

No. 12 July 27, 2023

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**NDSU FIELD DAYS SET**

**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:

- 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.)



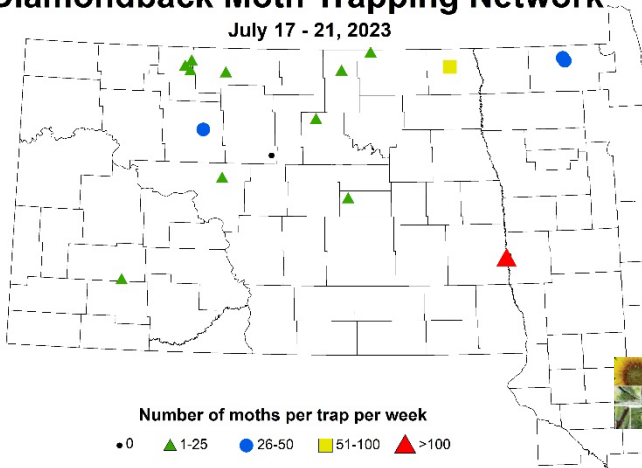


**CANOLA INSECT TRAP UPDATE**

Pheromone traps for bertha armyworm and diamondback moth are being monitored by IPM scouts and insect trappers through the IPM Crop Survey Program in 16 counties of North Dakota and 1 county in Minnesota. So far, trap counts for **bertha armyworm** continue to be low (<10 cumulative moths per trap per week) at all trap sites. **Diamondback moth**, total trap count at all trap sites decreased about 42% from last week’s count total (650 moths total for July 10-14 to 375 moths total for July 17-21). Scouting for diamondback moth is recommended in these areas with **high weekly trap catches of over 100 moths per trap per week and during susceptible crops stages (flowering to mid-pod stages)**. This will be the last report for the canola insect trap network in the *Crop & Pest Report*, since canola is maturing fast due to hot temperatures. Maps can still be accessed on the NDSU [Extension IPM Crop Survey – Canola Insect Trapping](#) website.

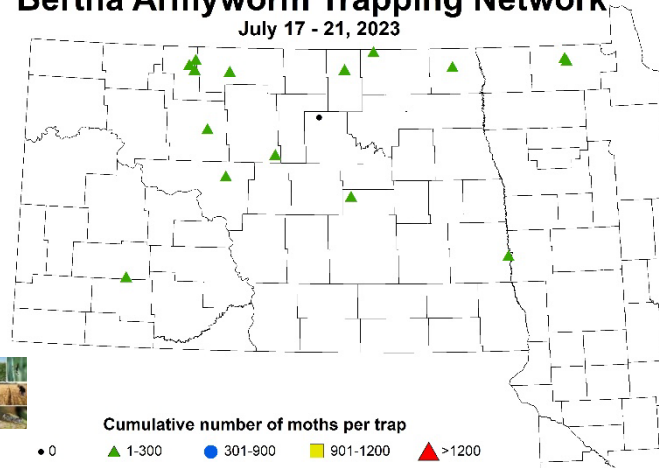
**Diamondback Moth Trapping Network**

July 17 - 21, 2023



**Bertha Armyworm Trapping Network**

July 17 - 21, 2023



**CORN INSECT TRAP UPDATE**



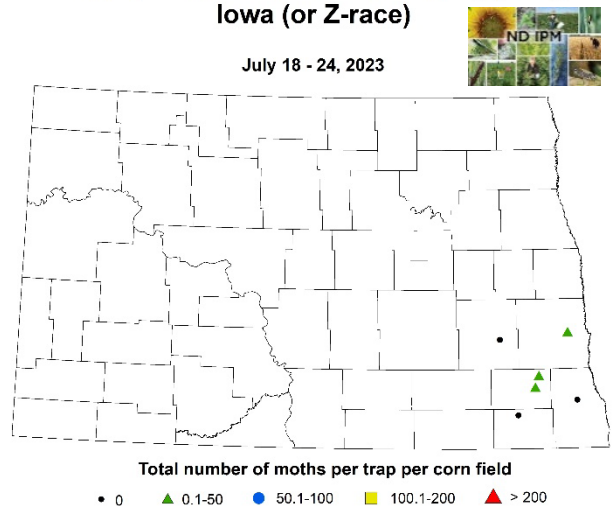
**European corn borer moth**  
(*V. Calles Torrez*)

This past week, trap counts for the Z-race ECB moths were low at all trap sites. The E-race ECB moth has not been detected in traps this year. See map on right and Table 1 (next page). Overall, ECB moth trap counts continue at low levels due to hot temperatures in 80s to 90°F and drought. Corn growth stages are between late vegetative to tassel. This will be the last report for corn borer in

the *Crop & Pest Report*. Maps can be accessed on the NDSU [Extension IPM Crop Survey – Corn Insect Trapping](#) website.

**European Corn Borer Trapping**  
**lowa (or Z-race)**

July 18 - 24, 2023



**Table 1. 2023 pheromone trap catches for European corn borer (ECB) moths in corn, ND**

Area	County	Nearest town	ECB Z-race moths						Total trap
			June 13-19	June 20-26	June 27-July 3	July 4-10	July 11-17	July 18-24	
EC	Barnes	Cuba	0	0	1	1	0	0	2
EC	Cass	Mapleton	0	0	0	0	1	1	2
SE	Sargent	Gwinner	0	1	0	0	0	0	1
SE	Ransom	Shenford	0	14	47	14	20	2	97
SE	Ransom	Sheldon	0	0	27	23	25	7	82
SE	Richland	Mooreton	0	1	7	3	1	0	12
<b>Total moths</b>			<b>0</b>	<b>16</b>	<b>82</b>	<b>41</b>	<b>47</b>	<b>10</b>	<b>196</b>

Corn rootworm beetle traps were set out on July 17 and no beetles were observed during trapping last week (Table 2). Stay tuned for corn rootworm updates.



*Northern corn rootworm beetle (V. Calles Torrez)*

**Table 2. 2023 adult corn rootworms (northern and western corn rootworms) per 4 traps per week in ND field corn.**

Area	County	Nearest town	July 18-24	Total # CRW per Trap
SE	Cass	Mapleton	0	0
SE	Barnes	Cuba	0	0
SE	Ransom	Sheldon	0	0
SE	Ransom	Shenford	0	0
SE	Sargent	Gwinner	0	0
SE	Richland	Mooreton	0	0
<b>Total corn rootworm =</b>			<b>0</b>	<b>0</b>
<b>Percentage of NCR =</b>			<b>0%</b>	<b>0%</b>
<b>Percentage of WCR =</b>			<b>0%</b>	<b>0%</b>

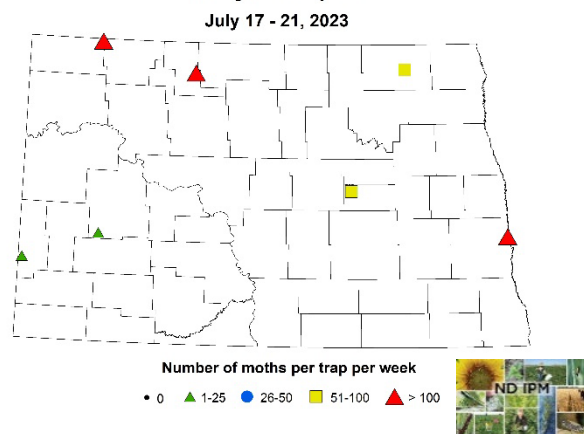
**Economic thresholds (ET) is 14 or more adults (either species) per sticky trap per week.**

**SUNFLOWER INSECT TRAP UPDATE**

- ✓ **Banded sunflower moths** increased from 181 moths total last week to 656 moths total this week, and were present at all trapping sites both weeks.
- ✓ **Arthuri sunflower moths** increased from 16 moths total last week to 86 moths total this week, and were present at only three trapping sites last week to all trapping sites this week.
- ✓ No **sunflower head moth** was trapped.

