North Dakota State University
CROP & PEST REPORT

NDSU EXTENSION

No. 09 June 19, 2025

Inside this Issue...

Field Day

REGISTER NOW FOR THE CROP MANAGEMENT FIELD SCHOOL

Time is running out to register for the 2025 Crop Management Field School at the Carrington Research Extension center on June 27, 2025! Agronomists, Extension personnel, and farmers are welcome to register and attend the annual Crop Management Field School. Registration starts at 8:30 AM with the program ending at 2:45 PM. The registration deadline is June 23, 2025, with a maximum of 50 participants, so register soon. You may register at the following link: ***www.tinyurl.com/payCREC*** **.**

Topics covered at the Crop Management Field School include Weed Identification by Alicia Harstad and Jeff Stachler, Herbicide Site of Action by Joe Ikley, Soybean Disease Management by Wade Webster, and Soil Health by Carlos Pires and Naeem Kalwar.

This is an amazing, long-standing hands-on training. Be sure to attend! If you have any questions, please contact Jeff Stachler at jeff.stacher@ndsu.edu.

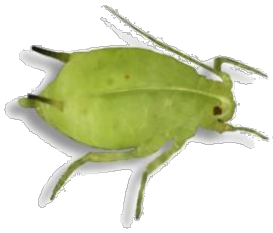
Jeff Stachler
NDSU Extension Cropping Systems Specialist at Carrington Research Extension Center

Entomology

IPM UPDATE FOR INSECT PESTS

The following insect pests were observed by the IPM Scouts this past week, June 9-13, in North Dakota.

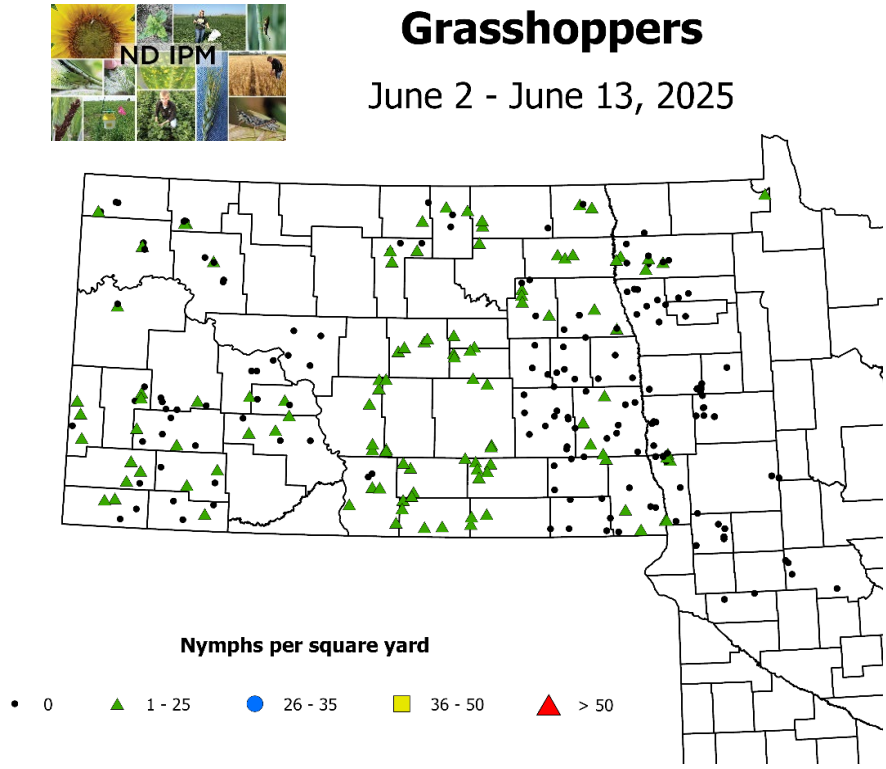
Wheat & Barley: Cereal aphids continue to be observed in wheat and barley. About 9% of the wheat fields scouted in North Dakota had cereal aphids present at an average of 0.02- 0.12 aphids per plant (well below the Economic Threshold of an average of 4 aphids per stem for vegetative through head emergence). Wheat stages ranged from Zadoks 11 (first leaf unfolded) to 33 (stem elongation and 3rd node detectable). Aphids were found in Pembina, Towner, Grand Forks, and Pierce counties. In barley, cereal aphids were only found in one field, Ransom County, at very low densities. See last week's Crop & Pest Report #8, June 12, 2025, for information on identification, scouting and thresholds.



Soybean: Soybean aphids were observed in only three fields (6%) in Barnes and Ransom counties at non-economic levels, with an incidence of 5-10% plant infested and an average of 0.05-0.7 aphids per plant. Soybeans were in the VC to V1-V4 crop stages. The **soybean aphid economic threshold is an average of 250 aphids per plant, 80% of the plants infested (incidence) and when populations are actively increasing in the field.** Areas with severe thunderstorms could kill aphids by washing and drowning the aphids off the plants.

Grasshoppers were observed in wheat, barley, and soybean fields in 29 counties throughout North Dakota. Grasshoppers were present in 46% of the fields scouted last week. The number of nymphs per square yard was low, 0.2-3.2 nymphs per square yard, well below the economic threshold.

