North Dakota State University
CROP & PEST REPORT

NDSU EXTENSION

No. 13 August 3, 2023

Inside this Issue...

entomology

CORN ROOTWORM BEETLES EMERGING

Corn rootworm beetles were trapped on yellow sticky cards during July 18-30 (Table 1). It is interesting to note that 78% of the beetles captured were western corn rootworm and 22% northern corn rootworm. Corn stages range from R1 (silk) to R2 (blister with clear liquid kernels). A total of two northern corn rootworms (1 at Gwinner, and one 1 at Mooreton) and 7 western corn rootworms at Sheldon were captured.

Western corn rootworm (Knodel) and northern corn rootworm beetle (V. Calles Torrez)

The economic threshold (E.T.) for yellow sticky cards is >14 beetles per trap per week. The northern and western corn rootworms are both counted on the traps. If you are above the E.T., this indicates that a high corn rootworm population is expected the following year in that field, and a corn rootworm management tool will likely be needed to protect the corn crop next spring.

Table 1. Adult corn rootworms (northern and western corn rootworms) per 4 traps per week in ND field corn, 2023

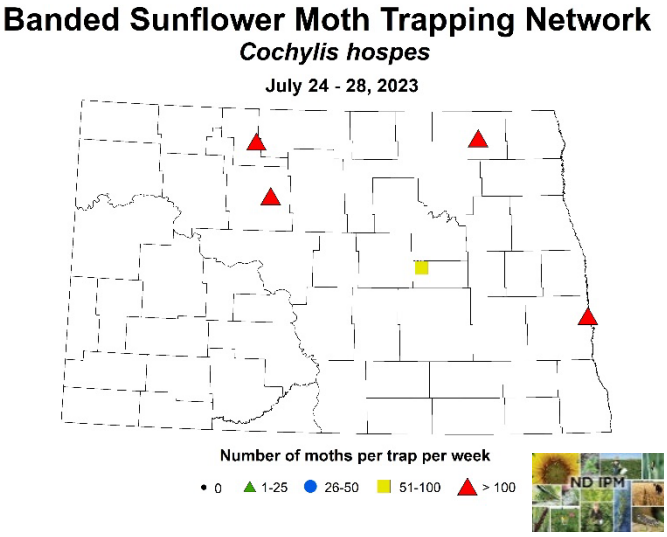
Area	County	Nearest town	July 17-24	July 25-31	Total Count
SE	Cass	Mapleton	0	0	0
SE	Barnes	Cuba	0	0	0
SE	Ransom	Sheldon	0	7	7
SE	Ransom	Shenford	0	0	0
SE	Sargent	Gwinner	0	1	1
SE	Richland	Mooreton	0	1	1
		Total corn rootworm =	**0**	**9**	9
		Percentage of NCR =	**0%**	**22%**	**22%**
		Percentage of WCR =	**0%**	**78%**	**78%**

Economic thresholds (ET) is 14 or more adults (individually or in combination) per sticky

***Asterisk indicates that particular corn field is at or above ET**

SUNFLOWER INSECT TRAP UPDATE

- ✓ **Banded sunflower moth trap counts** were similar to last weeks total count at 656 moths to 697 moths total this week, and were present at all trapping sites both weeks.
- ✓ **Arthuri sunflower moths** decreased from 86 moths total last week to 65 moths total this week, and were present at all trapping sites again this week.
- ✓ Only one **sunflower head moth** was trapped in Cavalier County.
- ✓ Crop stages at sunflower fields ranged from R1 to R4 for last week.



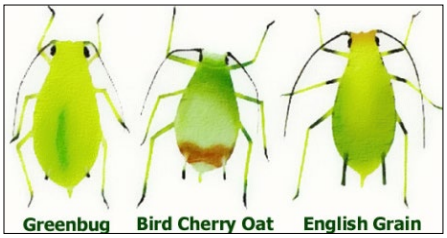
Scout sunflowers from R4 (bud open ray flower visible) through R5.7 (70% of florets flowering on face of sunflower head) for banded sunflower moth, Arthuri sunflower moth and red sunflower seed weevil.

CEREAL APHID SCOUTING

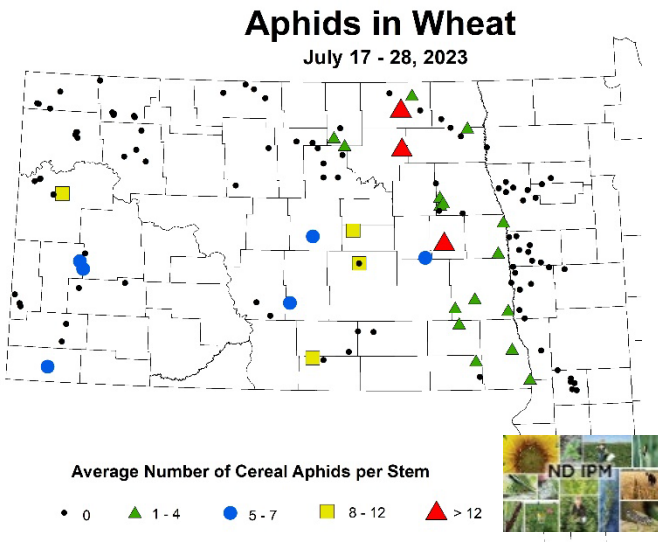
Cereal aphids are increasing in late-planted wheat and barley, and were observed in 31% of the 21 wheat fields scouted by the IPM Crop Scouts. About 23% of the wheat fields had economic populations of cereal aphids in Cavalier, Ramsey counties in the northeast, Eddy, Foster, Wells, Steele and Griggs counties in east central areas, Kidder and Macintosh County in south central areas, Billings, Bowman and Dunn counties in the southwest, and McKenzie County in the northwest area of North Dakota. Continue to scout fields up to the early dough stage of wheat.

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



Three species of cereal aphids that migrate into North Dakota include the English grain aphid, which is common on wheat heads, the bird cherry oat aphid found on undersides of leaves in the lower canopy, and occasionally the green bug aphid is found.