Scout sunflower from R4 (bud open ray flower visible) through R5.7 (70% of florets flowering on face of sunflower head) for banded sunflower moth, Arthuri sunflower moth and red sunflower seed weevil. See last week's [Crop & Pest Report #11](#) July 20, 2023 for red sunflower seed weevil scouting and threshold.

**Banded Sunflower Moth Trapping Network**  
*Cochylis hospes*



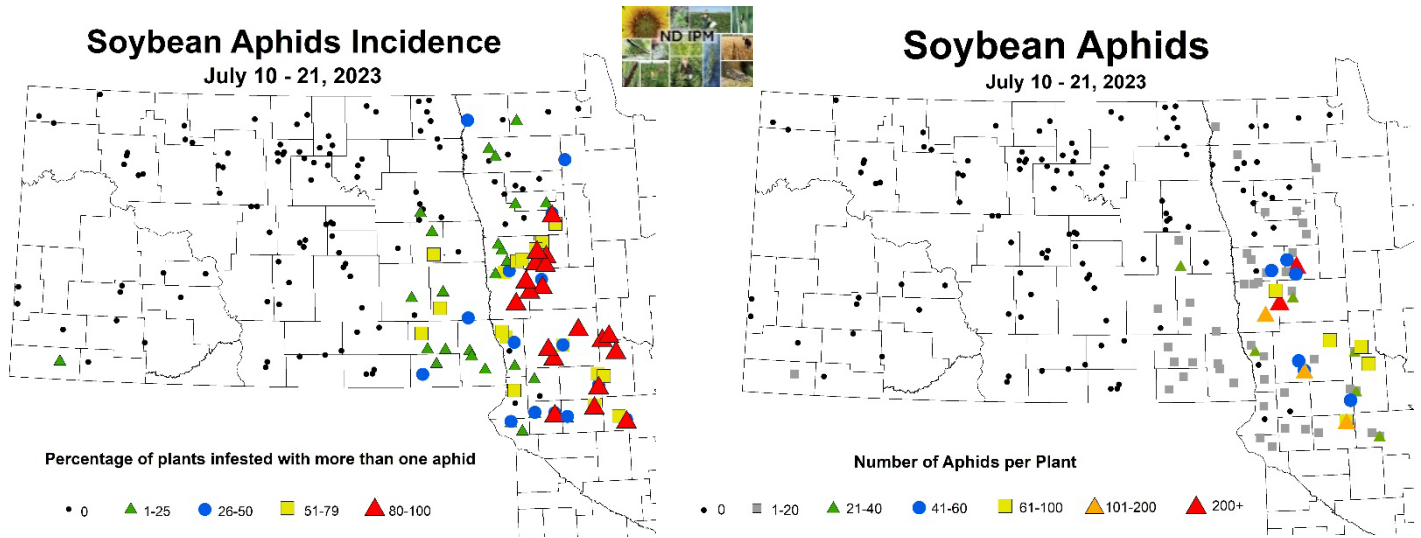


**CONTINUE TO SCOUT FOR SOYBEAN APHIDS AND CEREAL APHIDS**

In North Dakota, prevalence of soybean aphids increased from 6% last week to 22% of fields this week which were scouted by IPM Scouts. Aphid incidence was 0-65% incidence and low densities of <0-40 aphids per plant in the Red River Valley area of North Dakota. In Minnesota, higher incidence (0-100%) and numbers of aphids per plant (0-375 aphids per plant) are being recorded in 72% of fields scouted. As you know, the hot temperatures >90°F could slow soybean aphid reproduction to nil this week. Beneficial insects that control aphids are frequently being observed eating soybean aphids in fields, such as lady beetle larvae and adults, syrphid larvae and lacewing larvae (see photos below).

**Economic Thresholds for Soybean Aphids**

- R1 (beginning of flowering) to R5 (beginning seed)
- average of 250 aphids per plant
- 80% of plants infested
- when populations are actively increasing.



**14-spotted lady beetle feeding on aphids**  
(Scott Bauer, USDA ARS, bugwood.org)



**Syrphid fly (A. Varenhorst, SDSU Ext.)**



**Green lacewing (P. Beauzay)**



**Lady beetle larvae (J. Knodel)**



**Syrphid larvae (P. Beauzay)**



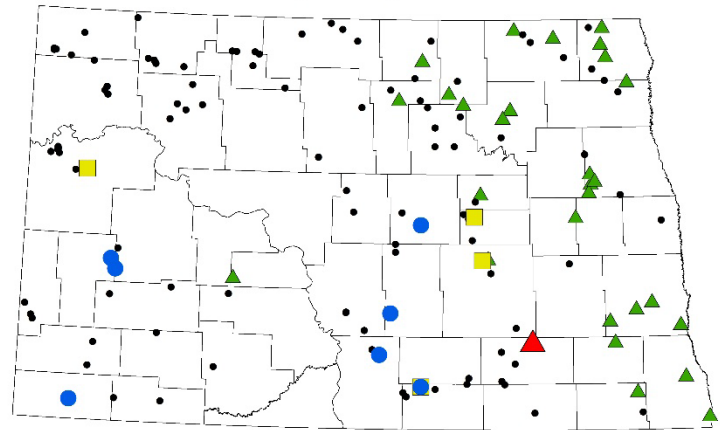
**Lacewing larva (A. Varenhorst, SDSU Ext.)**



**Cereal aphids** were sporadic and observed in 31% of the 78 wheat fields scouted by the IPM Crop Scouts last week, a slight increase from previous week's 21%. Cereal aphid counts ranged from an average of 1 to 12 aphids per stem. Some fields had economic populations of cereal aphids in central and southwest North Dakota. Other field reports in the north central area indicate cereal aphids have increased to near 100% incidence on plants and 1-10+ aphids per stem. Field scouting should be conducted from stem elongation and continue up to the early dough stage of wheat. Most of the wheat crop ranged from flowering to ripening.

### Aphids in Wheat

July 10 - 21, 2023



Average Number of Cereal Aphids per Stem

• 0    ▲ 1-4    ● 5-7    ■ 8-12    ▲ >12

#### Economic Thresholds for Cereal Aphids in Wheat, Barley or Oats

- vegetative through head emergence – 4 aphids per stem
- complete heading through the end of anthesis – 4-7 aphids per stem
- end of anthesis through medium milk – 8-12 aphids per stem
- medium milk through early dough – >12 aphids per stem

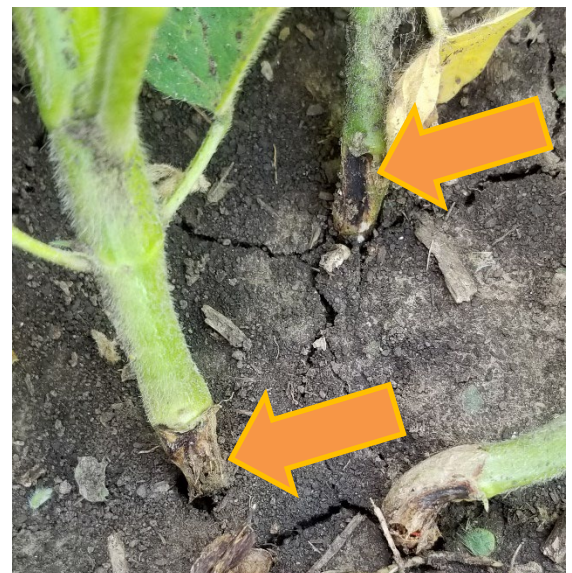
#### SOYBEAN GALL MIDGE UPDATE

The soybean gall midge is a new economic insect pest of soybeans, which first was reported causing yield losses in Nebraska, Iowa and South Dakota soybean fields in 2018. This pest also was detected in Minnesota in 2018 and Missouri in 2019. The known distribution of soybean gall midge continues to expand in the five infested states, and a recent detection of soybean gall midge was confirmed positive using DNA techniques near Gwinner in Sargent County, North Dakota.