Scout for nymphs (young grasshoppers without wings) in field margins. **Economic thresholds for nymph stage grasshoppers are 50-75 nymphs per square yard in the field edge and 30-45 nymphs per square yard in the field interior.** When population densities are high and hard to count, pest managers can use four 180-degree sweeps with a 15-inch sweep net, equivalent to the number of grasshoppers per square yard (adult or nymph).



SCOUT FOR DIAMONDBACK MOTH IN CANOLA

Several field reports of diamondback moth (adult) and young larvae were observed in canola fields from Fargo, Minot, Grand Forks and Crosby (Divide County) last week. This is the typical time when moths migrate into North Dakota.

The adult diamondback moth is a small gray moth about ½ inch long. Male moths have three diamond-shaped markings on the back of the forewing when the wings are folded together, hence the name diamondback moth. The newly hatched larva is light green and turns darker as it matures. Both ends of the larva are tapered, and the posterior end is forked. When the larvae are fully grown, they are about ½ inch long. When disturbed, larvae thrash backward violently and often drop from the plant, suspended on a strand of silk.

Diamondback moth on left (David Cappaert, bugwood.org) and larva on right (Russ Ottens, University of Georgia, bugwood.org)

Start scouting regularly to see if larvae are present and populations are near economic thresholds. Diamondback moth larvae can be monitored in the field by pulling all plants from a 1-square-foot area. Beat collected plants onto a clean surface or into a white bucket, then count the number of larvae dislodged from the plants. Larvae often will dangle from canola plants on a silk thread. Repeat this procedure in at least five locations in the field to obtain an average number of larvae per square foot.

Economic Threshold (E.T.) for DBM larvae

- Early flowering stage - 10 to 15 larvae per square foot (or one to two larvae per plant).
- Pod stage - 20 to 30 larvae per square foot (or two to three larvae per plant).

Canola is most susceptible to larval feeding from the second generation (July) injury during the flowering and pod stages. However, I have seen severe feeding injury to young canola in the seedling to 4-6 leaf stage (although not as common).

You can also monitor for the adult moths using a commercial pheromone trap and lure from pheromone supply companies. Field scouting for larvae is encouraged if you capture more than 100 moths per trap per week. We are running a canola insect trapping network with our IPM Crop Survey Program. We are just getting started with canola insect trapping, but the trapping results will be posted weekly on the IPM website

Pheromone trap for monitoring diamondback moth (J. Knodel, NDSU)

(https://www.ndsu.edu/agriculture/ag-hub/ag-topics/crop-production/diseases-insects-and-weeds/integrated-pest-management**).**
Weather can dramatically impact larval populations, drowning them out during storms and increasing the risk of fungal diseases. Biological control, such as parasitoids, can negatively impact diamondback moth survival.

If farmers need to treat Lepidoptera larvae (moths or butterflies) like diamondback moth, Vantacor is a newer mode of action, IRAC Group 22, Diamide. We tested it at the high labeled rate of 2.5 fl oz/acre, and it provided good to excellent control of the larval stage of diamondback moth. It also had a long residual of about 30 days. Diamondback moths can migrate into North Dakota with pyrethroid resistance from the southern states, so you don't know if they will have pyrethroid resistance when they arrive. I have previously observed suspected pyrethroid resistance in DBM in northeastern North Dakota canola fields.

For insecticides registered for diamondback moth management in North Dakota, please consult the ***2025 North Dakota Field Crop Insect Management Guide E1143-25***.

Thanks to the support from the Northern Canola Growers Association and the USDA NIFA, Crop Protection and Pest Management - Extension Implementation Program, award number 2024-70006-43752.

Disclaimer: Insecticides are given as examples only and do not imply endorsement of one product nor discrimination against any product not mentioned by the author or the university.

Janet J. Knodel
Extension Entomologist

plant pathology

FUSARIUM HEAD BLIGHT (SCAB) RISK

There are reports of spring wheat starting to poke awns, and now is a good time to start checking scab risk in your fields. There are two forecasting models that can be used to estimate scab risk. One is the NDSU Small Grain Disease Forecasting Model and the other is the US Wheat and Barley Scab Initiative Fusarium Risk Tool . Both use weather factors to estimate scab risk in varieties varying in susceptibility. Right now, the greatest scab risk is for susceptible varieties that are fully headed and flowering in southeast North Dakota (Figures 1 and 2). The risk for moderately resistant varieties is low across the state. After this week's rain events and several days with higher humidity, I am expecting scab risk to increase in the next 7 to 10 days for several areas in ND.

