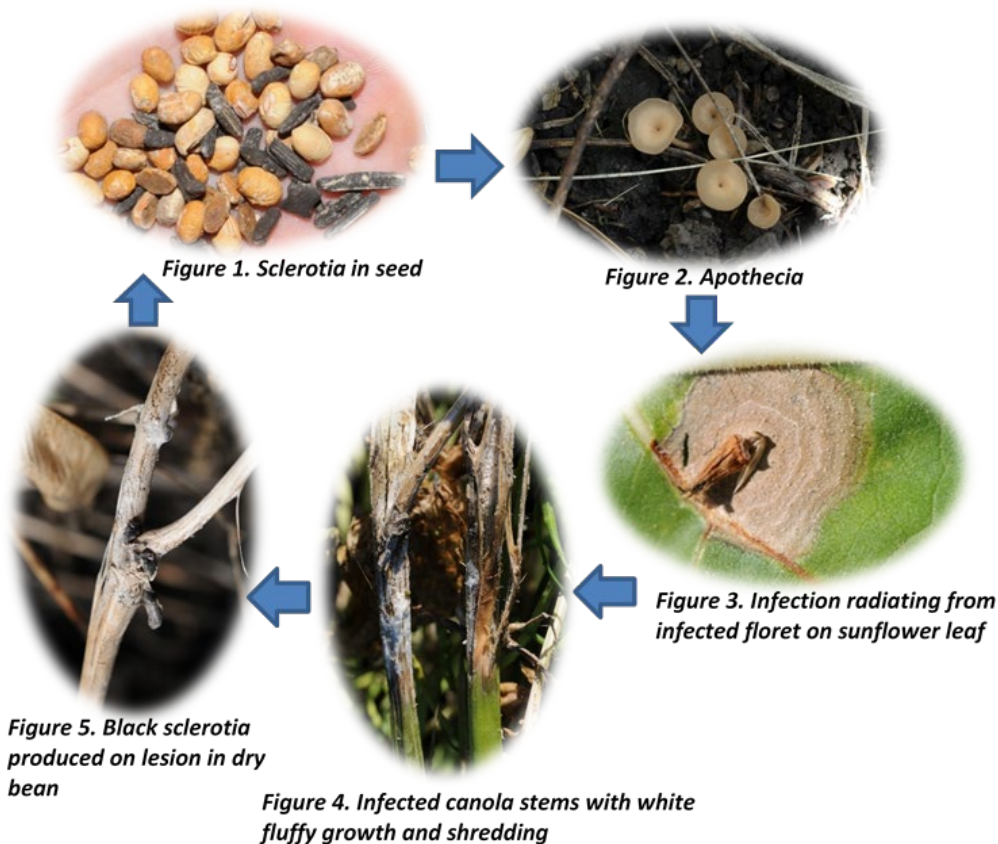
Understanding how white mold works can help you evaluate if and how to manage the disease this year. To help, a brief review of white mold and answers to important white mold questions are below.

Q. What crops are at risk for white mold?

A. The pathogen that causes white mold can infect **all broadleaf crops** (canola, dry bean, pulse crops, soybean, sunflower, etc..) and broadleaf weeds.

Q. When are the crops at risk?

A. In general, broadleaf crops are at risk of white mold when flowers are present, and not earlier. A notable exception is sunflower, which is sensitive to white mold at all growth stages.



Q. How does white mold occur?

A. The pathogen that causes white mold (*Sclerotinia sclerotiorum*) survives in the soil as sclerotia; hard, black structures (**Figure 1**). When there is ample soil moisture, at least 1 to 2 inches of water a week or two before bloom, the sclerotia will germinate, produce apothecia (little mushrooms) (**Figure 2**), and release ascospores. Once spores are released, they need to land on a nutritional source to begin the infection process; usually the flower petals. This is the reason that most broadleaf crops are considered susceptible only once they begin to flower. Once the flower petals become colonized (**Figure 3**), the

pathogen easily grows into the plant. Light tan/white lesions appear (resembling dried bone) and may be covered with white fluffy fungal growth (**Figure 4**), shred, and contain or be covered with black sclerotia (**Figure 5**).

Q. I haven't had white mold for a few years, could I still be at risk?

A. **Yes.** The pathogen that causes white mold can survive for many years in the soil, and if conditions become favorable, it can reappear. That said, the risk of epidemics decreases the longer you don't have the disease.

Q. What weather conditions are favorable for white mold?

- A.
1. Enough rainfall to keep the soil wet before bloom (so sclerotia germinate).
 2. Long and frequent wet periods (rain, heavy dew, fog) during bloom. Infection efficiency peaks when leaf wetness lasts on average 8-10 h daily for five days or longer.
 3. Cool to moderate temperatures during bloom.

Q. What other conditions are favorable for white mold?

- A.
1. Crop rotation and field history both make a difference. A field with a history of white mold and short (or no) rotations among broadleaf crops is more likely to have white mold problems than a field with no white mold history and/or long crop rotations. That said, no field is immune from white mold.
 2. Dense crop canopy and canopy closure create a more favorable environment for infection and disease development (such as high humidity and prolonged leaf wetness).
 3. Genetics. Some varieties and/or hybrids are less susceptible than others.

Q. Can we manage white mold?

A. **Yes, to a degree.** Fungicides are available, and can effectively reduce white mold severity and protect yield in many (though not all) crops. Evaluating the disease and economic risks of white mold in your field are important considerations before making a fungicide application.

If you choose to make a fungicide application, optimization is very important (including both timing and coverage) and will improve efficacy. Typically, optimal timing is in the earlier bloom stages of a crop (for example, 20-40% bloom in canola) and corresponds with favorable weather and microclimate conditions (such as canopy closure) for disease development. Similarly, efforts to maximize fungicide coverage (water, nozzles, etc.) will improve efficacy. Once the crop no longer has flowers present, applications are no longer effective.

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Extension Plant Pathologist,
Broad-leaf Crops

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NDSU Plant Pathologist

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Canola Pathologist,
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WHITE MOLD RISK IN CANOLA INCREASING

Recent rains have increased the white mold risk as canola is nearing bloom. The Sclerotinia risk map (**Figure 1**) for June 27th is reporting a slowly increasing risk for white mold. In the Northeast portion of the state, canola in Towner Co. has a low risk (15%) of infection, canola in Cavalier Co. shows intermediate risk (43%), and canola in Pembina Co. is at high risk (74%). Additionally, there is a good possibility that additional rains will occur in the region, which will likely maintain or increase risk.

We recommend that growers utilize the Risk Map and associated Risk Calculator as they make decisions about potential management options for white mold as canola enters bloom. Additionally, as the risk map uses precipitation and temperature as main predictors, the map is also helpful for those growing other white-mold sensitive crops. The Sclerotinia Risk Map and Risk Calculator are available at the [NDSU Canola Pathology program](#) or through the [Northern Canola Growers Association](#) and [Minnesota Canola Council](#) websites. We thank them for their support of the canola pathology program!