NDSU Extension Entomology has been proactive in surveying for soybean gall midge since 2019. A total of 78 fields in 11 counties in 2019; 605 fields in 47 counties in 2020 and 588 fields in 48 counties in 2021 were surveyed. All fields were found negative in 2019, 2020 and 2021. In 2022, we surveyed 435 soybean fields in 45 negative counties and detected one positive field Sargent County for soybean gall midge.

#### Scouting for Soybean Gall Midge

August is a good time to scout for soybean gall midge, because the darkened discoloration at the base of the soybean stems are readily visible from larval feeding injury. Scout by walking a line transect in the first four rows near the field edge and focus in areas where dense vegetation occurs. Examine 10 consecutive plants at 10 sampling sites per field near the field edge (total of 100 plants per field). Sampling sites should be spaced more than 50 feet apart.



Darkened stem at base of soil caused by soybean gall midge feeding injury (*V. Calles Torrez*)

At each sampling site, examine plants for the presence of necrosis and brown or dark discoloration at the base and lower portion of each stem. If necrosis is observed, pull up the soybean plant and peel back the outermost layer of the stem (epidermis) on the necrotic area to look for small white or orange larvae. Growers are encouraged to scout for soybean gall midge. Additional scouting will help detect this economic insect pest of soybeans at new locations in North Dakota.

**What to Do if You Find Suspect Soybean Gall Midge in North Dakota**

If you happen to find white or orange larvae in the stems of soybeans, you need to confirm whether it is the soybean gall midge or white-mold gall midge. Collect more than 10+ larvae and place them in alcohol vials, or collect two to three plants with larvae and place them in a plastic bag. Notify and send collected samples to the Extension agent in your county or to the NDSU Extension Entomology in Fargo campus for further identification. For more information, see the NDSU Extension publication on [Soybean Gall Midge and White-mold Gall Midge in Soybean E2006](#).



Young (white) and older (orange) larvae of soybean gall midge (*V. Calles Torrez*)

**Integrated Pest Management (IPM) of Soybean Gall Midge**

Because the soybean gall midge is a newly discovered insect pest, entomologists have been studying different integrated pest management strategies in the infested states. Studies on planting dates, host plant resistance, crop rotation, tillage and insecticide control for this pest are being conducted in states with economic populations. For more information, see the websites on soybean gall midge that summarizes the IPM research:

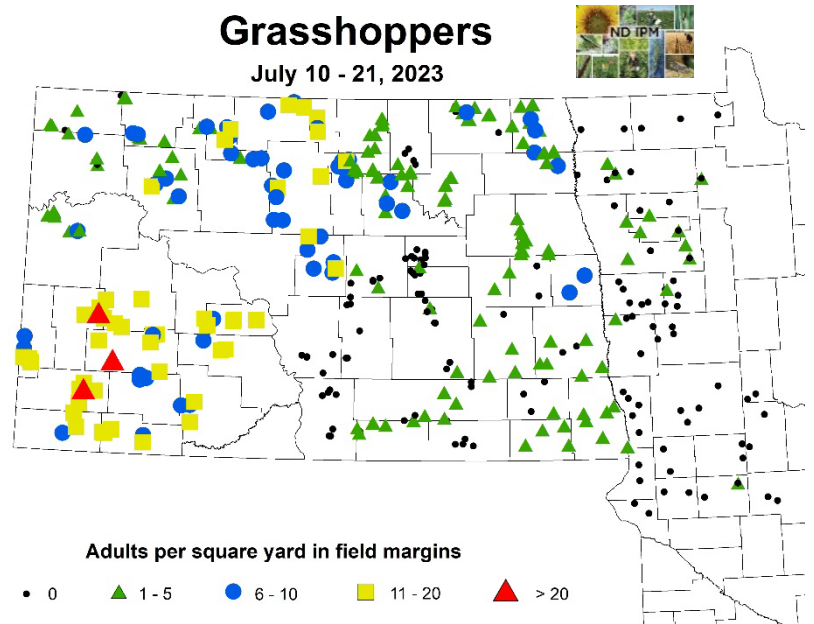
- [Soybean Gall Midge](#), Soybean Research and Information Network
- [Midwest Soybean Gall Midge Discussion Series](#), University of Minnesota Extension
- [Soybean Gall Midge Alert Network](#), University of Nebraska Extension

**GRASSHOPPERS ACTIVE**

Adult grasshoppers and some late instar nymphs are common in field crops. IPM Scouts are finding higher grasshopper densities in the western part of the state. Drought and heat are increasing grasshopper damage.

As small grain crops are harvested, grasshoppers will be moving into broadleaf crops (corn, flax, soybean, sunflower and other crops) for feeding. Scouting fields for grasshopper damage to foliage and pods/heads is important during this time of year. Adult grasshoppers can readily move around from fields and even re-infested fields in ‘hot’ spots.

Janet J. Knodel  
Extension Entomologist







# plant pathology

## DRY EDIBLE BEAN RUST

Frequent dews and moderate-warm temperatures over the last few weeks have provided a very favorable environment for dry edible bean rust. We encourage dry edible bean growers to consider scouting for dry bean rust.

Rust is capable of causing yield loss, especially when it first occurs in the early to middle of the growing season.

However, rust can be managed with fungicides, so scouting for the disease is encouraged.

**Signs and Symptoms.** Dry bean rust is usually first found on the lower leaves of bean plants in ‘hot spots’, which are clusters of plants with relatively severe damage (Figure 1). Hot spots are often small (a few feet to several yards in diameter) and can occur anywhere in a field, but are more common near shelter belts or other areas prone to long dew periods. Rust is usually first observed on the upper sides of the leaves and appear as dusty cinnamon-brown pustules that may be surrounded by a small yellow halo (Figure 2, next page). Pustules on the undersides of the leaves may appear more robust and lack the yellow halo (Figure 3, next page).



*Figure 1. Close up of a rust hot spot in dry edible beans.*



**Management.** Importantly, dry bean rust does not occur in every field, every location or every year, so scouting is very important. If rust bean rust occurs early enough in the growing season and conditions remain conducive for infection and spread, the disease can cause significant yield loss. A hot-spot can turn into a full-blown epidemic in just a couple weeks. The best timing for a fungicide application to manage rust is shortly after it is first found, up until the later growth stages when fungicides no longer have a benefit (such as when pintos begin to stripe). QoI fungicides [strobilurins: FRAC 11] (such as Headline, Quadris, Aproach, etc.), DMI fungicides [Triazole: FRAC 3] (such as Proline, Quash, tebuconazole, etc.) and mixtures containing these groups (such as Priaxor, Propulse, etc.) have been the most efficacious in our trials. Fungicides with other modes of action, some of which are more commonly applied for white mold may still reduce disease severity, but are often less effective in our trials. Exceptions have occurred.