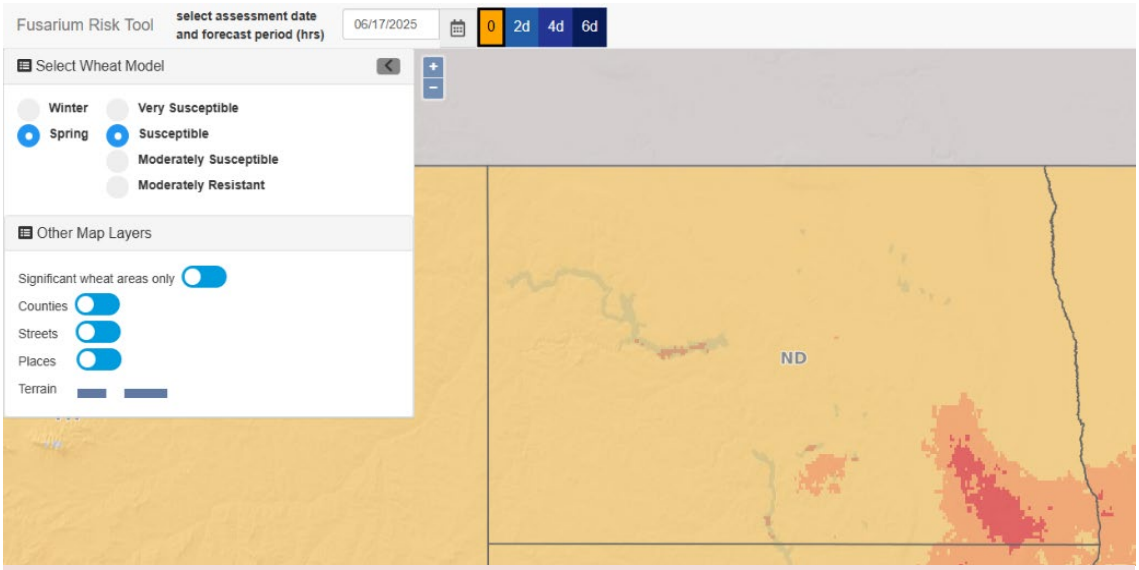


Figure 1. Scab risk for susceptible varieties on June 16 according to the USWBSI Fusarium Risk Tool. Red means high risk; orange means moderate risk and yellow means low risk.

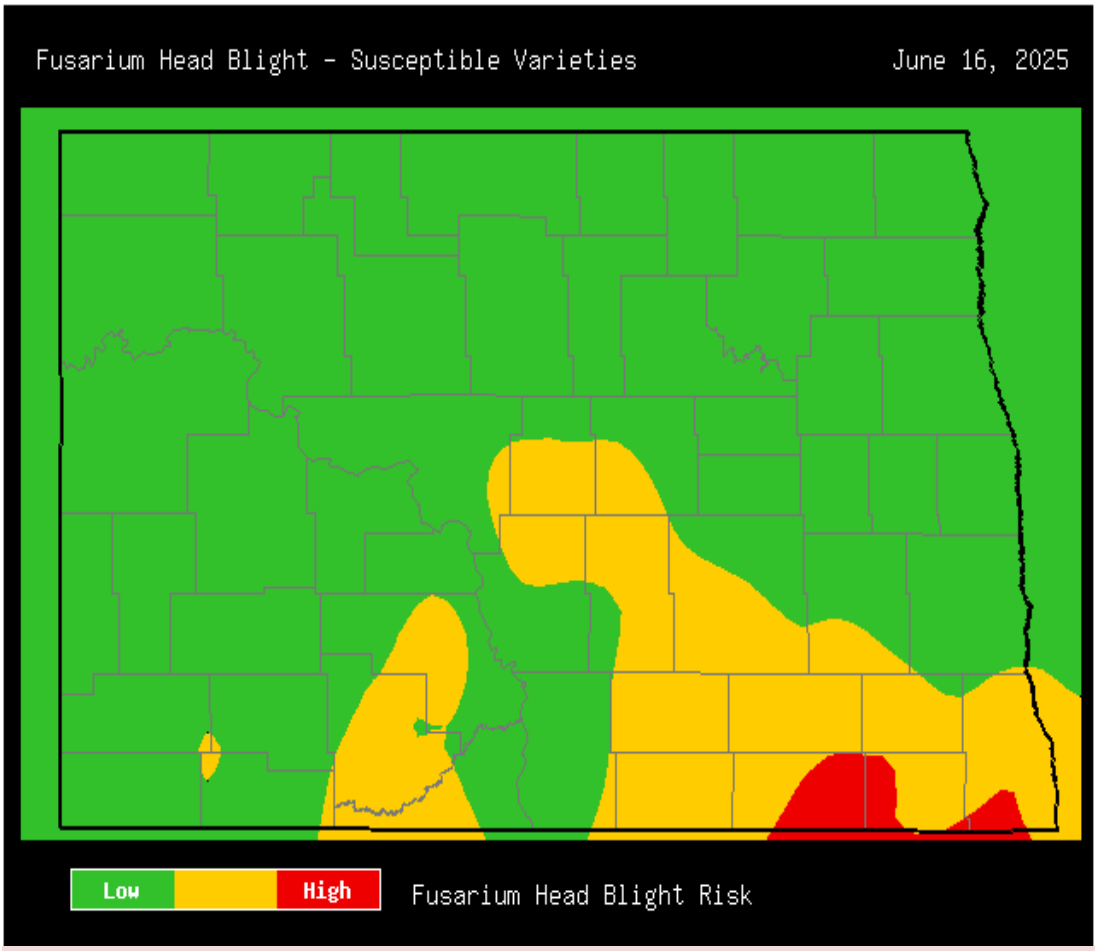


Figure 2. Scab risk for susceptible varieties on June 16 according to the NDSU Small Grain Disease Forecasting Tool. Red means high risk; yellow means moderate risk and green means low risk.