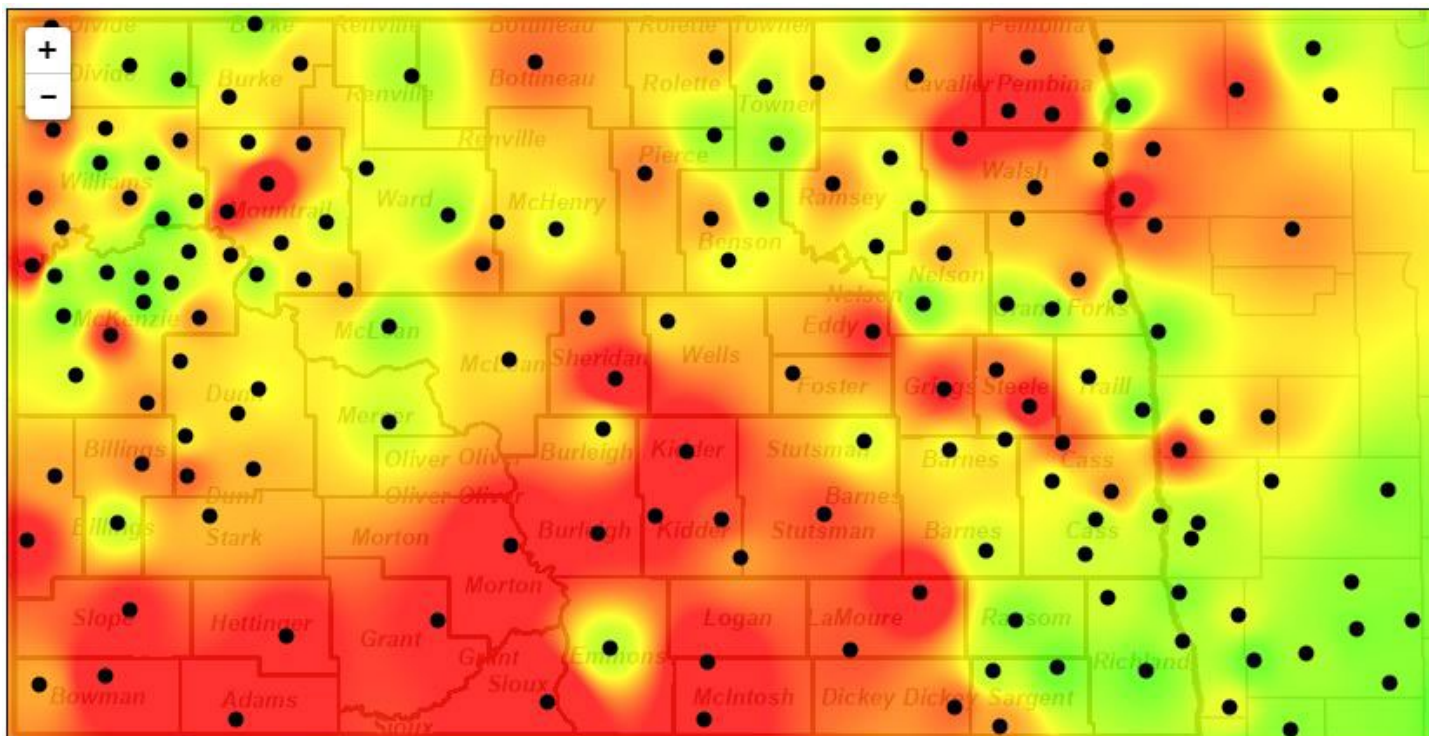


Figure 1. Estimated risk of Sclerotinia stem rot development for 6/27/23. The color-coded Risk Map is designed to estimate risk of white mold development; low (green), moderate (yellow) and high (red).

[Sam Markell](#)

Extension Plant Pathologist, Broad-leaf Crops

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Canola Pathologist, NDSU Plant Pathology

FUSARIUM HEAD BLIGHT (FHB) RISK AND FUNGICIDE QUESTIONS

Last week's widespread rains provided much needed relief across much of North Dakota and Minnesota. It immediately increased questions about the risk for Fusarium head blight (scab). A one- or two-day rain event does not automatically increase our chances of scab in small grains. We are recovering from multiple weeks of hot temperatures, sporadic rainfall, low relative humidity, and very infrequent dews. Like most fungal pathogens, the fungus that causes scab too needs rain and/or high relative humidity for development of fruiting bodies and spore releases that can cause initial infections of scab in wheat and barley. The previous weeks greatly reduced the probability of these events occurring for most areas in both states. Therefore, we think of last weekend's rain as priming the pump that starts the scab disease cycle by providing the moisture needed to initiate the development of fruiting bodies that eventually will lead to spore releases

If you watched the scab risk models over the weekend and in the first half of the week you have probably noticed that models have already started to trend higher in many locations. Understand that the models are solely predicting to risk

of initial infections to occur and do not predict the development of the fruiting bodies. Without those spores being released by the fruiting bodies, infections are unlikely to occur.

So, what does this all mean? It means that we will likely see the risk for scab to increase this weekend and into the beginning of next week. The risk will be moderate to high for the most susceptibility varieties (FHB score of 6 to 9), while the moderately resistant to resistant varieties (FHB score of 3 to 5) will likely remain under low risk. The fields that flowered last week, this past weekend, and at the beginning of this week more than likely escaped the elevated risk window. The fields that will be heading and/or flowering at the end of the week into next week will have a higher risk of scab now that the pump has been primed, especially varieties that are more susceptible.

Leaf Disease Management with a Fungicide Application for FHB

Applying a fungicide for FHB will also present an opportunity to protect the flag leaf from fungal leaf spots, in particular tan spot and/or *Stagonospora nodorum* blotch. To date, the fungal leaf spot pressure had been very low for the same reasons the scab risk was low, and it is unlikely fungal leaf spots reach will reach economically damaging levels before the end of the grainfill period. Bacterial leaf streak is the only disease that is likely to increase and reach economically damaging levels after these weather patterns. Unfortunately, this disease cannot be controlled with a fungicide.

Yield Response

A recent PhD graduate (LeAnn Lux – now Extension Plant Pathologist at North Carolina State University) in the plant pathology department conducted research from 2019-2021 and explored the response to fungicides on reducing FHB and protecting yield in dryland environments. This North Dakota Wheat Commission funded research provided us a great opportunity to understand the yield response on two hard red spring wheat varieties (ND-VitPro and WB-Mayville) with very similar yield potential, but that differed drastically in their resistance to scab. A total of seven field trials were conducted and were categorized into three FHB disease environments (Very High, Low and Very Low). The yield data from the research are summarized below are (Table 1).

The yield response of fungicide depended on variety susceptibility and the level of scab risk. In the susceptible variety WB-Mayville, the largest yield responses were observed in the very high FHB environment. In the very low FHB environment, no differences were observed among any of the fungicides and the non-treated check on WB-Mayville. For the moderately resistant variety ND-VitPro, there were no statistical differences among any of the treatments under any FHB risk. However, trends in the data suggest a similar approach to yield response values in that the greater the risk for scab, the greater the yield response to use of a fungicide.

Table 1- Grain yield of ND-VitPro and WB-Mayville in a North Dakota Wheat Commission Funded trial exploring the yield response among commonly used fungicides for management of scab.