**Figure 2. Dusty cinnamon-brown rust pustules the upper side of a dry edible bean leaf.**



**Figure 3. Pustules on underside of dry edible bean leaf.**



## SUNFLOWER RUST

Sunflower rust is being found and reported in North and South Dakota, and we encourage growers to scout for sunflower rust as the crop approaches bloom. Confection-type sunflowers are often particularly sensitive to rust. Yield and quality losses can be high if an epidemic develops early in the season. If rust is found above the threshold, a fungicide application at R5 can prevent or limit yield loss.

### Signs and Symptoms.

Frequent dews and moderate to warm temperatures have resulted in favorable environments for infection. Consequently, sunflower rust is commonly first observed near shelter belts or other areas of a field with longer dew periods. The sunflower rust pathogen overwinters in our climate, so it is also common to first find sunflower rust near last year's sunflower residue or wild/volunteer sunflowers. Pustules are cinnamon-brown and dusty, often first found on the leaves in the lower canopy (Figure 1). If an epidemic occurs, pustules may be found on stems, petioles and leaves.



**Figure 1. Dusty cinnamon-brown rust pustules on a sunflower leaf.**

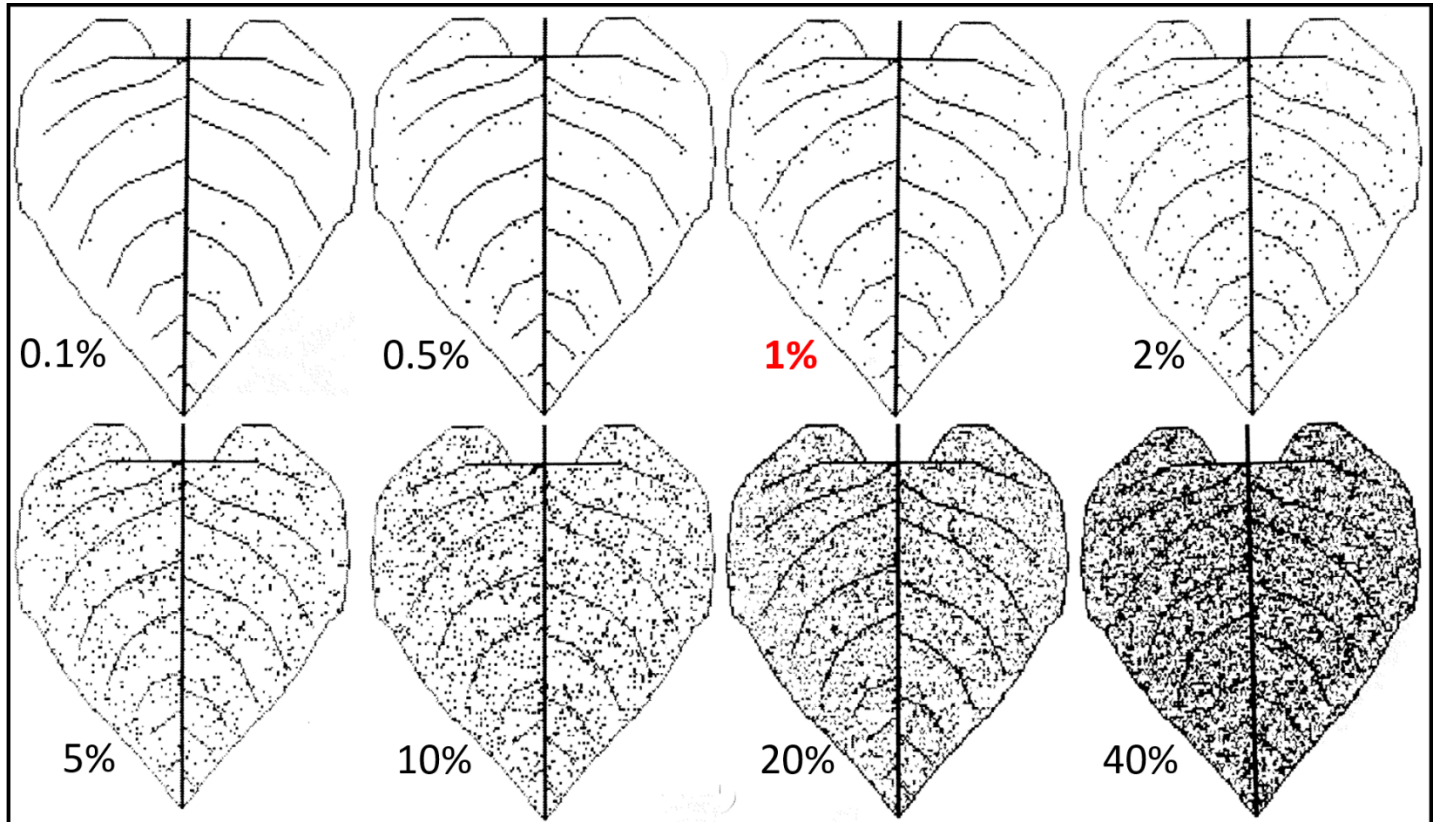
### Management.

**Timing.** If rust reaches approximately 1% severity on the upper four fully expanded leaves at or before bloom (R5) a fungicide should be considered (Figure 2-3). At R6 or later (after bloom) fungicide applications have not had impact on yield in our trials.

**Efficacy.** DMI [FRAC 3: Triazole] and QoI fungicides [Strobilurin: FRAC 11] and fungicides containing mixtures of those modes of actions are among the most effective on rust in our trials.



**Figure 2. Approximately 1% rust severity on a fully-expanded sunflower leaf.**



**Figure 3. Sunflower rust severity assessment diagram; 1% severity in red.**

[Sam Markell](#)

Extension Plant Pathologist, Broad-leaf Crops



### **CORN AND SMALL GRAIN CROP CONDITIONS HIGHLY VARIABLE ACROSS NORTH DAKOTA**

I had the pleasure of attending and speaking at most of the NDSU Research Extension Center field days the past two weeks. During my travels across the state, "highly variable" are the best two words I have to describe crop conditions. I saw spring wheat and barley fields filling grain or turning color in the same counties where there are fields heading out and flowering. I saw corn in one field silking and just a few minutes down the road another corn field that was V10 and more than a week away from tasseling. Driving south and east out of Langdon on my return to Fargo on July 20th, isolated thunderstorms the previous day dumped 5-8 inches and flooded fields, leaving standing water in crops that had not seen good moisture for weeks.

Regarding drought stress in corn, the high temperatures of this week will not do the crop any favors, especially where it is dry. Excessively hot and dry conditions during tasseling and pollen shed can reduce pollen grain viability compared to pollen shed in cooler temperatures and higher relative humidity. This can reduce the number of silks that get pollinated. Additionally, moisture stress during tasseling can cause a lag between pollen shed and silking and this also reduces the



rate of kernel fertilization. Reduced fertilization results in yield loss as the unfertilized flowers do not develop into kernels. Hopefully the cooler temperatures predicted for next week come true along with rain to help get the corn crop through this crucial stage in its development.

The ND Wheat Commission annual Wheat Quality Tour kicked off in Fargo on Monday, July 24<sup>th</sup>, and will be traveling the state this week to check wheat fields and estimate yields. I anticipate they will see winter wheat being harvested and spring wheat fields everywhere from flowering to turning color. Hopefully they will cover a lot of ground and provide us with good information about the 2023 spring wheat crop. Let's thank them for their efforts!

[Clair Keene](#)

Extension Agronomist Small Grains and Corn



## AROUND THE STATE

### NORTHEAST ND

Crops are advancing amidst dry conditions. Depending on the location, some crops are showing severe moisture stress symptoms. Small grains are at heading and grain development stages with some early planted fields turning color. Corn is at tasseling and silking stages while soybeans, field pea and canola are at flowering and pod development stages. Dry beans and sunflowers are at flowering stages.