LEAF DISEASE UPDATE AND FLAG LEAF FUNGICIDE DECISIONS

The precipitation (for most areas in the state), cool temperatures, and favorable dew periods at night have provided favorable wheat growing conditions. However, the frequent moisture has also increased the number of questions pertaining to leaf disease risk. Each field situation is different, but understanding the disease triangle (environment, pathogen, and host) can help estimate risk in a field.

Although the conditions have been favorable for leaf diseases, remember, this is only one side of the disease triangle. You will still need to have the pathogen present and a susceptible host. On the pathogen side, residue-borne pathogens that cause tan spot and Stagonospora nodorum blotch (SNB) are going to be most common in no-till, wheat-on-wheat production systems. Tillage and/or planting wheat after a broadleaf significantly inhibits fungal leaf spot development in a field. Wheat rust pathogens overwinter in the southern USA and are dependent on southerly winds to carry spores north. The furthest north report of a wheat rust this year is in northeast Nebraska. Understanding the level of susceptibility in a variety is equally important. Most of the commonly grown hard red spring wheat varieties have average to above-average resistance to fungal leaf spots. For the three wheat rust diseases, review the scores listed in the North Dakota Hard Red Spring Wheat Variety Trial Results and Selection Guide. Another tool that can be used to determine leaf disease risk in wheat is the Small Grain Disease Forecasting Model. *Remember, this tool is only applicable after the disease has been detected in a field*.

Small Grain Disease Forecasting Model

| Share |

The NDSU Small Grains Disease Forecasting Model assists producers in estimating the possibility of disease in their crops and gives recommendations as to possible preventative applications and times for these applications. This is done in conjunction with NDAWN weather station locations within North Dakota and sections of western Minnesota and eastern Montana.

As easy as 1-2-3

NDAWN Center
North Dakota Agricultural Weather Network

1. **Click on the NDAWN station location nearest you**
   - see NDAWN Home Page for a station location map
2. **Click the button representing the growth stage of your crop**
   - see the growth stage information for explanations of growth stages
   - click on the small image to see a larger image
   - select the **Flowering** growth stage to access the scab forecast
   - or see NDAWN's estimated growth stage for your crop based on planting date.
3. **Click "Get Forecast".**

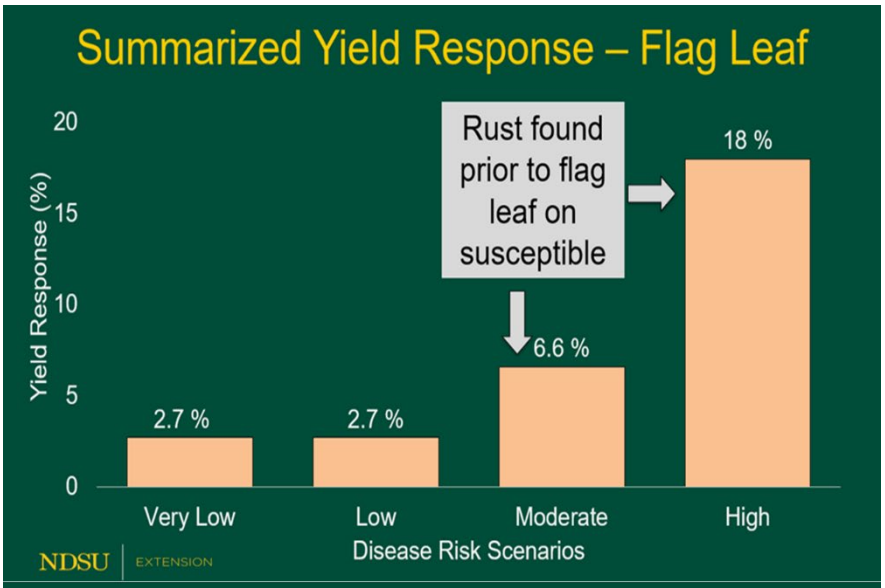
Leaf Disease Reports from the Fields:

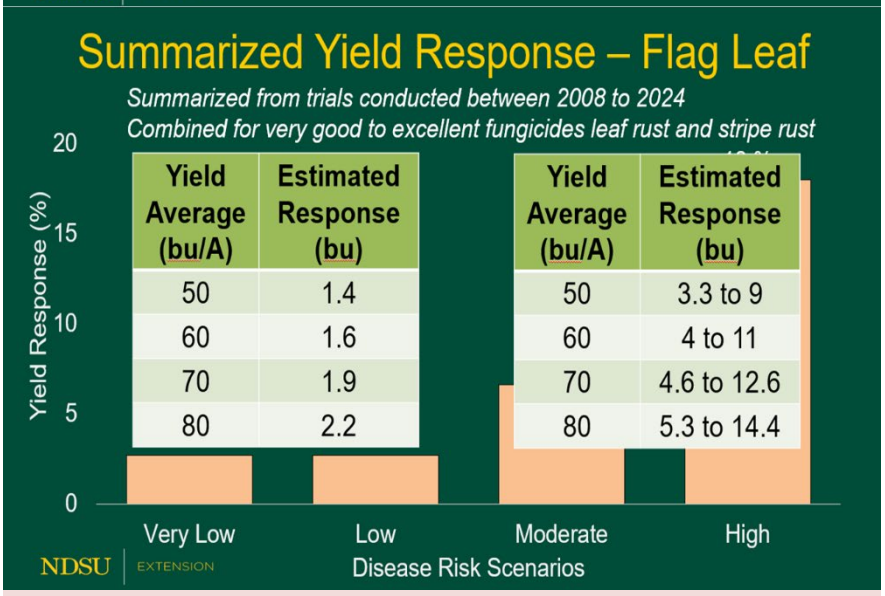
Reports of tan spot and SNB remain low across North Dakota. Most of the texts and emails I have received are images of abiotic leaf spots. For help with fungal leaf spot identification, please review the virtual tour pertaining to Identifying Wheat Diseases in North Dakota and Extension publication Fungal Leaf Spot Diseases of Wheat.