Fungicide	Timing	Very High FHB		Low FHB		Very Low FHB	
		WB-Mayville	ND-VitPro	WB-Mayville	ND-VitPro	WB-Mayville	ND-VitPro
Non-treated Control	Early-Flowering	31 c	48	63 c	66	57	58
Prosaro @ 8.2 oz/A	Early-Flowering	41 b	52	66 bc	68	60	57
Caramba @ 17 oz/A	Early-Flowering	41 b	50	65 bc	70	59	60
Sphaerex @ 7.3 oz/A	Early-Flowering	44 ab	52	67 b	69	58	57
Tebuconazole @ 4 oz/A	Early-Flowering	34 c	49	65 bc	70	58	59
Miravis Ace @ 13.7 oz/A	Early-Flowering	49 a	55	72 a	72	60	59
Sphaerex @ 7.3 oz/A	3 to 7 days after Early Flowering	46 a	52	68 b	70	57	59
	<i>p-value</i>	<0.0001	0.0831	0.003	0.2872	0.3963	0.1930
DON/VOM in Non-Treated Check		29 ppm	15 ppm	2.3 ppm	1.3 ppm	0 ppm	0 ppm

The Bottom-line

The risk for scab will be increasing over the next week. The decision to spray is more difficult this year than most years for two reasons. First, much of the region needs additional rain to alleviate the drought stress the crop was under and may continue to be under, stress that will limit yield potential (this is the period when the crop uses more than a ¼" of water per day). Secondly, the fungicides will likely not provide the additional yield response that we see when controlling the leaf diseases during the grain fill period. If you are so lucky to have adequate soil moisture and have caught a few more showers and feel confident that you have still good yield potential, base your decision on the susceptibility of the variety to scab and the risk level indicated by the risk model. Consider Prosaro®, Prosaro Pro®, Sphaerex®, or Miravis Ace® if the risk is high or very high and the variety is rated susceptible or very susceptible. Consider using generic tebuconazole if the variety is rated moderately resistant or better and the risk models indicate low to moderate risk

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Small Grains Specialist
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SOYBEAN ENTERING THE REPRODUCTIVE PHASE

Early planted soybean plants have started to change from the vegetative to the reproductive growth phase (R stage). The first flowers have been observed in the region. Although the reproductive phase is starting, most of the dry weight that accumulates is allocated to vegetative tissue. The amount of leaf tissue and branches is still increasing so the plants can prepare to direct all of its resources towards maximizing seed dry weight between the start and end of seed fill. Sufficient soybean flowers are needed for subsequent reproductive development. Soybeans are resilient to stress during flowering due to their ability to continue to develop flowers over several weeks. Flowering starts on the third to sixth node on the main stem. This flower development will progress up and down the plant. Branches eventually also flower. Soybean can continue to flower while pods and seeds are developing. Flowering marks the beginning of rapid dry weight and nutrient accumulation rates.

Reproductive stages (R)

Stage	Description
R1	Beginning bloom - One open flower at any node on the main stem
R2	Full bloom - Open flower at one of the two uppermost nodes on the main stem with a fully developed leaf
R3	Beginning pod - Pod 3/16 inch long at one of the four uppermost nodes on the main stem with a fully developed leaf
R4	Full pod - Pod 3/4 inch long at one of the four uppermost nodes on the main stem with a fully developed leaf
R5	Beginning seed - Seed 1/8 inch long in a pod at one of the four uppermost nodes on the main stem with a fully developed leaf
R6	Full seed - Pod containing a green seed that fills the pod cavity at one of the four uppermost nodes on the main stem with a fully developed leaf
R7	Beginning maturity - One normal pod on the main stem that has reached its mature pod color
R8	Full maturity - 95% of the pods have reached their mature pod color. Five to 10 days of drying weather are required after R8 for the soybean moisture levels to be reduced to less than 15%

From Fehr, W.R., and C.E. Caviness. 1977. Stages of soybean development. Spec. Rep. 80. Iowa State Univ. Coop. Ext. Serv., Ames.

Maximum light interception by a healthy canopy is needed to maximize yield. Plants reach their maximum height, node numbers, weight of vegetative parts (leaves, stems and petioles) by the beginning of seed fill, just past R5. By early seed filling, the effective canopy consists of the leaves on the upper two-thirds of the nodes, with the large leaves attached at and above the middle of the stem providing the most photosynthate to pods at these nodes. Leaves act as the major Nitrogen (N) storage organ for soybean plants, with as much as 40% to 50% of the N that ends up in the seed already accumulated by stage R5.5, before seed filling gets underway. In nearly every field, the N needed by the plant is supplied by soil N plus N fixed in nodules; applying in-season N to a soybean crop with good canopy color is highly unlikely to add yield.

Adapted from: 'The soybean growth cycle' at <https://soybeanresearchinfo.com/wp-content/uploads/2022/01/Science-for-Success-Soybean-Growth-Stages-V3.pdf>



Close up of soybean flowers. Flower color can be white, near white, dark purple, purple, light purple, pink, or other colors. The flower color is genetically determined.

For more information see Soybean Growth and Management Quick Guide at <https://www.ndsu.edu/agriculture/sites/default/files/2021-11/a1174.pdf>

[Hans Kandel](#)

Extension Agronomist Broadleaf Crops



CHECK LABELS FOR PRE-HARVEST INTERVAL

My how the 2023 season has flown by! In approximately 45 days and we will be initiating the sugarbeet preharvest campaign! That means it's necessary to double-check the preharvest interval (PHI) before making a pesticide application to control escape weeds in sugarbeet. Preharvest interval is the minimum amount of time between the last application of a pesticide and when the crop can be harvested. Harvest is the cutting of the crop or removal of produce from the plant. The PHI is found on the pesticide label.

PHI provides growers and consumers with confidence that harvested produce does not contain unsafe pesticide residues and that residues in the treated produce will not exceed the maximum residue limit (MRL). MRL represents the maximum amount of pesticide residues that are expected to remain on a food product when the pesticide is used according to label directions.

Residues found on food in excess of the MRL may constitute a violation and may pose a risk to consumer health. Use pesticides only for the crops and pests listed on the product label and be sure to follow the application rates, number of applications, growth stages, and PHI as stated on the label.

PHI for several sugarbeet herbicides follow:

Herbicide	PHI (day)
S-metolachlor products	60
Outlook, normal timing, 2- to 8-lf	60
Outlook, extended timing, 2- to 12-lf	95
Warrant	70
glyphosate	30
ethofumesate	Check ethofumesate product labels
Ultra Blazer	45
Stinger or Stinger HL	45
Spin-Aid	75

[Tom Peters](#)

Extension Sugarbeet Agronomist
NDSU & U of MN



HORNTAIL REPORTS

NDSU Extension Entomology has received a few reports of horntails (thankfully not the Hungarian Horntail featured in J.K. Rowling's *Harry Potter* books). Sawflies, horntails (wasps, not dragons), and other wood wasps belong to several families in a group called 'Symphyta' within the order Hymenoptera, which includes wasps, bees and ants. The biggest difference between

Symphyta and other Hymenoptera is that there is no narrow constriction between the thorax and abdomen. Horntails belong in the family Siricidae, and by far our most common horntail is the pigeon tremex (*Tremex columba*) (Figure 1). Pigeon tremex females deposit eggs into dead, declining or cut hardwood trees, especially ash, cottonwood and elm in our area. A fungus is also introduced to the wood when the female deposits eggs. The fungus is essential for larval development and survival - as the fungus decays the wood, the larvae consume the fungus and softened wood as they bore towards the heartwood. Larvae overwinter, pupate the following spring and emerge as adults. One of our most magnificent insects, the giant ichneumon wasp *Megarrhyssa atrata* (Figure 2), parasitizes pigeon tremex. Females have an ovipositor nearly four inches long, which they use to probe wood for pigeon tremex larvae. Eggs are laid near the tremex larvae, and the ichneumon wasp larvae feed on and eventually kill the tremex larvae.