Most critical timing for cereal aphid densities and yield loss and seed weight is through the vegetative stage to the completion of heading. The risk of yield and seed weight loss is reduced as grain crops mature, and as a result the Economic Threshold numbers go up for cereal aphids (see yellow box). However, some yield loss will occur up to the early dough stage of wheat, if aphids are above 12 aphids per stem.

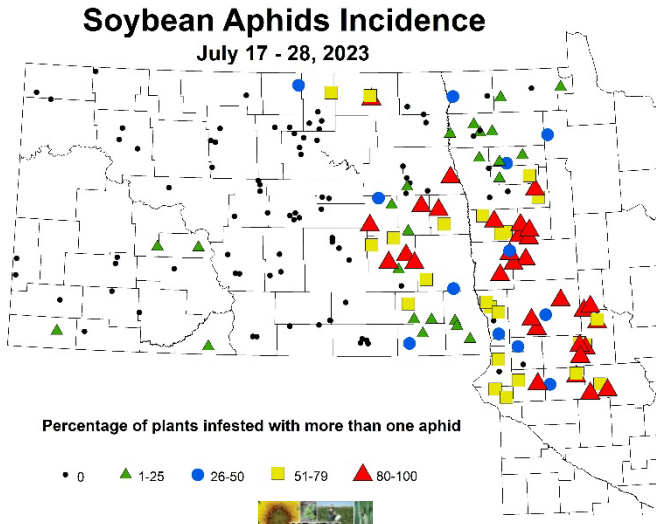
SOYBEAN APHIDS INCREASING

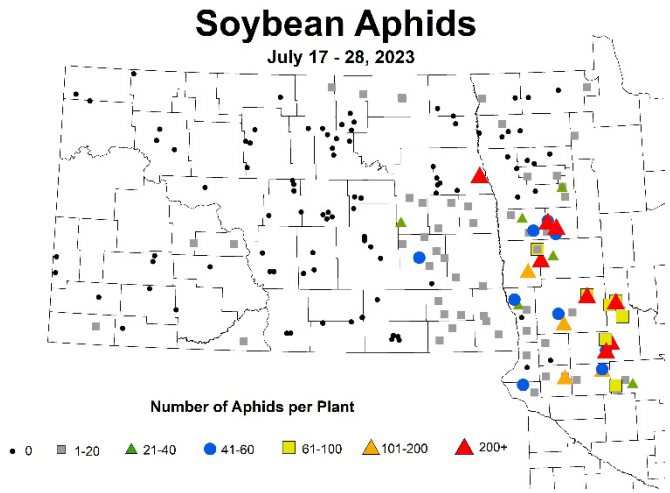
Soybean aphids are slowly increasing, from 22% of fields scouted by IPM Scouts positive for aphids last week to 40% of scouted fields with aphids this week. Soybean aphid incidence ranged from 0-100% and aphid densities of 0-300 aphids per plant in soybean fields located in eastern North Dakota. In Minnesota, higher incidence (0-100%) and numbers of aphids per plant (0-375 aphids per plant) are being recorded in 82% of fields scouted, an increase from 72% last week. About 33% of the soybean fields scouted were at the Economic Threshold in Minnesota. Please continue to send me your field reports for soybean aphid counts and locations.

The **critical growth stages** for making most soybean aphid treatment decisions in North Dakota is from the late vegetative to early reproductive stages (R3 – beginning pod). **Continue to scout for soybean aphid populations.**

Economic Threshold for Soybean Aphids

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





Janet J. Knodel
Extension Entomologist

SOYBEAN APHIDS - BEWARE OF PYRETHROID RESISTANCE

Soybean aphid populations continue to build in eastern ND and western MN, with some fields already at threshold. Fields not at threshold should be scouted frequently to monitor aphid population growth as well as the presence and level of additional pests, including grasshoppers, bean leaf beetles, foliage-feeding caterpillars, and spider mites. **The economic threshold for soybean aphids is 250 aphids per plant across 80% of the field with the population increasing.** The threshold is valid from vegetative through R5 growth stages.

Given the pyrethroid resistance that has been prevalent in soybean aphid populations in our eastern area, soybean producers need to consider carefully which products to use, especially if other pests are present in addition to soybean aphids. We're conducting soybean aphid insecticide trials at the Casselton AES this summer, and we want to share some insights with you. **Preliminary data suggest a low to moderate level of pyrethroid resistance in our trials.**

- ✓ All **pyrethroids** when used alone have shown anywhere from a 90% to 50% decrease in aphid numbers compared to the untreated check.
- ✓ Lambda-cyhalothrin has demonstrated the poorest control, followed by zeta-cypermethrin, bifenthrin, beta-cyfluthrin and esfenvalerate. In all pyrethroid treatments, aphid numbers began rebounding 7 days after application.
- ✓ Our **newer aphid-specific chemistries**, including afidopyropen (Sefina Inscalis), flupyradifurone (Sivanto Prime), and sulfoxaflor (Transform WG), are all performing very well, with very few aphids detected in any of these three treatments even at 10 days after application. Furthermore, these three chemistries, when used alone, have less negative impact on beneficial insects compared to pyrethroids or premixes containing pyrethroids. If soybean aphids are the only economic pest in your field, please consider using one of these three products alone.

Soybean aphids at Casselton Agronomy Farm (Patrick Beauzay)

- ✓ If you have grasshoppers, bean leaf beetles or foliage-feeding caterpillars in addition to soybean aphids, then you'll want to consider a premix. Premixes containing a **pyrethroid and either sulfoxaflor or afidopyropen** also are performing very well 10 days after application. Premixes containing a **pyrethroid and a neonicotinoid** also are performing very well against soybean aphids at 10 days after application. Alternatively, you can tank mix a pyrethroid with Transform WG, Sefina Inscalis, Sivanto Prime, or a labeled neonicotinoid (see table below), but be sure to check the labels of all products for mixing instructions and compatibility. It's always a good idea to do a compatibility test before tank mixing. **Keep in mind that pyrethroids (with the exception of bifenthrin at a high rate) and neonicotinoids can flare spider mites.** In this scenario, use a premix containing bifenthrin and an aphid-specific chemistry or make your own tank mix using bifenthrin and an aphid-specific product. The good news on spider mites is that they like it hot and dry, and our 6-10- and 8-14-day outlooks show temperatures to be below normal and precipitation slightly above normal. Hopefully this will suppress spider mite activity and we won't have to worry about it.