None of the wheat rusts have been reported in ND in 2025. I will continue to share updates as wheat rusts are tracked along the Great Plains. One disease that may start to appear in the earliest planted wheat is bacterial leaf streak. This seed-borne disease is favored by thunderstorms, plant injury, and high humidity, especially when the flag leaf is exposed.

Flag Leaf Fungicide Decisions

Disease identification and evaluating disease risk are needed to gauge the value of a flag leaf fungicide. In our field research trials, the yield response of a flag leaf fungicide is largely driven by rust epidemics. Similar to a data set that was presented on tillering fungicides a few weeks ago, I calculated yield responses from flag leaf fungicides rated good to excellent on rust diseases in trials conducted between 2008 to 2024 (Figure 1). Four disease risk categories were created and were mainly categorized according to the susceptibility of a variety and when rust was detected in the plots. In the very low and low disease risk categories, a rust resistant variety was used, and fungal leaf spots were either not detected or were detected after the flowering growth stage in the lower canopy. The moderate to high disease risk scenarios had a susceptible rust variety, and rust was detected prior to the flag leaf growth stage. The yield response from a flag leaf fungicide for very low and low disease risk situations was 2.7%. A yield response of 6.6% was observed in moderate disease risk scenarios, and 18% for high disease risk scenarios.





Yield Average (bu/A)	Estimated Response (bu)
50	1.4
60	1.6
70	1.9
80	2.2

Yield Average (bu/A)	Estimated Response (bu)
50	3.3 to 9
60	4 to 11
70	4.6 to 12.6
80	5.3 to 14.4

Figure 1: Provides the yield response values and the estimated bushel response (based on yield expectations) from a flag leaf fungicide rated good to excellent on stripe rust and leaf rust.

Andrew Friskop
Extension Plant Pathology, Cereal Crops

NORTH DAKOTA SOYBEAN SCN SAMPLING PROGRAM

If you are a long-time reader of the Crop and Pest Report, you probably have heard of the dreadful Soybean Cyst Nematode, commonly referred to as SCN. And if you are a new reader of the Crop and Pest Report, then let me fill you in quickly. SCN are small, microscopic worms that cause infection in soybeans, and to a lesser degree dry beans, and then begin robbing yield throughout the entire growing season. Across North Dakota, SCN on soybeans has been estimated to cause annual losses of approximately 7.6 million bushels each year since 2020. This equates to roughly a $14.01 loss per acre of soybeans planted in the state. There are many reasons why SCN has established so successfully across North Dakota, but unfortunately, it is here to stay.

One of the first lines of defense against this pest is understanding if SCN is present in your fields and, if so, at what levels are they at. Once established, SCN is incredibly difficult to reduce in severity, so remaining proactive is a valuable strategy.

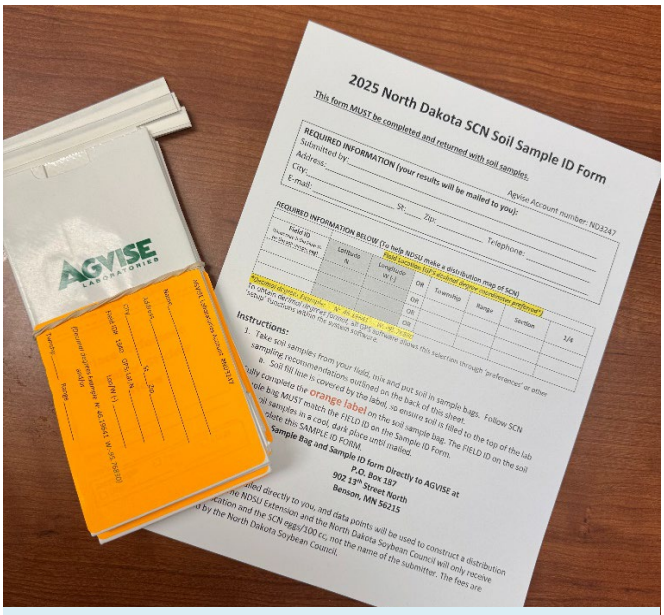


Figure 1. SCN sampling bags and submission form for the 2025 growing season. This year, our sample bags have an ORANGE label.