Figure 1. Pigeon tremex female. Photo by J. Kalisch, UNL



Figure 2. Giant ichneumon female. Photo by Janet Knodel, NDSU Extension



Figure 3. Yellow-horned horntail female.
Photo by Brenden Klebe, NDSU Extension

Another horntail species reported to us last week was the yellow-horned horntail (*Urocerus flavicornis*) (Figure 3). In 15 years, we've never had one reported until Tuesday, when we got two identification requests for this species on the same day! Both requests came through NDSU ANR Extension agents, one from Pierce County and the other from Steele County. This species has similar life habits as pigeon tremex, but females oviposit in dead and declining conifers rather than hardwoods, and can have up to a three-year life cycle. Perhaps these are the reasons that yellow-horned horntails are not encountered frequently in North Dakota.

[Patrick Beauzay](#)

NDSU Extension Entomology



NORTH CENTRAL ND

The so much-needed rain was observed in the region the past week to alleviate the drought in some areas. Several counties in the region were experiencing drought conditions in the crops. Rachel Wald, ANR Extension Agent for McHenry County, and I traveled across the county to check drought-stressed fields, and a considerable part of the county was severely affected. Moderate temperatures and chances of precipitation appear to be part of next week's forecast. At the NCREC, 0.56" of rain was observed since last Monday (June 20th). The following are precipitation observations across the area as noted by local NDAWN stations from June 20th through June 27th: Bottineau: 1.22"; Garrison: 0.56"; Karlsruhe: 1.82"; Mohall: 0.78"; Plaza: 1.01"; and Rugby: 1.90".

Grasshoppers are continuing to worry farmers in the region, so scouting and making applications must be made considering the economic threshold. Blister beetle is present in flowering alfalfa and other host plants. SCAB risk is increasing this week since the rain is expected and the current environmental conditions.

Spring wheat is found in the region from growth-stage Feekes 5 to early flowering. Canola is mostly from the rosette stage to flowering. Sunflowers are found from V2 to V4 stage. Flax is mostly at the flowering stage. Soybeans are found from V3 to R1 stage. Corn is found from V4 to V6 stage. Most of the pulses in the region are flowering.

[Leo Bortolon](#)

Extension Cropping Systems Specialist
NDSU North Central Research Extension Center

NORTHEAST ND

The weekend rains were much needed in a majority of the NE region bringing relief to many crops that were starting to show drought stress. The rainfalls ranged between 0.5 to 3 inches, with extremes of 5-7 inches recorded in some parts of Pembina county. The crops are looking much better after the rains. However, for some early planted small grains the

rain was too late to improve the condition. Crops such as field peas, soybeans, canola, corn, and sunflowers are growing quickly, some nearing the flowering phase of crop growth. With every rain event, grasshopper hatching is increasing and the potential for hot spots too. Keep scouting for grasshopper populations frequently and make spraying decisions at threatening numbers. Cereal aphids (bird cherry oat aphids) are showing up in wheat and barley. Aphids tend to stay close to the base of the plant in the leaf sheaths. Aphid populations can increase exponentially under favorable conditions (60°F -75°F and dry). The recommendation is to frequently scout for estimating the buildup of aphid populations. Small grains are susceptible to aphid damage from the vegetative to the soft-dough stage. While scouting



Soybeans at flowering stage and wheat heading out in Cavalier County
 Photo: Anitha Chirumamilla, LREC

for aphids, look for beneficial insects like lady bugs, syrphid fly larvae and lace wings as they are efficient predators in managing aphid populations at low densities. Weeds such as waterhemp, green foxtail, wild oats and kochia are posing severe challenges in many fields.



Bird cherry oat aphids found in Rolette County
 Photo: Nancy Feil, NE IPM scout



Poor stand of canola in Ramsey County
Photo: Lindsay Overmyer, ANR Extension Agent, Ramsey County



Green foxtail in soybeans in Ramsey County
Photo: Lindsay Overmyer, ANR Extension Agent, Ramsey County



Wild oats in a spring wheat field in Cavalier County
Photo: Anitha Chirumamilla



Waterhemp in the field edges in Griggs County
Photo: Jeff Stachler, ANR Extension Agent, Griggs County

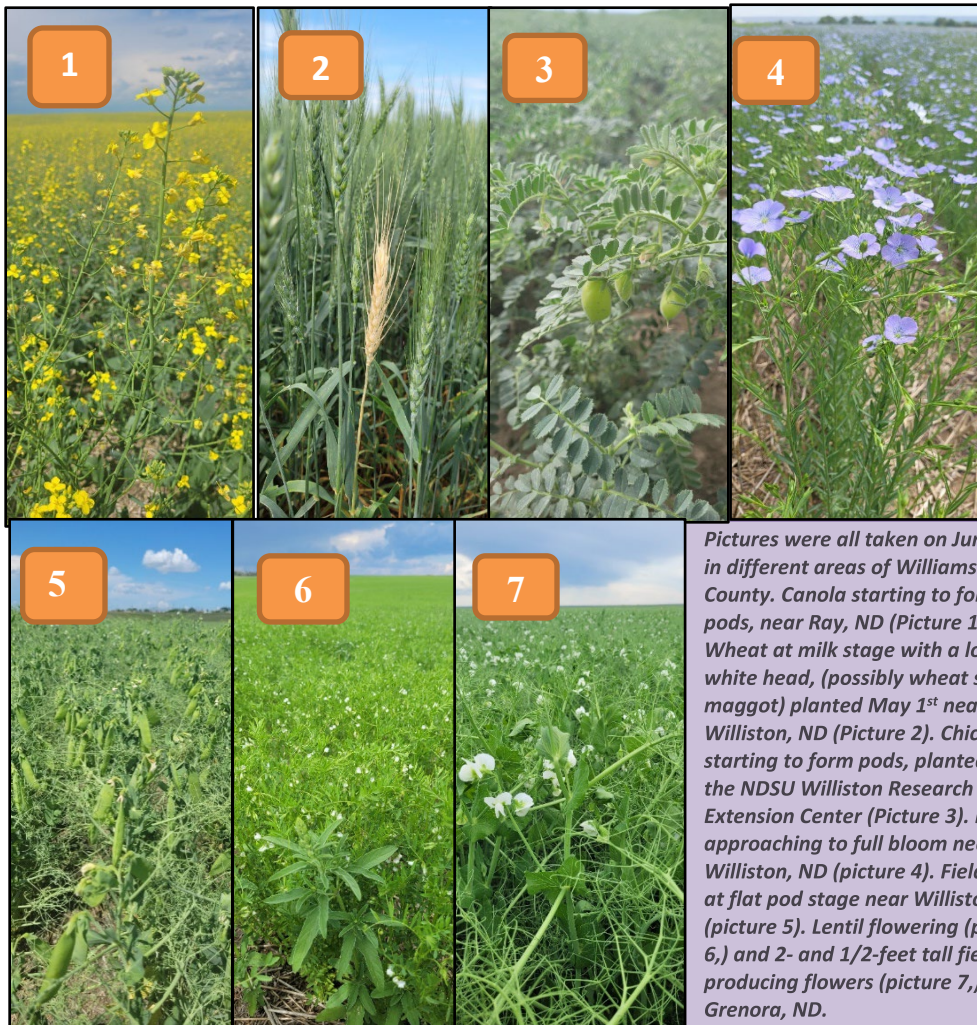
[Anitha Chirumamilla](#)