To help sort this all out, the table below contains a list of premix and single ingredient products, active ingredients, chemical groups, major soybean pests controlled, and notes on use.

Example Brand(s)	Active Ingredients	Chemical Group	Pests Controlled	Notes
Premixes				
Brigadier, Skyraider, Swagger	bifenthrin imidacloprid	pyrethroids neonicotinoids	Soybean aphids, BLB, grasshoppers, caterpillars, spider mites	Use high rate for spider mites
Endigo ZC	lambda-cyhalothrin thiamethoxam	pyrethroids neonicotinoids	Soybean aphids, BLB, grasshoppers, caterpillars	
Leverage 360	beta-cyfluthrin imidacloprid	pyrethroids neonicotinoids	Soybean aphids, BLB, grasshoppers, caterpillars	

Example Brand(s)	Active Ingredients	Chemical Group	Pests Controlled	Notes
Premixes (continued)				
Renestra	alpha-cypermethrin afidopyropen	pyrethroids pyropenes	Soybean aphids, BLB, grasshoppers, caterpillars	
Ridgeback	bifenthrin sulfoxaflor	pyrethroids sulfoxamines	Soybean aphids, BLB, grasshoppers, caterpillars, spider mites	Use high rate for spider mites
Single Chemistries for Soybean Aphids Only				
Admire Pro, others	imidacloprid	neonicotinoids	Soybean aphids	
Belay	clothianidin	neonicotinoids	Soybean aphids	
Sefina Inscalis	afidopyropen	pyropenes	Soybean aphids	
Sivanto Prime	flupyradifurone	butenolides	Soybean aphids	2ee reduced rate label (5 fl oz/acre)
Transform WG	sulfoxaflor	sulfoxamines	Soybean aphids	
Pyrethroids Only - SOYBEAN APHIDS MAY BE RESISTANT TO ONE OR MORE OF THESE CHEMISTRIES				
Asana XL	esfenvalerate	pyrethroids	BLB, grasshoppers, caterpillars	
Baythroid XL	beta-cyfluthrin	pyrethroids	BLB, grasshoppers, caterpillars	
Brigade, others	bifenthrin	pyrethroids	BLB, grasshoppers, caterpillars, spider mites	Use high rate for spider mites
Fastac CS	alpha-cypermethrin	pyrethroids	BLB, grasshoppers, caterpillars	
Hero	bifenthrin zeta-cypermethrin	pyrethroids	BLB, grasshoppers, caterpillars, spider mites	Use high rate for spider mites
Mustang Maxx	zeta-cypermethrin	pyrethroids	BLB, grasshoppers, caterpillars	
Warrior II, others	lambda-cyhalothrin	pyrethroids	BLB, grasshoppers, caterpillars	

For more information on managing pyrethroid resistant soybean aphids, please consult our multistate fact sheet *Management of Insecticide-resistant Soybean Aphids*. Our research and extension efforts are supported by the North Dakota Soybean Council, our industry partners and our soybean producers – we graciously "thank you."

Disclaimer: Insecticide are given as examples only and do not imply an endorsement of one product versus another nor discrimination against any product not mentioned by the authors or the university.

Patrick Beauzay
State IPM Coordinator
Research Specialist, Extension Entomology

Janet J. Knodel
Extension Entomologist

soils

SYMPTOMS OF N LOSS EVIDENT

Last fall, much N was applied in North Dakota and the region. This is not unusual, nor is it normally an issue due to soil freezing in November/December to a great depth, not thawing until late March to early April. However, last fall, the first big snowfall occurred before the soil was properly frozen, and unlike most years, it formed an icy sheath over the soil that lasted the entire winter. The icy sheath prevented soil blowing, but it also prevented soil freezing. While the region experienced the usual 20 below zero temperatures at times during the winter, the cold did not penetrate the icy sheath so the soil at the surface was frosty, but not frozen. I have worked at this position since 1994, and this is only the 2nd time I have seen soil not deeply frozen during the winter. The last time there were similar conditions was about 20 years ago, and I stopped east of Cooperstown because I needed some loam/sandy loam soil, and I knew the area had some. So, I stopped at a field in February, after a Griggs County meeting. I easily chopped through the icy sheath and dug a couple buckets of soil below it.

The guidelines for fall N application are: no N of any kind before October 1. After October 1, wait until the soil temp at 4 inches, taken between 6AM and 8AM, dips to 50 degrees, then risks are low to apply anhydrous ammonia. From that date, add 7 days to the low-risk date for banded urea (such as with a drill or air-seeder), then another 7 days to the low-risk date for broadcast urea. A 'low risk date' does not mean that nitrification stops at that point, just that the risk is relatively low.

This year, nitrification likely took place all winter, so that this spring there was little ammonium N remaining from the fall N application. In areas of fields with surface water having direct access to tile, nitrate likely leached or ran directly into the tile. In sandy areas with deep snow cover and subsequent melt, some nitrate leached deeper into the soil. In the Red River Valley in soils with high clay, I suspect there was a substantial amount of denitrification during the winter and on into spring.

The small grains are now mature or nearly mature, so the spring wheat/durum protein will be testament to any N loss from those fields. The effect on corn is hard to see after tasseling, but drones/aerial survey might capture some color differences. The effect of N loss on sugar beet, however, is easily seen. Low areas according to communications are most affected, probably because they have access to more water during melt/runoff events, resulting in leaching or denitrification. The growing season is now so far along that nothing can or should be done.