Since 2013, NDSU Extension has been working in partnership with the North Dakota Soybean Council to provide free SCN sampling bags to North Dakota farmers. During this time, SCN has been identified in 24 counties across the state, with the greatest levels being found in the Red River Valley. However, SCN have also been identified in Western North Dakota in isolated fields. Recently, SCN sample bags have been sent out across the state to North Dakota Extension offices. We are only able to support the first 1,000 samples that are submitted, so if you are a North Dakota farmer, get ahold of your local Extension agent to get your bags while you still can. It is important to note that each year, we need to replace all SCN sample bags, so if you happen to have any sample bags from previous years, please make sure to get the newest bags for submission. In 2025, we will be using orange labels on the sample bags.
Sampling for SCN should be held off until the fall, around harvest for when SCN populations are the highest, and you can get the most representative evaluation of what levels are in your field. For further information, please check out more information on SCN sampling here. I will be providing more updates throughout the season, so please stay tuned.

Wade Webster
Extension Plant Pathology, Soybeans

PROACTIVE IN-SEASON MANAGEMENT FOR CLS IN SUGARBEET

The second half of June has brought warm weather, some rain, and we should have rapid growth in sugarbeet fields as plants approach row closure. This is a critical time to manage pests of all kinds—weeds, insects, and diseases. Successful sugarbeet production in North Dakota and Minnesota requires a comprehensive plan to manage Cercospora leaf spot. Carefully timed and planned fungicide applications are crucial to manage the disease in-season, regardless of any genetic tolerance in varieties planted this year. The NDAWN Sugarbeet Cercospora Daily Infection Value (DIV) tool begins calculations in mid-June, and already indicates high risk in areas that received multiple inches of rain over the last several days (Figure 1). As soon as row closure occurs, disease symptoms are likely to develop. Therefore, it is crucial to begin CLS fungicide programs at or prior to row closure.

In general, 2024 experienced increased CLS pressure in CR+ sugarbeet varieties, due to a combination of favorable environments for disease and adaptation of the fungus, *Cercospora beticola*, population to CR+ varieties. The implications for this year are three-fold: **1) CLS inoculum levels (airborne spores) are already high.** This year, Dr. Gary Secor's program detected airborne CLS spores as early as April 4th; **2) CR+ genetics must be complemented by robust fungicide programs.** Valley-wide surveys and NDSU CLS trials point to increased economic returns from these late-June applications; **3) In areas experiencing extended heat and moisture, CLS pressure will be high again.** As soon as conditions support CLS infection, epidemic risk is greatly increased. For more information on pathogen surveys, trial results, and Extension resources, please visit the Sugarbeet Research and Education Board of MN and ND website, www.sbreb.org).

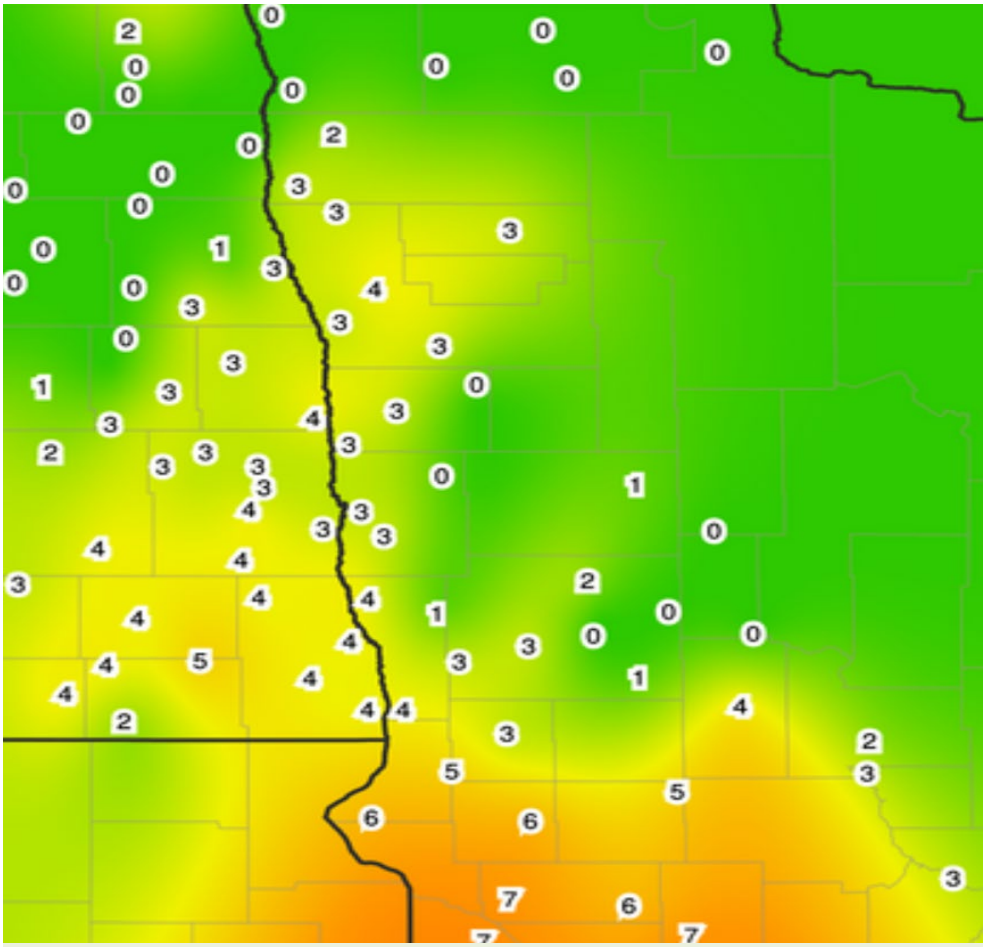


Figure 1. Red and orange areas indicate high risk based on temperature and humidity, as illustrated by NDAWN. After a series of close-spaced rain events, 2-day CLS risk is high in southern Minnesota. This emphasizes the need for preventative fungicide programs. Under these high-risk conditions, disease development is likely as soon as row closure occurs.