No reports of foliar diseases in small grains except for some hot spots of bacterial leaf streak and wheat streak mosaic virus in Pembina County. No rescue treatments are available for either disease. Fusarium head blight is starting to show up in some fields but expected to be at low levels.



***Wheat Streak Mosaic Virus infected wheat field***

***Photo: Madeleine Smith, Extension ANR Agent, Pembina County***

Soybean aphids are increasing in numbers as well as in distribution. More fields have been reported of having aphids compared to last week. However, the populations tend to be below threshold, which might be due to hot and dry conditions and a healthy population of predators and parasitoids.

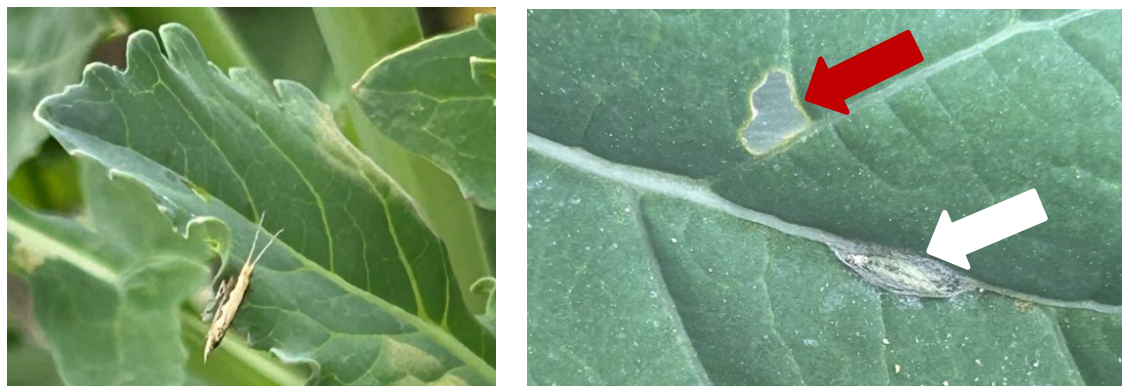
Diamondback moth populations appear to be scattered with high populations in some fields. Frequent scouting is recommended to check their larval populations.



**Left: Soybean aphid predator syrphid fly larva**

**Right: Soybean aphids in Ramsey County**

**Photo: Lindsay Overmyer, ANR Agent Ramsey County**



**Left: Diamondback moth adult in canola**

**Right: Diamondback moth larval feeding damage (red arrow) and pupa (white arrow)**

**Photo: Venkat Chapara, NDSU Plant Pathologist, LREC Photo: Lindsay Overmyer, ANR**

[Anitha Chirumamilla](#)

Extension Cropping Systems Specialist  
Langdon Research Extension Center

## NORTHWEST ND

It's been hot and dry again in northwest ND this past week. Since Friday last week (July 21), temperatures were in the uppers 90s and even to low 100s °F. Temperature in Williston reached 102°F around 5pm on last Monday. Some areas received very few scattered rains showers the day before, but temperatures were hot and the minor rain event probably didn't do much to help our crops. The soils are also dry. As of Tuesday (July 25), average soil moisture readings by NDAWN weather stations across the northwest was 11% at the 4-inch soil depth and even lower at the 2-inch depth (8%). The soil moisture ranged from 4.7% in Hanks in Williams County to only 18.4% in Croff in McKenzie County. These are definitely low soil moisture readings. Although the hot temperatures are good for drying down of some of our mature crops like wheat or field pea, other crops like safflower, soybean, corn, canola and other broadleaf crops definitely needs moisture. In corn, drought and heat stress (over 90°F) can have significant negative impacts on yield when experienced during corn silking and pollination. [Drought and heat stress in corn](#) can cause slow silk emergence



and accelerate pollen shed, and dry up the silk or kill the pollens directly that will result in reduced kernel onset. Most of the corn in the region have produced tassel and are at silking to blister stage.

After spraying glyphosate as desiccant last week, field pea harvest has started at the Williston REC. In the region, pulse crops like pea, chickpea, lentil are starting to turn yellow (full pod to mature). Corn is at silking to blister stage. Wheat is at soft to hard dough. Soybean is at full flower to beginning of pod. Flax at boll stage and starting to turn yellow. Safflower is just about to start flowering. Sunflower is at immature flower bud stage (R2 to R3). Canola is at late flowering to pod filling stage.



Harvesting of field pea at the NDSU Williston Research Extension Center. Photo taken July 25.



Canola at pod fill stage. Photo taken in Williams County on July 24.



Furrow irrigated corn at blister stage. Photo taken in McKenzie County on July 24.



Soybean at R3 stage (beginning of pod) showing symptoms of heat and drought stress. Photo taken afternoon of July 24 when temperature reached 102°F in west of Williams County.

[Charlemagne “Charlie” Lim](#)  
 Extension Cropping Systems Specialist  
 NDSU Williston Research Extension Center



**SOUTH-CENTRAL/SOUTHEAST ND**

According to NDAWN, accumulated rain received in this region during July 1-24 ranges from 0.2 inch at Harvey to 2.0 inches at the Carrington Research Extension Center (CREC). During the past week of July 18-24, average daily water use (date of plant emergence in parenthesis): spring wheat (May 15), corn (May 20) and soybean (June 1) was about 0.25 inch.

Winter cereals are mature and harvest has begun. First-half May planted barley is at hard-dough stage to mature; spring wheat at soft- to hard-dough stages; and corn at silking (R1) to blister (R2) stages.

The majority of the region's soybean and dry bean are developing pods and initial seeds. Flowering is nearly complete with canola and pods are filling with seed. Sunflower are nearing or starting to bloom.

**CREC crop tours:**

- \*Barnes County – Dazey, July 27, 6 p.m.
- \*Tri-county – Wishek, August 1, 6:30 p.m.
- \*Oakes Irrigation Research Site, August 3, 8:30 a.m.
- \*Barnes County – Fingal (corn), August 10, 8:30 a.m.
- \*Row Crop, August 31



***CREC dryland spring wheat variety trial (planted May 11).***



***Sunflower at R4-5 stages***



***Pinto bean at R6 stage (planted May 25)***

[Greg Endres](#)