Does this mean that fall N application is a bad idea? I think not. Two years of issues over 28 total years does not represent a large risk compared to delaying N application until spring and fighting wet soil/delayed planting for most of the 28 years. The lesson is that in biology nothing is absolute or consistent, and after a winter like 2022-23, growers and their support people need to be more vigilant to spot potential problems and treat early if necessary and not assume all is well in Northern Plains-land.

Dave Franzen
Extension Soil Specialist
701-799-2565

around the state

AROUND THE STATE

NORTHEAST ND

Summary:
The hot and dry conditions are pushing the small grains towards maturity. While winter wheat is being harvested, spring wheat and barley are turning color. Moisture stress symptoms are becoming visible in many crops, with stunted plants, rolled leaves, and small heads. Variability in crop condition is evident in locations that caught rain or not, and in sandy vs clay soils. Sunflowers look the best among all the crops in terms of crop condition and drought tolerance. Disease pressure continues to be low on small grains. No reports of scab yet. However, barley yellow dwarf virus and ergot have been spotted in few fields. Several wheat and barley fields were loaded with aphids. Spraying is recommended for cereal aphids up to soft dough stage. Soybeans are entering into pod development stage where the plants are more susceptible to stress from moisture, insects and diseases. Soybean aphid populations reached economic threshold levels in many areas. Also, bacterial blight is showing up on the lower leaves of the canopy for which there is no rescue treatment. Field peas are at pod and seed development stages. Pea aphid infestations appear to be high this year, and farmers are spraying insecticides to manage their populations. Canola is finishing flowering, and pod set is well underway. Diamondback moths have been detected in some canola fields. Overall, both surface and subsurface moisture remain at a premium and good rains are still needed to carry crops through to a good harvest. The lack of rainfall is leading to poor pasture conditions.

Drought affected wheat field.
Photo: Bailey Reiser, Extension ANR Agent, Cavalier County

Cereal aphids in high numbers on a wheat head.
Photo: Bailey Reiser, Extension ANR Agent, Cavalier Countv

Barley Yellow Dwarf Virus in a barley field, Rolette County.
Photo: Anitha Chirumamilla, LREC

Bacterial blight in soybeans.
Photo: Anitha Chirumamilla, LREC

Soybean aphids at economic threshold in Grand Forks County.
Photo: Anitha Chirumamilla, LREC

Anitha Chirumamilla
Extension Cropping Systems Specialist
Langdon Research Extension Center

NORTHWEST ND

Northwest counties finally got the needed rain to break free from the dry and hot weather spell. Thunderstorms from July 29 to August 1 brought in more than one inch of rain in most of northwest ND. Williston received a total of 2.14 inches within the same time period, with 1.27 inches of it falling heavily with hail in less than half an hour last Tuesday evening. However, some areas didn't receive nearly as much. Rat Lake in Mountrail County only received 0.33 inches and Portal in Burke County only received only 0.09 inches in the same time period. In the past seven days, air temperatures have been cooler (daytime highs in the 80s and nighttime lows in the high 50s to low 60s), compared to the high 90s and even 100-degree dry weather early last week. Overall, the cooler summer weather pattern in the past few days coupled with the recent rain events was especially helpful for our crops that are still at late flowering, pod formation or pod fill, or kernel development stage such as in canola, sunflower, safflower, soybean, and corn.

Harvesting of winter wheat started last week, as well harvesting of field peas. Lentil and chickpea fields are starting to turn yellow. Canola fields are starting to change color as well, and in some instances, whole fields have already turned mature yellow. Flax at the Williston REC has already turned to a golden-brown color, but flax on the eastern side of Williams County that was planted much later is still at flowering stage. Soybeans are at R3 to R5. Sunflowers are mostly flowering. Harvesting of spring planted small grains like oats, barley, durum, and spring wheat is expected to start this week but could get delayed a few more days if forecasted rain events this week through the weekend hold true.

Mature winter wheat (left) and spring wheat at watery ripe stage (right) near Ray, ND (Williams County). Two and half feet tall wheat in the picture looks great, however in much drier areas of northwest ND, wheat has only grown to about a foot tall through maturity. Picture taken July 28.

Sunflower flowering at the R5.6 stage. Chemical pesticide applications to control insect pests in sunflower (i.e. red seed weevil, banded moth) have been observed and may become more frequent in the next days. Picture taken July 28 near Alamo, ND (Williams County).

Dryland (silage) corn severely damaged due to heat and drought stress and that failed to recover. Tassels were only half-way out then dried out. The long period of high heat with no rain (to allow recovery) in the previous weeks has permanently damaged some of our crops like this corn crop that's only at 2.5 to 4 ft tall. Picture taken July 28 near Arnegard, ND (McKenzie County).

Harvesting of field pea near Watford City, ND (McKenzie County). Harvesting of pea and small grains has picked up in the past week. At the NDSU Williston REC dryland farm, initial field pea yields so far have been in a wide range from 1,200 to 2,400 bushels.

Charlemagne "Charlie" Lim
Extension Cropping Systems Specialist
NDSU Williston Research Extension Center

weather

WEATHER FORECAST

The Week in Review

Average air temperature was near to slightly above normal across ND this past week (Figure 1) - we had hot days early and late in the week, and cool days sandwiched in between. Total rainfall for the week is depicted in Figure 2. Shortwaves riding along the northern boundary of the high pressure over the central and southern Great Plains brought us a few rounds of thunderstorms, with the heaviest precipitation mainly west of the Missouri River. Some storms were severe, with hail and strong winds being the main hazards. Hail reports were mostly in the range of 1 to 1.25 inches, and for the most part occurred in western ND with each round of storms last week. Despite the rounds of storms, much of ND was below normal for rainfall last week (Figure 3).