Fungicide program strategies

Effective fungicide programs for CLS in sugarbeet make use of three management principles, outlined below (Table 1).

Table 1. Overview of strategies for proactive Cercospora leaf spot management in sugarbeet

FRAC group rotation	Mode of action or FRAC group rotation reduces the risk of fungicide resistance development • Especially important for single-site products (DMI, QoI, thiophanate-methyl) • Rotation between a DMI/triazole and tin/TPTH as the "heavy hitters" in the program • EBDC (mancozeb) alone is also acceptable
Tank mixing	Each application must include an effective tank-mix partner to reduce the risk of fungicide resistance • EBDC/mancozeb is commonly used (up to 7 applications per season) • Thiophanate-methyl/Topsin can be mixed with tin • Copper is a good option when short pre-harvest intervals are needed. • Full rates of each tank mix component are recommended • SDHIs (FRAC 7) or azoxystrobin is not recommended as a tank mix partner unless EBDC/mancozeb is also included.
Maintaining 10-14 day intervals between applications	10-14 day intervals line up with typical growth/spore production cycles of Cercospora leaf spot • High heat (75°F or more) and moisture (rain or dew) increase disease risk; shorter intervals may be necessary. • Rainfall may wash off contact fungicides, such as tin or EBDC, indicating shorter than usual spray intervals. • Longer intervals allow pathogen populations more opportunity to adapt to genetic CLS-tolerance or develop fungicide resistance.

A note about "complex mixtures":
The other topic of interest for sugarbeet at this time is whether or not to combine multiple herbicides and adjuvants, fungicides, or insecticides in order to reduce application time and costs. While this can be safe for sugarbeet in many cases, one of the big concerns is efficacy. Droplet size, gallons per acre, adjuvant choice, and other factors may vary depending on the target. Complex mixtures are therefore not recommended, but data is sparse in this area. NDSU Extension sugarbeet projects have a number of experiments underway in the 2025 season.

Eric Branch
Extension Plant Pathology, Sugarbeets

plant science

KERNZACON 2025 A SUCCESS

Over 80 researchers, graduate students, non-profit staff, and food entrepreneurs gathered in Fargo last week for KernzaCON, a unique conference focused on the novel perennial small grain called Kernza®. Kernza has been bred as the first commercially available perennial grain crop, derived from intermediate wheatgrass (*Thinopyrum intermedium*). Kernza® is a cool-season, perennial grass with a deep and fibrous root system. The breeding program at The Land Institute in Salina, Kansas has been intensively selecting for grain-type traits for the past 15 years. Compared to old forage-type intermediate wheatgrass lines, recent Kernza® lines yield significantly more seed per unit area, exhibit larger seeds, and are shorter to resist lodging and facilitate harvest. Depending on the environment, most stands of Kernza can be planted once and yield harvestable grain for two or three years, and possibly a fourth year in more semi-arid regions.

Attendees heard from UMN food scientist Dr. George Annor who has been working to characterize this new grain and experimenting with recipes that highlight Kernza's nutty flavor, golden color, and nutritional characteristics. Kernza® is a high protein grain with levels often reaching 18% but weak gluten-forming properties. Because of its weak gluten-forming protein, blending Kernza® flour with wheat flour can help enhance the nutrition and flavor of baked goods while maintaining the texture and volume desired in the finished product. Several commercial pancake and muffin mixes are now available from companies like Kodiak, Sturdiwheat, and Perennial Pantry.

Photo 1. Kernza seed head up-close (credit: Clair Keene)

On the agronomic side of things, attendees visited the companion cropping plots of Taonga Msimuko, a Master's student working with Dr. Clair Keene. In this project, Kernza is spring-seeded with either spring wheat, barley, or oat to determine if establishing it with an annual grain crop can help improve profitability during the establishment year. Because Kernza has to vernalize (go through the winter, like winter wheat and cereal rye) before setting seed, spring planting will not result in grain yield in the first season. Planting Kernza with an annual small grain may help off-set the cost of establishment.

KernzaCON attendees also learned about NDSU Agriculture and toured the new Peltier Complex. They met with Northern Crops Institute and Plant Sciences staff to learn about the food product development and wheat quality testing programs housed in the new building. Participants were especially interested in the various flour mills available for research use and the equipment NCI has available to test pasta recipes and create plant-based milk products.

Photo 2. Graduate student Taonga Msimuko discusses his research investigating the feasibility of establishing Kernza with annual small grains spring wheat, barley, and oat at his Fargo plots. (credit: Clair Keene)

Photo 3. Dr. Shahid Islam explains the sensory test kitchen in the new Peltier Complex. (credit: Clair Keene

Clair Keene
Extension Agronomist Small Grains and Corn

LET'S CHECK SOME NODULES!