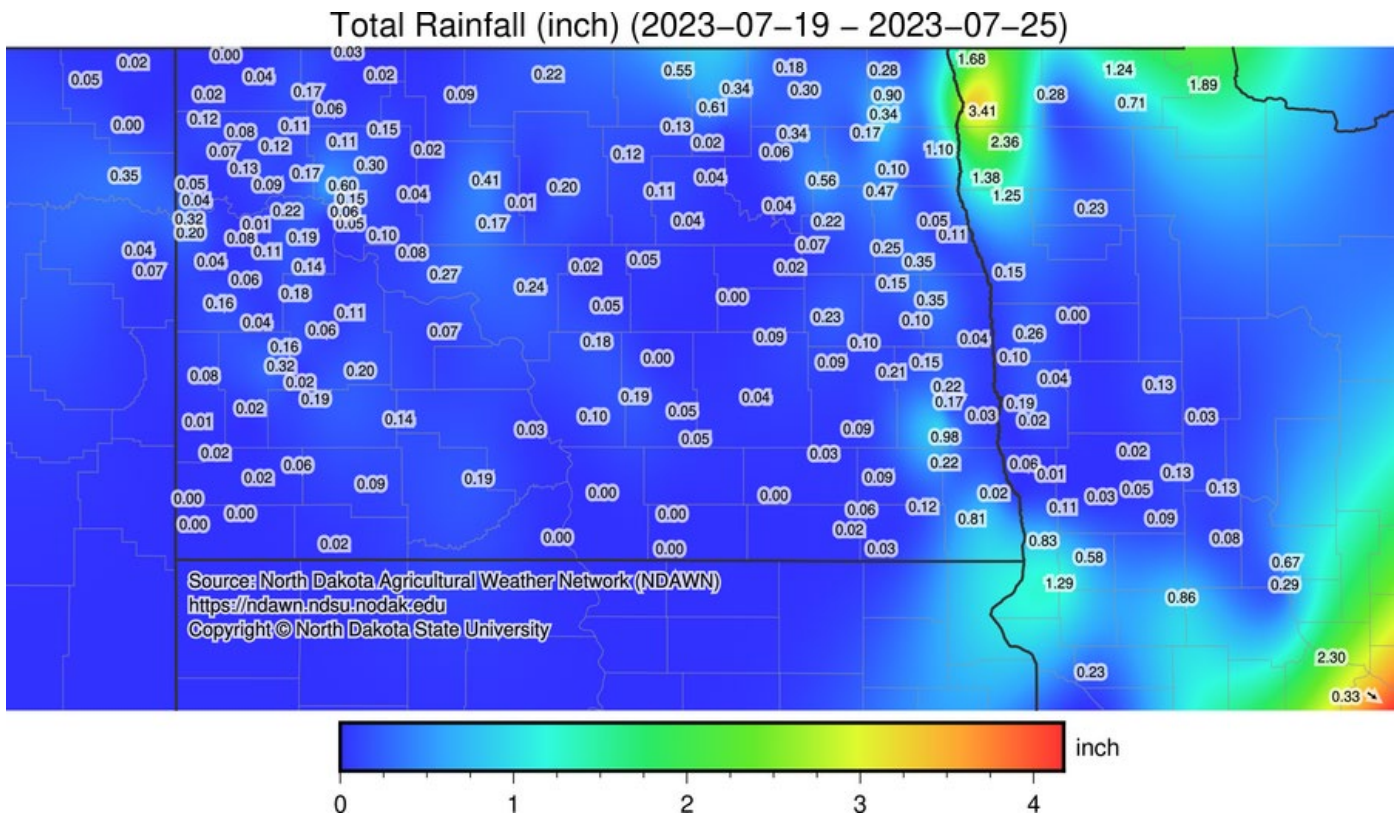
Extension Cropping Systems Specialist  
NDSU Carrington Research Extension Center



**WEATHER FORECAST**

**The Week in Review**

Average air temperatures for the 7-day period were close to normal but that's due to below normal temperatures late last week and above normal temperatures this week. Forecast highs for July 26 will be in the low to mid 90s F statewide, and I wouldn't be surprised to see a few triple digit readings south of Highway 200 and east of the Missouri River. Scattered light rain events occurred across ND and MN this past week, with most NDAWN stations picking up less than 0.25 inch (Figure 1). A few NDAWN stations in eastern ND and northwestern MN recorded over 1 inch, with the station at Kennedy, MN in Kittson County receiving 3.41 inches as of July 25. Rainfall was again below normal for the 7-day period, except in those isolated areas that received heavier rainfall (Figure 2). For the growing season to date, most of ND and MN are well below normal for rainfall (Figure 3).



**Figure 1. Rainfall from July 19 through July 25.**



Departure from Normal Rainfall (inch) (2023-07-19 – 2023-07-25)

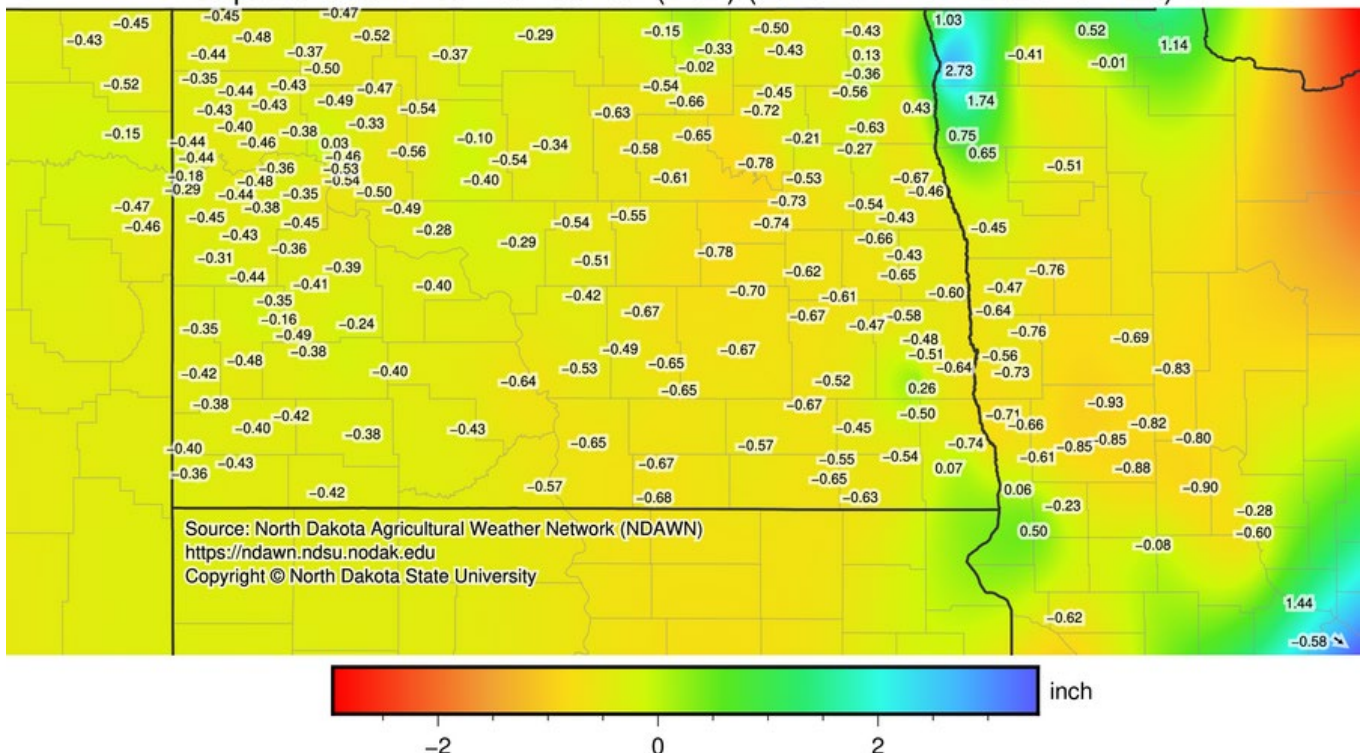


Figure 2. Rainfall departure from normal from July 19 through July 25.