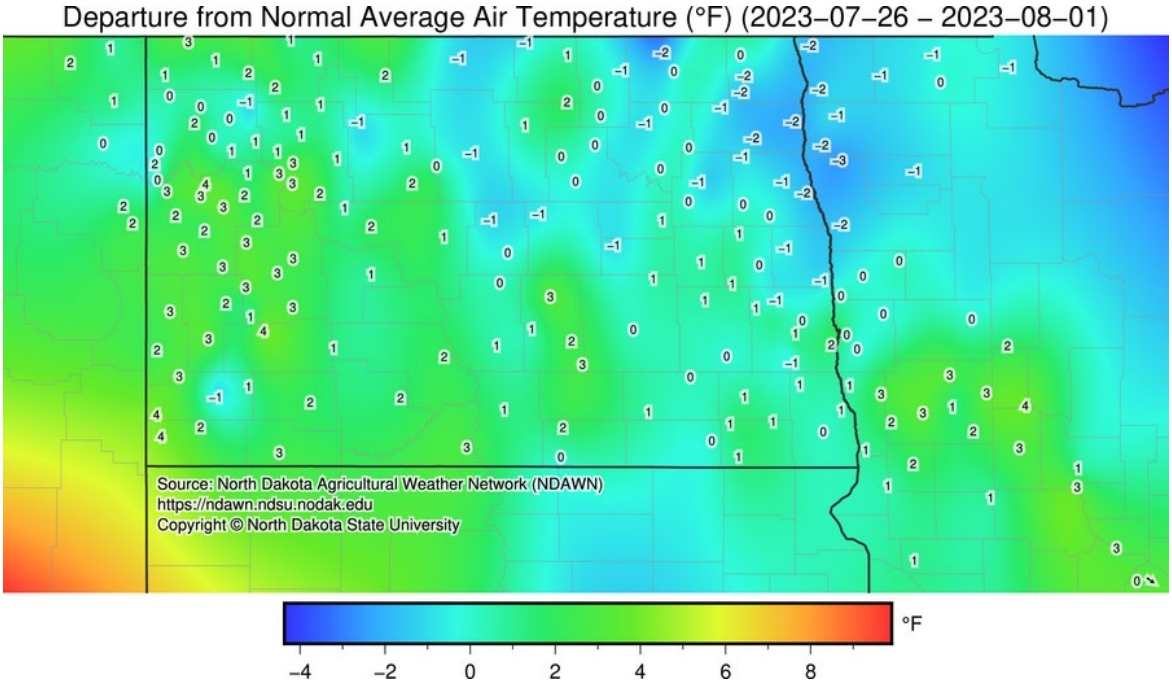


Figure 1. Average air temperature departure from normal from July 26 through August 1.

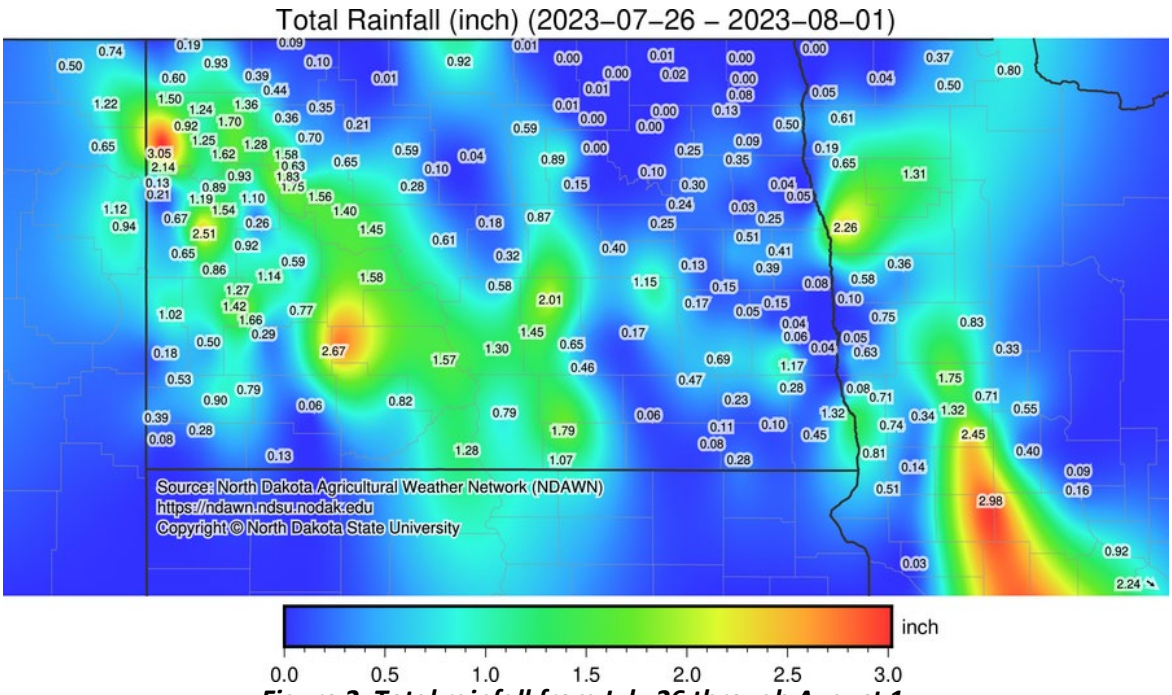


Figure 2. Total rainfall from July 26 through August 1.