Extension Cropping Systems Specialist
Langdon Research Extension Center

NORTHWEST ND

The northwest finally got a break from dry and droughty weather conditions this past week. Severe thunderstorms brought much needed rain at a time when our crops are blooming. In Williston, the scattered and severe thunderstorms experienced over the past 8 days (June 19 to 27) brought in a total of 0.75 inches of rain. However, other areas in Williams County, such as the location where the Williams NDAWN weather station is located, received up to 1.59 inches of rain in the same time span. Some areas in Williams County received more rain and some areas received less. The same can be said in McKenzie, Divide, Mountrail and Burke counties. The rain received by Northwestern ND counties in the past week isn't as much compared to the rain that the Southwestern ND counties received (more than 4 inches of rain) but has helped the northwestern crops recover from the dry and hot weather conditions. Although the crop conditions improved this week, soils are drying up fast as crops remove a lot of moisture from the soil. Scattered thunderstorms forecasted this week (June 28) and some chances of rain forecasted next week provide hope that there will be adequate moisture to help crops smoothly go through the reproductive stage, as this is the time when crops are most sensitive to high temperatures and drought. These two stresses have the potential to lower the yield significantly when occurring around and during the reproductive stage.

Crops in the northwest are in a wide range of growth stages. The most advanced stages seen so far: pods starting to form in canola, mustard, chickpea and field pea; flowering in lentil and flax; V10-11 in irrigated corn; up to 5th to 6th trifoliolate in irrigated soybean; and many wheat fields are heading, some are already at the milk stage for those planted around the 1st week of May. Fields that have grasshopper issues have been sprayed and this week grasshopper populations have gone down. With most wheat fields heading, wheat midges have been detected through insect trapping efforts, particularly in Divide and Mountrail.



Pictures were all taken on June 27 in different areas of Williams County. Canola starting to form pods, near Ray, ND (Picture 1). Wheat at milk stage with a loose white head, (possibly wheat stem maggot) planted May 1st near Williston, ND (Picture 2). Chickpea starting to form pods, planted at the NDSU Williston Research Extension Center (Picture 3). Flax approaching to full bloom near Williston, ND (picture 4). Field pea at flat pod stage near Williston, ND (picture 5). Lentil flowering (picture 6,) and 2- and 1/2-foot tall field pea producing flowers (picture 7,) near Grenora, ND.

[Charlemagne “Charlie” Lim](#)

Extension Cropping Systems Specialist
NDSU Williston REC

[Samantha Turnquist & Dayna Roberts](#)

IPM Insect Trappers
NDSU Williston REC

SOUTH-CENTRAL/SOUTHEAST ND

According to NDAWN, rain received in this region during the past week (June 20-26) ranges from 1.3 inch (Harvey and Milnor) to 4.7 inches (Wishek), with the Carrington Research Extension Center (CREC) receiving 2.25 inches. The rain was welcome throughout the region for supporting small grain seed development and row crop growth; plus aiding in regrowth of pastures and harvested hayland, and replenishing livestock dugouts. Temporary disadvantages of rain: lodged small grain and corn, flooding of lowlands, and delays in fieldwork, including application of post herbicides in beans and sunflowers.

Mid-May planted corn at the CREC has 8-9 leaves. The next potential yield component to be determined are the number of kernels per row on the ear. Much of the corn in the region experienced some drought stress prior to last weekend's rain which may have reduced plant height, but typically is not expected to reduce leaf number. More importantly, grain yield is not substantially reduced with drought stress occurring before the 13-leaf stage. Also, with the rapid growth and current vegetative stages, corn is susceptible to green snap.



Corn at V8 stage. Note initial development of brace roots.

Soybean has begun to flower and dry bean are rapidly approaching the reproductive stage.

With recent rain, a field history of white mold and soybean entering the reproductive stages, you may have the following question: "Is a single fungicide application targeting white mold sufficient in soybean when conditions favoring white mold extend through the bloom period, particularly in irrigated production." Answer can be



Soybean at initial flowering (R1 stage; picture taken June 26 at CREC).

found in the CREC's weekly blog:

<https://www.ndsu.edu/agriculture/ag-hub/impact-stories/are-two-fungicide-applications-targeting-white-mold-needed-soybeans-or-single>

[Greg Endres](#)

Extension Cropping Systems Specialist
NDSU Carrington Research Extension Center
NDSU Dickinson Research Extension Center



WEATHER FORECAST

The Week in Review

Most of North Dakota received much needed rainfall after increases in areal coverage of abnormally dry (D0) conditions across eastern and extreme western ND, and the introduction of moderate drought (D1) in Pembina, eastern Cavalier and northern Walsh Counties. With the exception of northwestern ND, these areas received ample rainfall (Figure 1) and in some cases, excessive rainfall. We'll see what the latest [drought monitor](#) indicates when it's released on the morning of June 29. Average air temperatures were very near normal for the week.

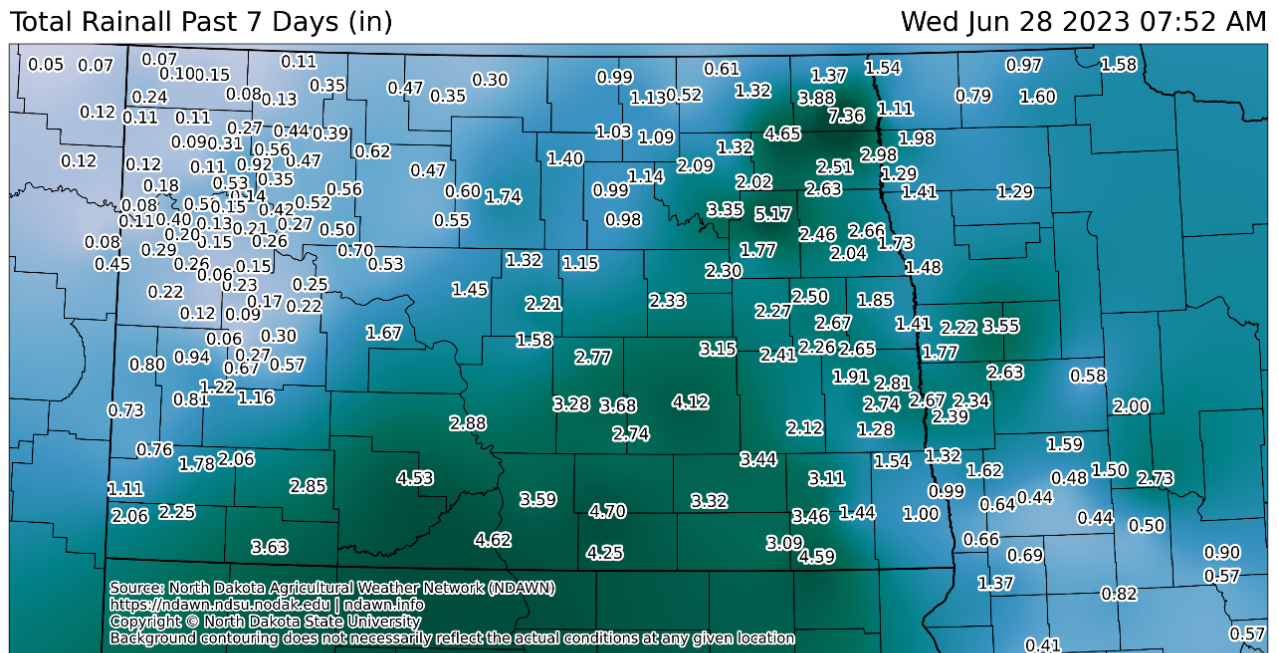


Figure 1. Total rainfall at NDAWN stations for the 7-day period ending at 7:52 a.m. June 28.