Departure from Normal Rainfall (inch) (2023-04-15 – 2023-07-25)

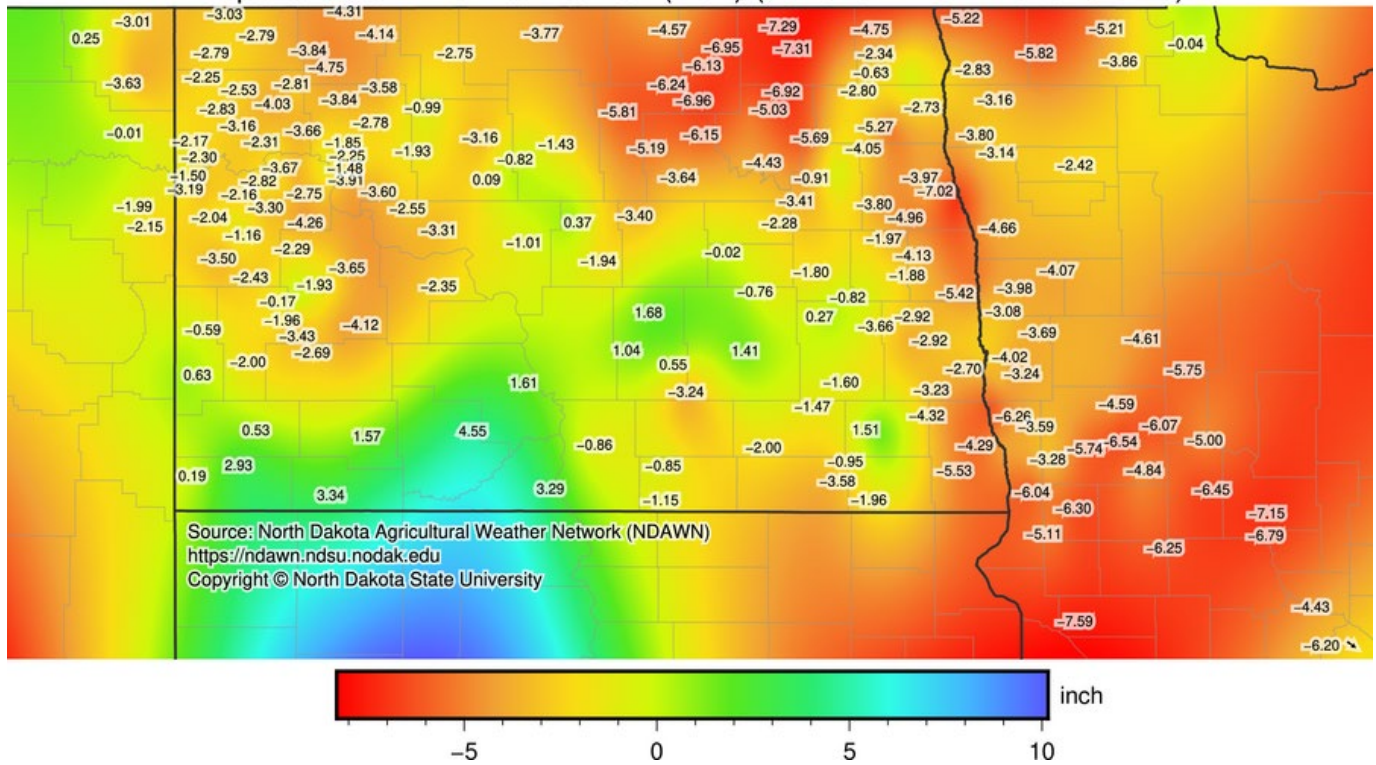


Figure 3. Rainfall departure from normal from April 15 through July 25.



Soil moisture continues to remain deficient at the 4 and 8 inch depths across most of ND and west central MN, except in areas that were fortunate enough to receive ample rainfall (Figures 4 and 5). Keep in mind that conditions at any given NDAWN may not reflect soil moisture conditions in your fields, even if close to an NDAWN station. Soil type, soil physical properties, crop, and canopy cover all play a role. Be sure to check [this week's drought monitor](#), which should be released on July 27. This is a critical time now for water use in our later maturing crops, especially corn and soybeans. Once again, I encourage our readers to participate in the [Condition Monitoring Observer Reports \(CMOR\)](#) system. Reports can be submitted using your desktop or laptop computer or through a smart device app. The website provides a [training video](#) and a [factsheet](#) on how to use the app. Reports should be submitted by noon each Monday. And I again encourage our readers to become [CoCoRaHS](#) weather observers.

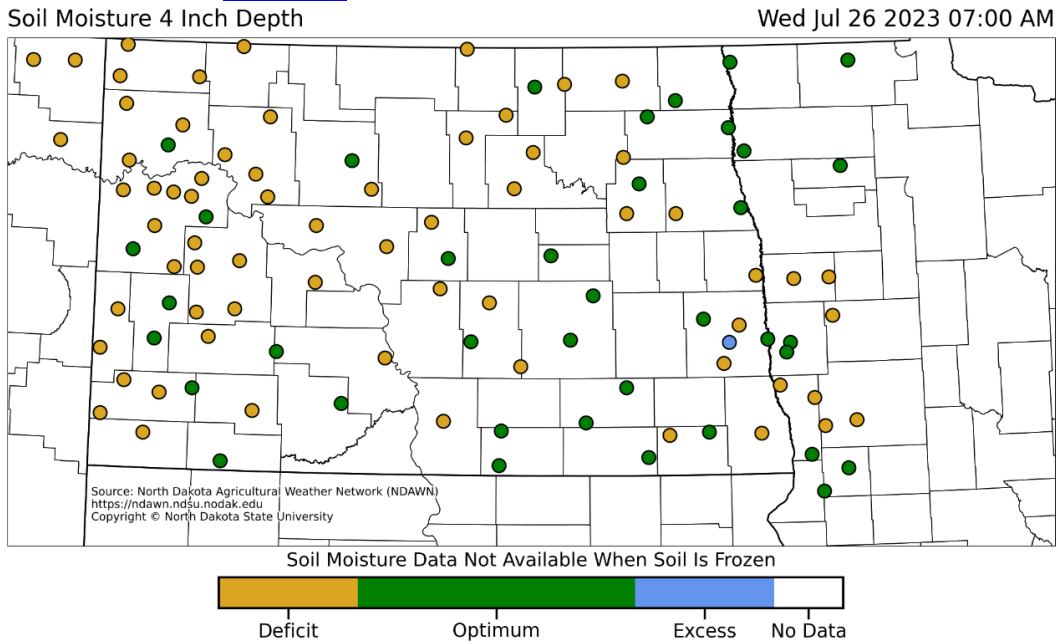


Figure 4. Soil moisture at the 4 inch depth as of 7:00 AM, July 26.