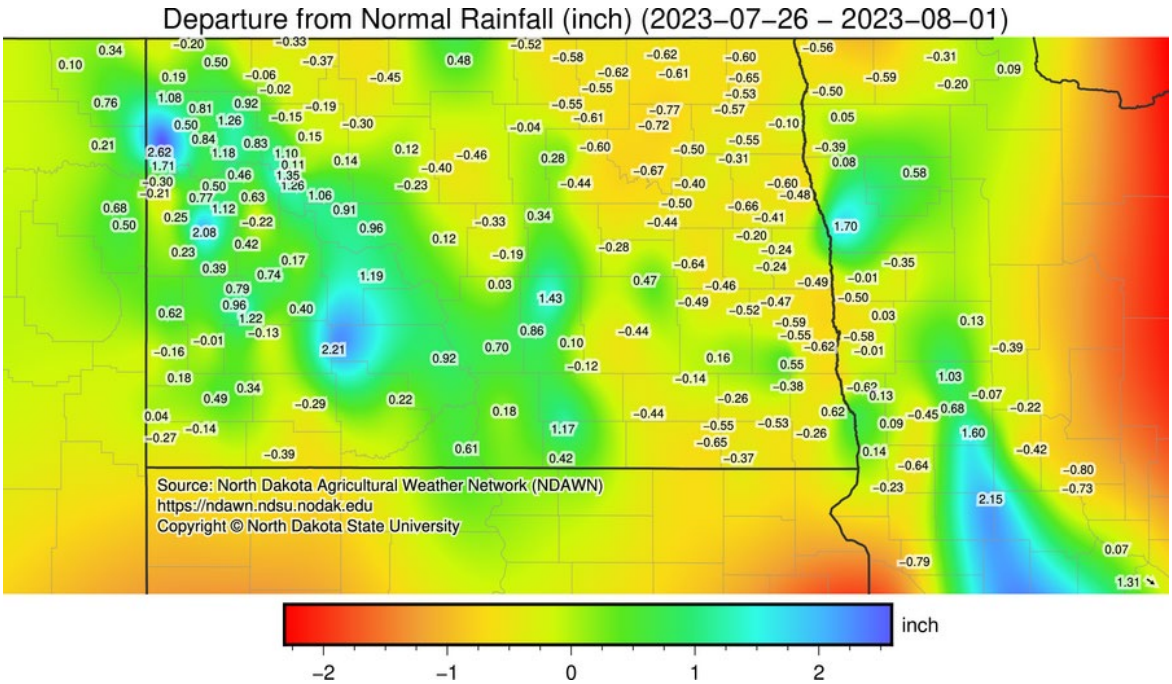


Figure 3. Rainfall departure from normal from July 26 through August 1.

Soil moisture remains deficient across much of ND except in areas that received ample rainfall last week (Figures 4 and 5). Keep in mind that soil moisture conditions at NDAWN stations may not reflect conditions at your individual locations. As I pointed out last week, many factors influence available soil moisture, including soil type and physical properties, crop, and canopy closure.

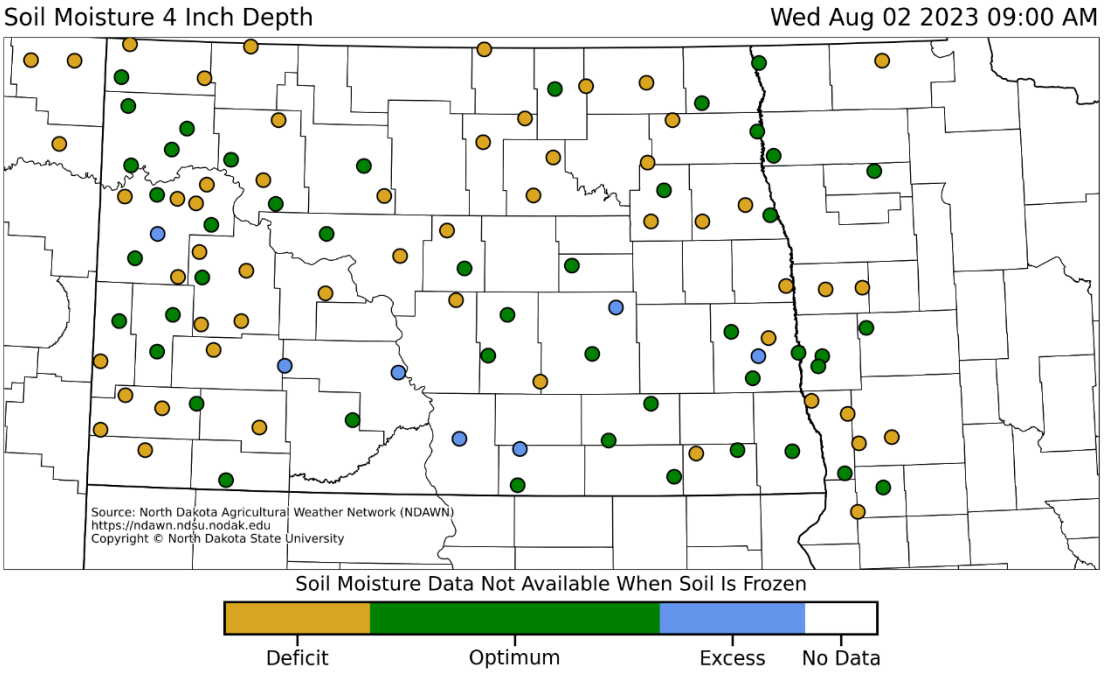


Figure 4. Soil moisture conditions at the 4-inch depth as of 9:00 AM on August 2.