Beginning last Thursday, a low-pressure system moved along the ND/SD border and produced soaking rains around the low as it moved from west to east. By Saturday afternoon, a surface low was located over southeastern ND. The warm front associated with the low advanced from south to north over western MN and eastern ND, triggering severe thunderstorms. There was enough energy, lift and wind shear along the warm front to prompt a tornado watch for extreme southeastern ND and adjacent MN. Around 3:00 p.m., discrete low-topped supercell thunderstorms began building mainly along and north of US Highway 10. Low-topped supercells have most of the same characteristics as classic supercells, but on a smaller scale. Classic supercells typically reach the top of the troposphere at over 55,000 feet whereas low-topped supercells do not (Figure 2). That doesn't mean low-topped supercells aren't capable of causing tornados. There were at least 15 reports of tornados in Becker, Norman, Mahnomen and Polk Counties in northwestern MN Saturday afternoon. The tornados occurred over rural areas. According to the National Weather Service Grand Forks office's Facebook page, these were weak tornados (EF-0 or EF-unknown) that did little or no damage, **with one exception**. The exception was a strong EF-2 tornado with top wind speed estimated at 125 MPH just east of the town of Mahnomen that tore the roof off a house and damaged several other buildings. Thankfully, no fatalities or injuries were reported. This tornado showed up well on the KMVX NEXRAD radar near Mayville, ND (Figure 3). Red is air moving away from the radar, green is air moving towards the radar. The brighter the colors, the faster the air is moving. The tornado is at the spot where the bright reds and greens are adjacent to one another. Some storms developed over areas that had already received rainfall, and lingered into the early hours of Sunday morning, which resulted in a flash flood warning for the Drayton and St. Thomas areas in Pembina County (Figure 4). The St. Thomas NDAWN station received 7.34 inches of rain from this system, with a nearby radar-indicated estimate of 7.84 inches! More rain fell across the Devils Lake basin Tuesday evening into Wednesday morning, including an additional 2 inches at the Michigan NDAWN station.

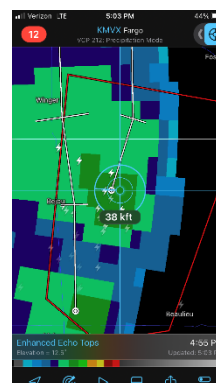


Figure 2. NEXRAD radar showing storm height of 38,000 feet for a tornadic low-topped supercell



Figure 3. NEXRAD radar velocity showing tornadic storm near Mahnomen, MN

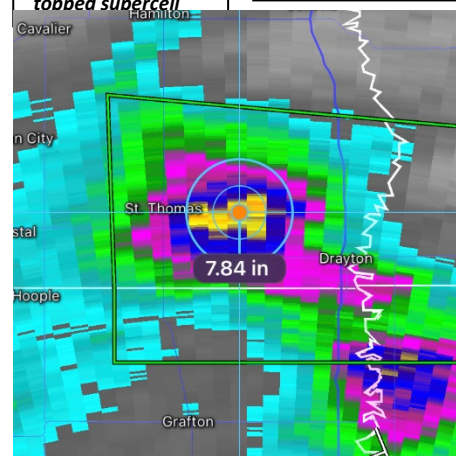


Figure 4. NEXRAD radar image showing estimated rainfall and flash flood warning

Not surprisingly, volumetric soil moisture at the 4 and 8-inch depths increased over the past 7 days in areas that received ample rainfall (Figures 5 and 6). Soil moisture conditions in these areas are now optimum (Figures 7 and 8). Note that northwestern ND still shows deficient conditions at the 4 and 8-inch depths.

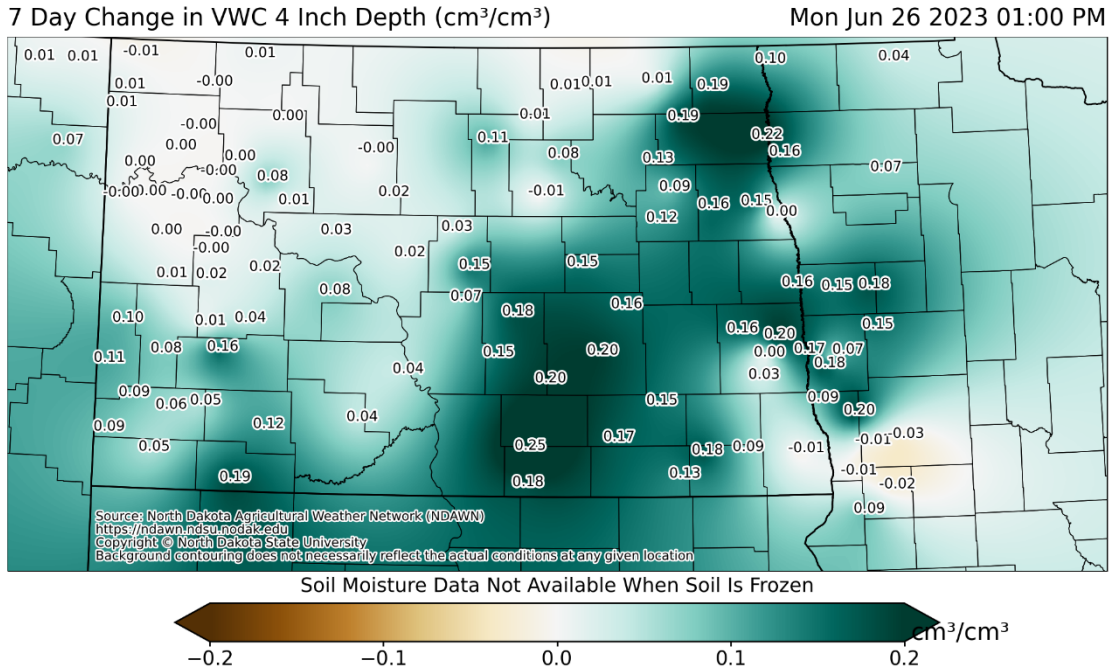


Figure 5. Change in volumetric water content at the 4-inch depth for the 7-day period ending June 26.