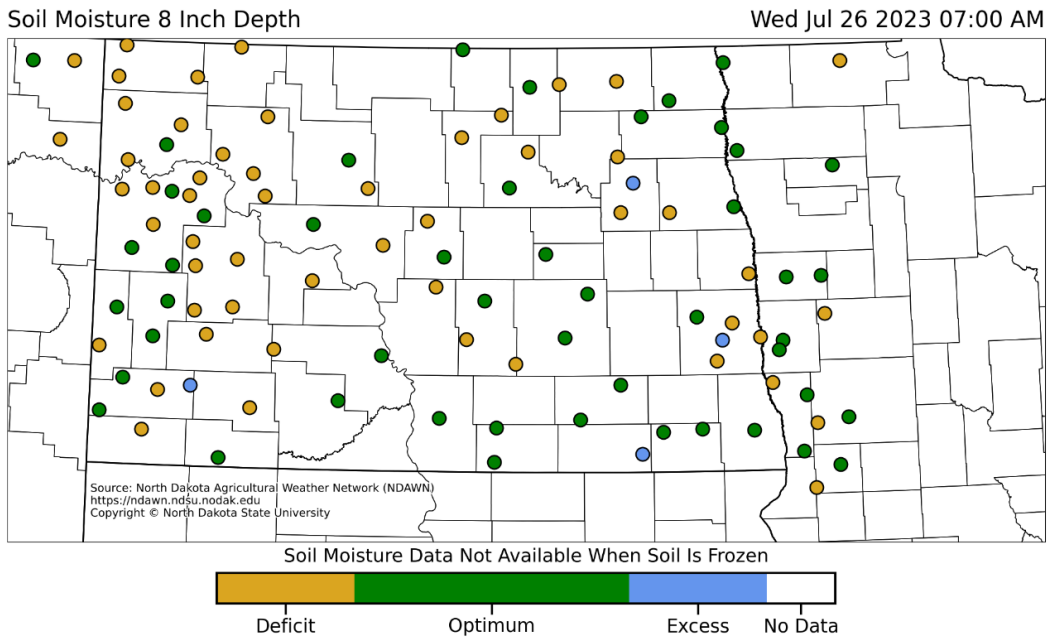
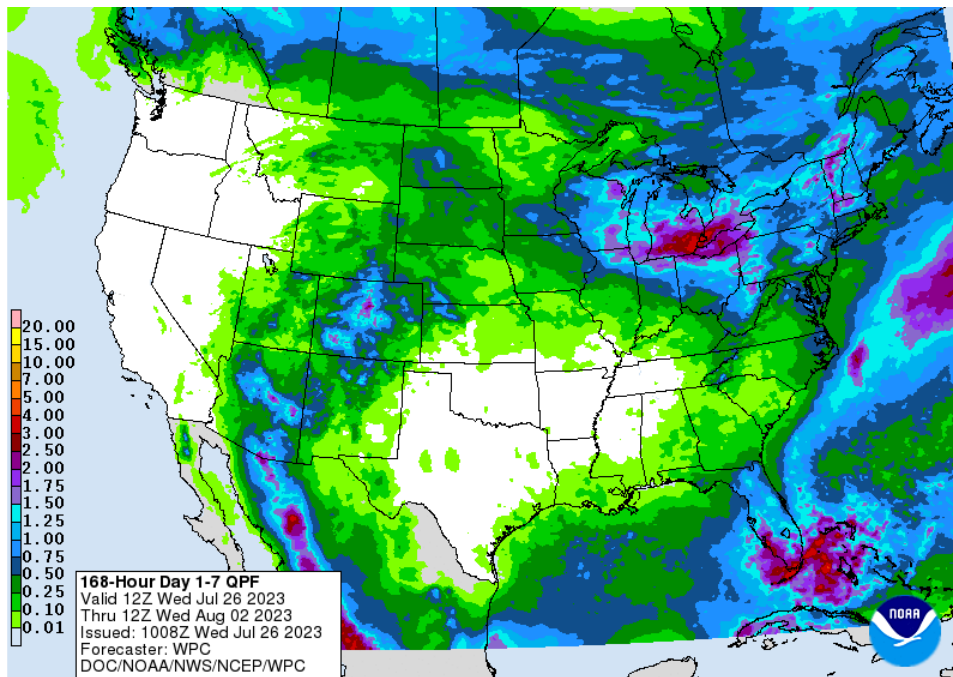


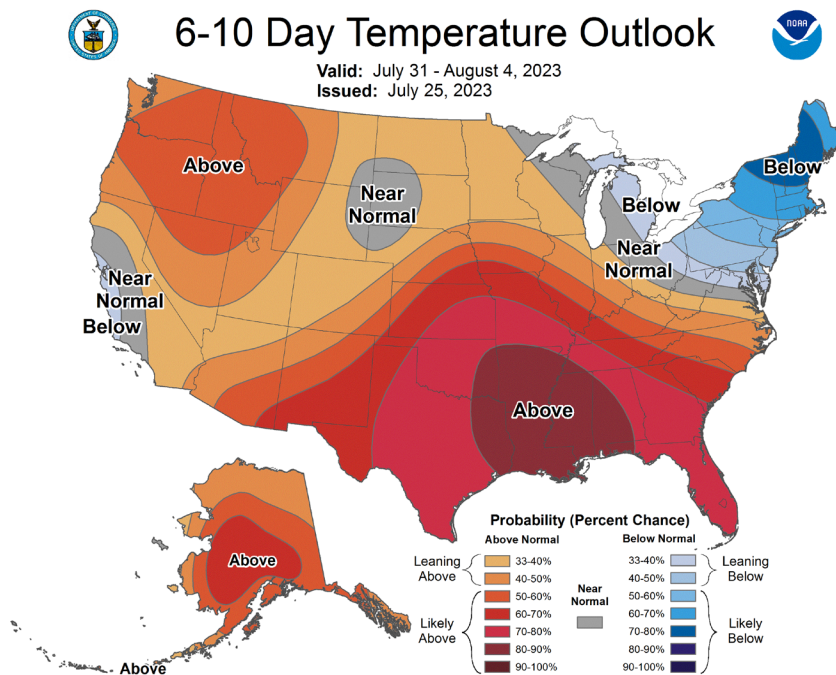
Figure 5. Soil moisture at the 8 inch depth as of 7:00 AM, July 26.

**The Week Ahead**

Looking at forecast models for the 7-day period beginning July 27, the high pressure ridge that brought us the heat this week will remain in place, but will flatten out somewhat and the upper level flow will turn more westerly. The result is that temperatures will be near normal. We're again on the northern boundary of the high pressure ridge, which will allow shortwaves to pass through and bring us precipitation chances through early next week. However, it doesn't appear that these systems will have much moisture to work with. That's reflected in the 7 day precipitation forecast (Figure 6). Looking ahead, the 6 to 10 day outlooks favor near normal temperatures and precipitation (Figures 7 and 8).

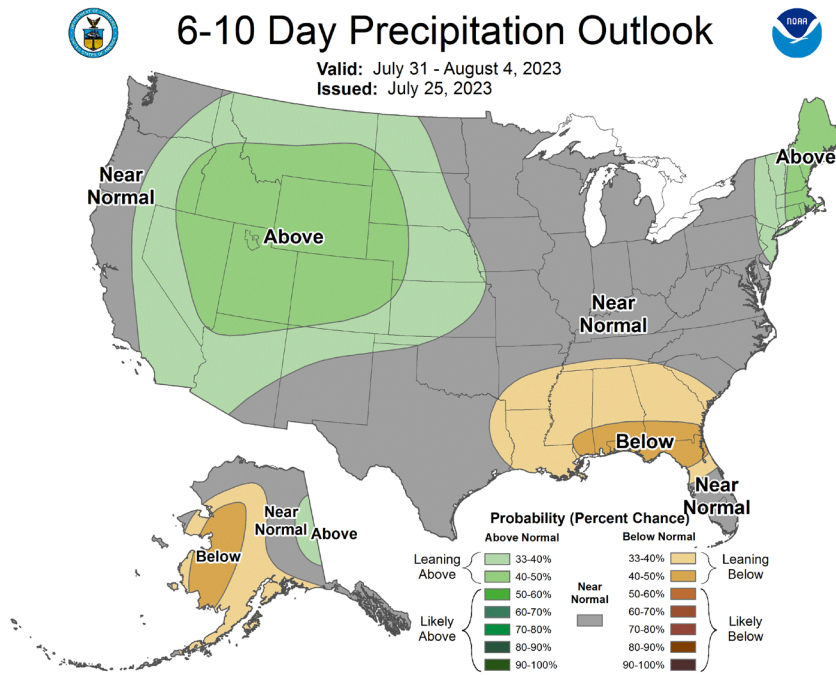


**Figure 6. Precipitation forecast for the continental US from 7:00 AM July 26 through 7:00 AM August 2.**



**Figure 7. Temperature outlook for the continental US and Alaska from July 31 through August 4.**





**Figure 8. Precipitation outlook for the continental US and Alaska from July 31 through August 4.**

[Patrick Beauzay](#)  
State IPM Coordinator  
Research Specialist, Extension Entomology

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