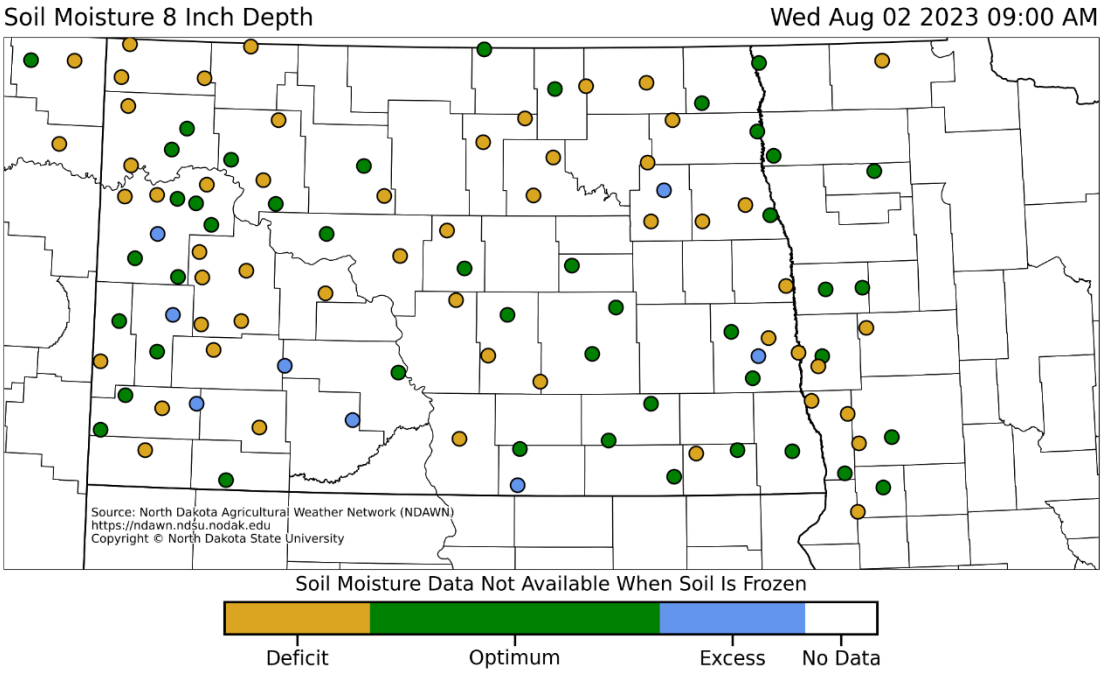


Figure 5. Soil moisture conditions at the 8-inch depth as of 9:00 AM on August 2.

Last week's drought monitor (Figure 6) showed a slight expansion of D1 (moderate) drought across northern ND. Other areas in the upper Midwest continue to suffer from severe (D2) to exceptional (D4) drought conditions. Be sure to check out the latest drought monitor which should be available Thursday, August 4.

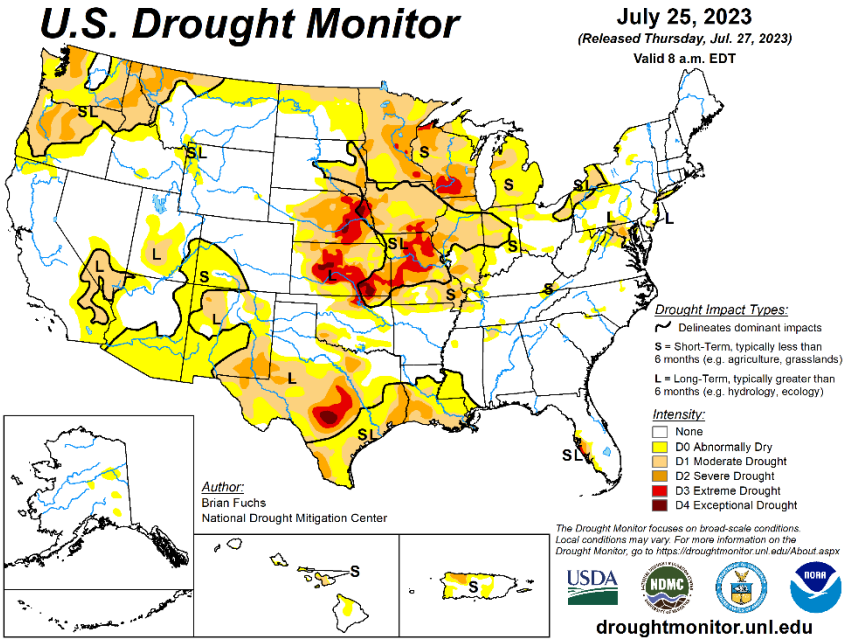


Figure 6. U.S. drought conditions as of July 25.

Crops that I've observed in eastern ND are progressing. Spring wheat and barley are maturing, corn is silking or in the early blister stage, and soybeans are mostly at R3 to R4. Growing degree days for all crops have trended slightly above normal for the season, given a May 1 planting date. For the most accurate degree day accumulations for your crops in your locations, please visit the main NDAWN website. Under 'Applications' from the menu, select your crop(s) GDD models, select the nearest NDAWN station, enter your planting date, and select any departure comparisons.

Outlook for the Week Ahead

We will continue to have a northwesterly flow aloft over ND, but it looks like a low-pressure system will move in late this week, which will bring at least a 50% chance of rain late week and through the weekend. There is disagreement right now as to the exact track of the system, but it looks like southeastern MT, southern ND, most of SD and into NE see the best chances of rainfall. The 7-day precipitation forecast is depicted in Figure 7. Severe weather is not anticipated, but an isolated severe storm or two can't be ruled out, with hail and strong wind gusts being the main hazards.
Temperatures will cool behind this system, with temperature in the 70s F. Looking ahead, the 6-10-day temperature and precipitation outlooks call for below normal temperatures and a slight chance for above normal precipitation (Figures 8 and 9).

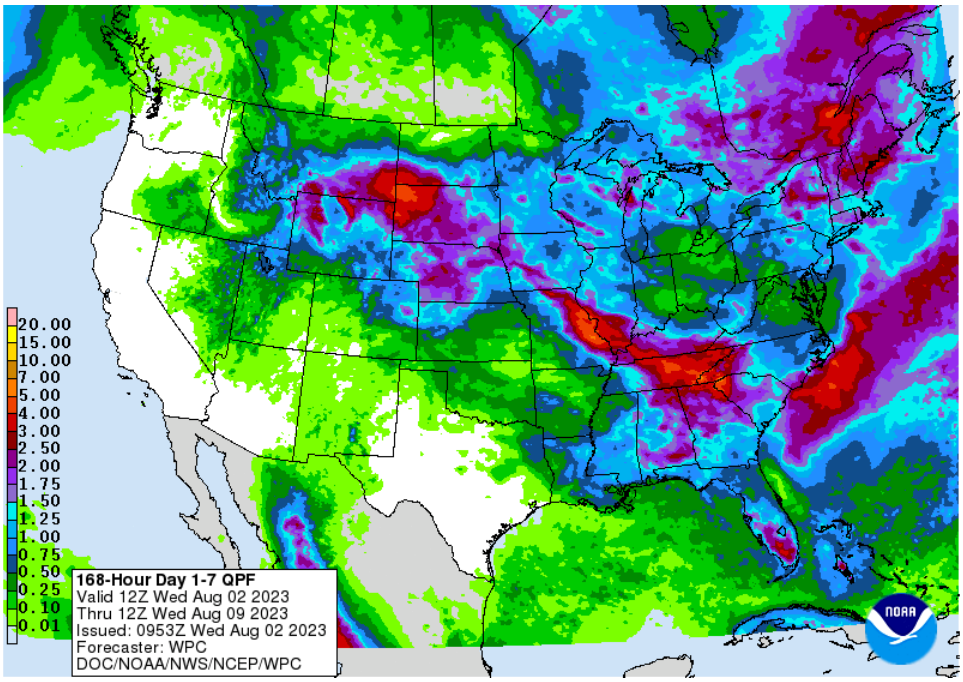


Figure 7. Precipitation potential from 7:00 AM August 2 through 7:00 AM August 9.