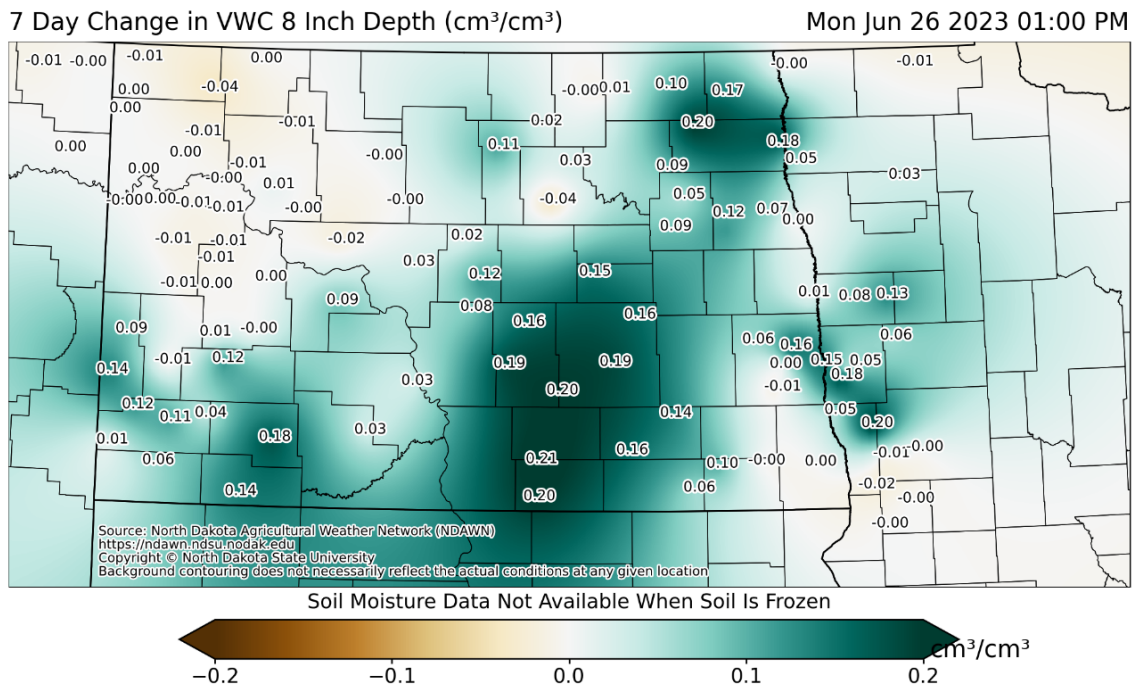


Figure 6. Change in volumetric water content at the 8-inch depth for the 7-day period ending June 26.

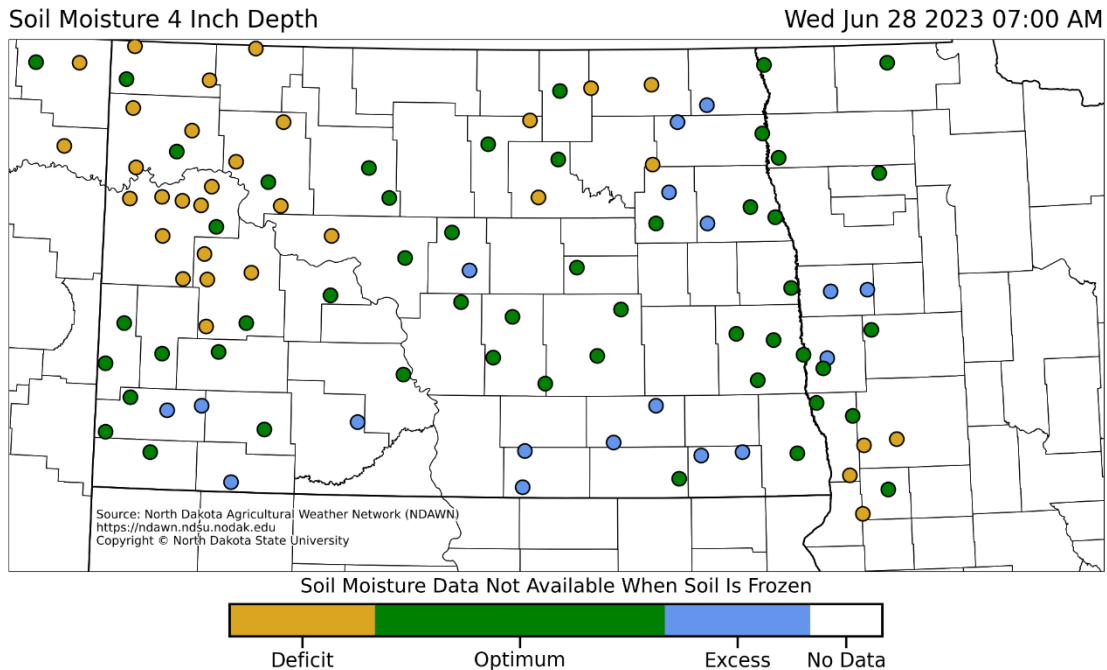


Figure 7. Soil moisture conditions at the 4-inch depth as of 7:00 a.m. on June 28.

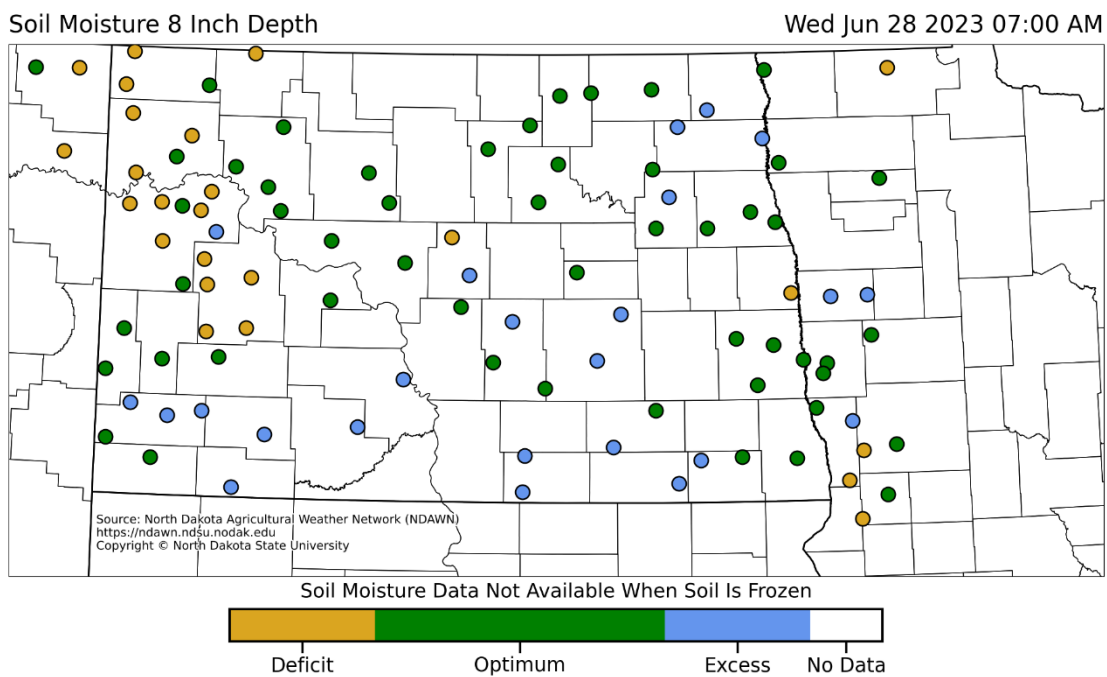


Figure 8. Soil moisture conditions at the 8-inch depth as of 7:00 a.m. on June 28.

The Week Ahead

The next seven days looks relatively dry, with seasonable high temperatures in the upper 70s to low 80s. Best chance for precipitation comes Sunday night into Monday west, and Monday into Tuesday east. This system will not bring as much rain as last week’s system, and the rainfall forecast for the next seven days indicates less than one inch total over the period (Figure 9). Having said that, our recent rains, coupled with crop growth and canopy closure, could lead to higher relative humidity conditions within crops that persist longer than indicated by open air weather stations. **Pay attention to disease risk models in the days ahead.** Looking ahead, the 6-10 forecasts call for slightly below normal temperatures

west and near to slightly above normal temperatures east (Figure 10), and slight chance for above normal precipitation (Figure 11).

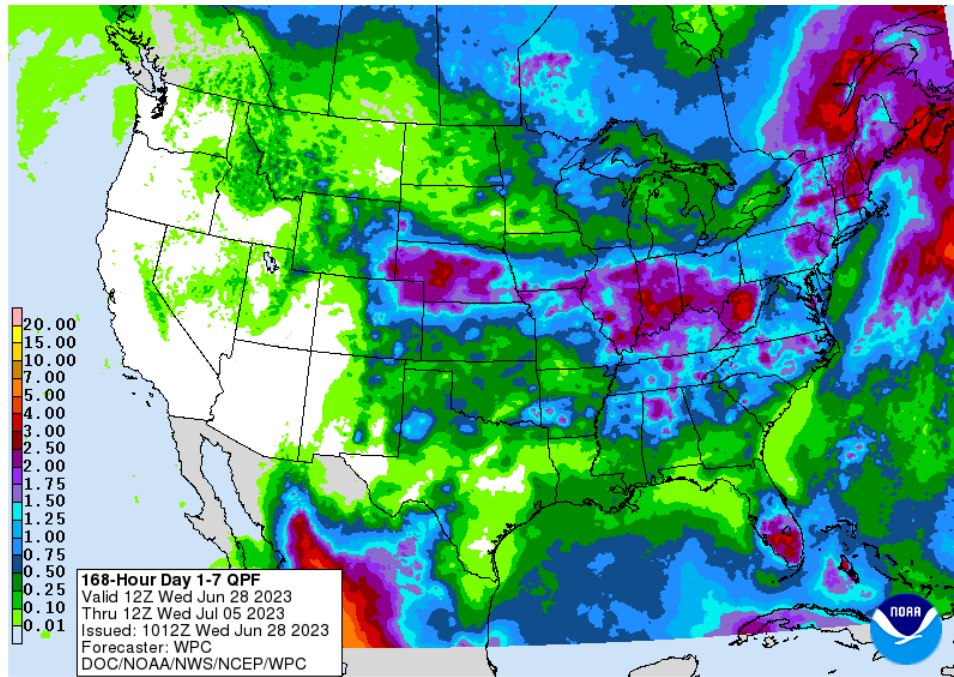


Figure 9. 7-day quantitative precipitation forecast for the continental United States.

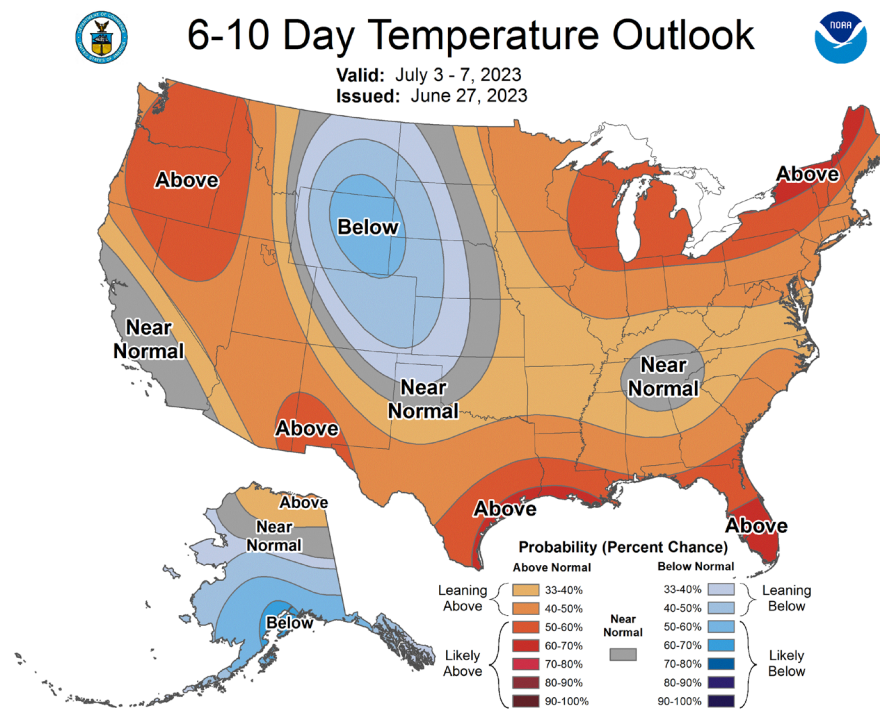


Figure 10. Temperature outlook for July 3 through July 7 for the continental United States and Alaska.

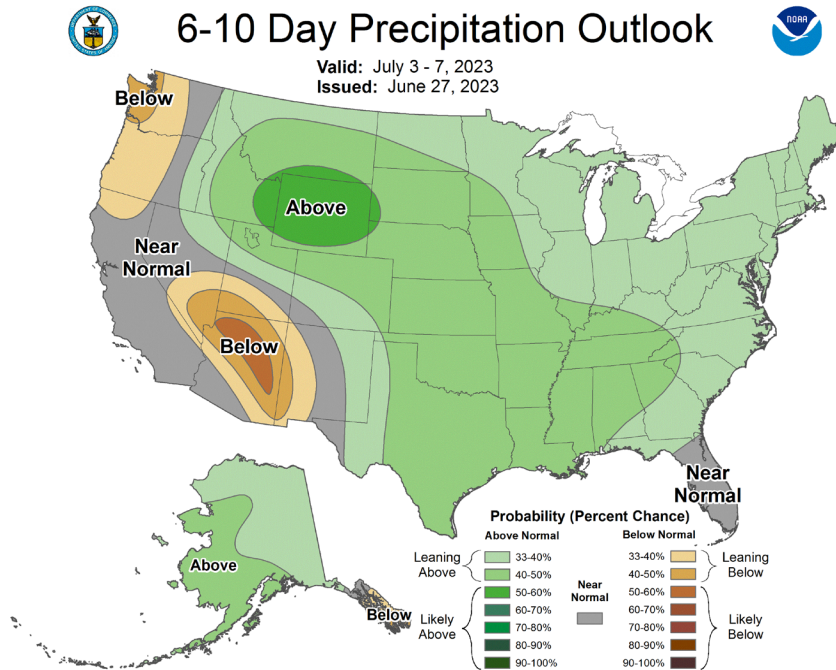


Figure 11. Precipitation outlook for July 3 through July 7 for the continental United States and Alaska.

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