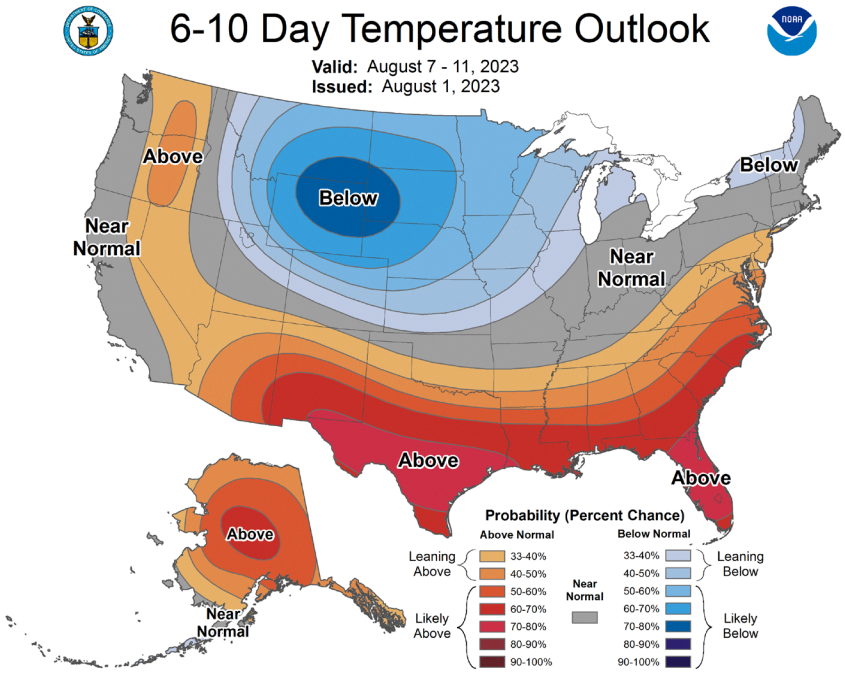


Figure 8. Temperature outlook for the continental U.S. and Alaska from August 7 through August 11.

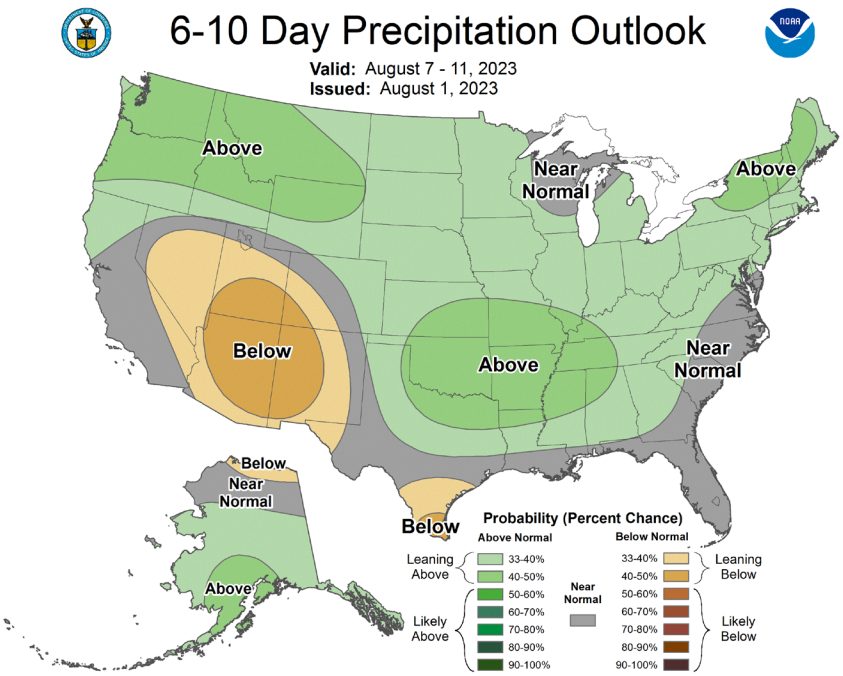


Figure 8. Precipitation outlook for the continental U.S. and Alaska from August 7 through August 11.

Patrick Beauzay
State IPM Coordinator
Research Specialist, Extension Entomology

North Dakota State University
CROP & PEST REPORT
NDSU Dept. 7660; PO Box 6050
Fargo, ND 58108-6050

Crop and Pest Report is on Facebook!
Ctrl + Click image below or go to www.facebook.com/ndsuextcpr to 'Like' us and receive notifications and other information.

Not on the List to receive this report?
Sign up now with your smart phone using the code to the right:

Janet Knodel
Co-Editor

Entomology
701-231-7915

Plant Sciences
701-231-7971

Soils
701-231-8881

Sam Markell
Marcia McMullen
Co-Editors

Plant Pathology
701-231-7056

Weeds
701-231-7972

Ag Engineering
701-231-7261

NDSU EXTENSION

EXTENDING KNOWLEDGE ❯❯ CHANGING LIVES

This publication will be made available in alternative formats for people with disabilities upon request (701) 231-7881.
This publication is supported in part by the National Institute of Food and Agriculture, Crop Protection and Pest Management - Extension Implementation Program, award number 2021-70006-35330.