Soybean planting this year has occurred over a wide range of dates. For those who managed to plant early, many fields are now seeing soybeans at the two to three trifoliate growth stages.
This is a key time to scout your fields for root nodulation.

Why Now?

As soybeans develop, nodules begin forming as early as the unifoliate stage (Figure 1) and typically peak during reproductive growth. Early nodulation is crucial for providing the plant with sufficient nitrogen through biological fixation. Inspecting your roots now can help assess whether inoculation was successful or if intervention may be needed.

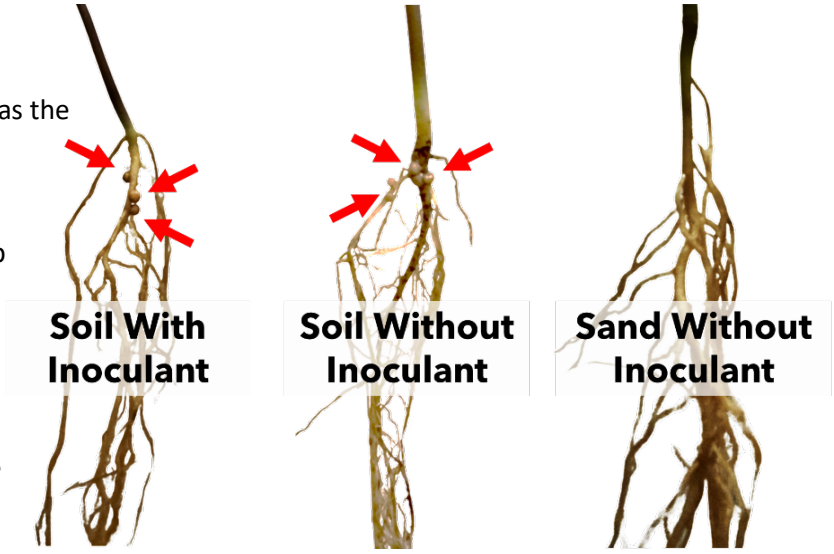


Figure 1. Soybean roots of plants planted on soils with soybean history, with and without inoculant, and planted on sand without inoculant. Plants were collected at V1 (unifoliated). The red arrows indicate the position of the nodule

How to Check for Nodules?

1- Carefully dig up plants to avoid dislodging the nodules.
2- Rinse roots gently with water to expose the nodules.
3- Sample multiple areas of the field for a representative assessment.

Remember, the mere presence of nodules isn't enough—they need to be functional. Cut a few open: actively fixing nodules will appear pink or red inside. If they're brown or mushy, they are not fixing nitrogen.

What Can Go Wrong?

Poor nodulation can result from several factors during early root infection and nodule formation. Some common causes include:

- pH below 6.5.
- Inoculant that has been heated, frozen, exposed to direct sunlight, or it is expired.
- Excessive wet (saturated) or dry soil conditions
- Compacted soils that limit available oxygen
- High N content in the soil
- Presence of root rots
- Severe IDC
- Limited availability of bacteria (e.g., no soybean production in the past two years)

Take-home message

Soybeans have high nitrogen requirements, needing about 3.5 to 5 pounds of nitrogen to produce a bushel of grain. For instance, a 50-bushel soybean takes 175 to 250 pounds of nitrogen. If we had to fertilize to reach this amount of N, our production cost would skyrocket. It is important that we take the necessary measurements to ensure a good nodulation. *Now, at the two to three trifoliate stages, is the ideal time to evaluate nodulation. Doing so allows you to plan a rescue nitrogen application if needed.*

Do you want to know more about inoculation? Check these articles.

- Nitrogen and Soybean Nodulation | NDSU Agriculture,
- Soybean Soil Fertility SF1164

Ana Carcedo
Broadleaf Agronomist

CANOLA SITUATION UPDATE – SOUTHWEST ND

Canola emergence has been challenging in Southwest North Dakota this season. With dry soil conditions and temperatures reaching the 90's°F at planting, followed by up to 7 inches of rain in 5 days in some areas, many fields are showing poor and uneven emergence, with considerable variability in growth stages. While most fields are now approaching or entering the bolting stage, some even beginning to flower (Figure 1), others planted later remain in early vegetative stages.

In this context, conducting stand counts is essential. As an example, one research trial at the Dickinson Research Extension Center (DREC) averaged only 53% emergence relative to the target seeding rate of 600,000 seeds per acre. But what does that mean in practical terms?

According to previous NDSU studies, a canola stand loss of 75-50%, resulting in a minimum stand of 4 plants per square foot, typically does not warrant replanting. This is thanks to canola's phenotypic plasticity, or its ability to adapt to low population densities.

Figure 1. (A) Canola field starting to bloom in Adams county, ND. (B) Another canola field in Dunn County, the pictures were taken one week apart in the same field.

What do we mean by plasticity?

Plasticity refers to the plant's ability to adjust its structure in response to environmental conditions. In thin stands, canola compensates for the missing plants by increasing branching and better pod retention at each node, which leads to a greater number of pods per plant and therefore lower yield penalties. In other words, with more space to grow, individual plants produce more pods (Figure 2).

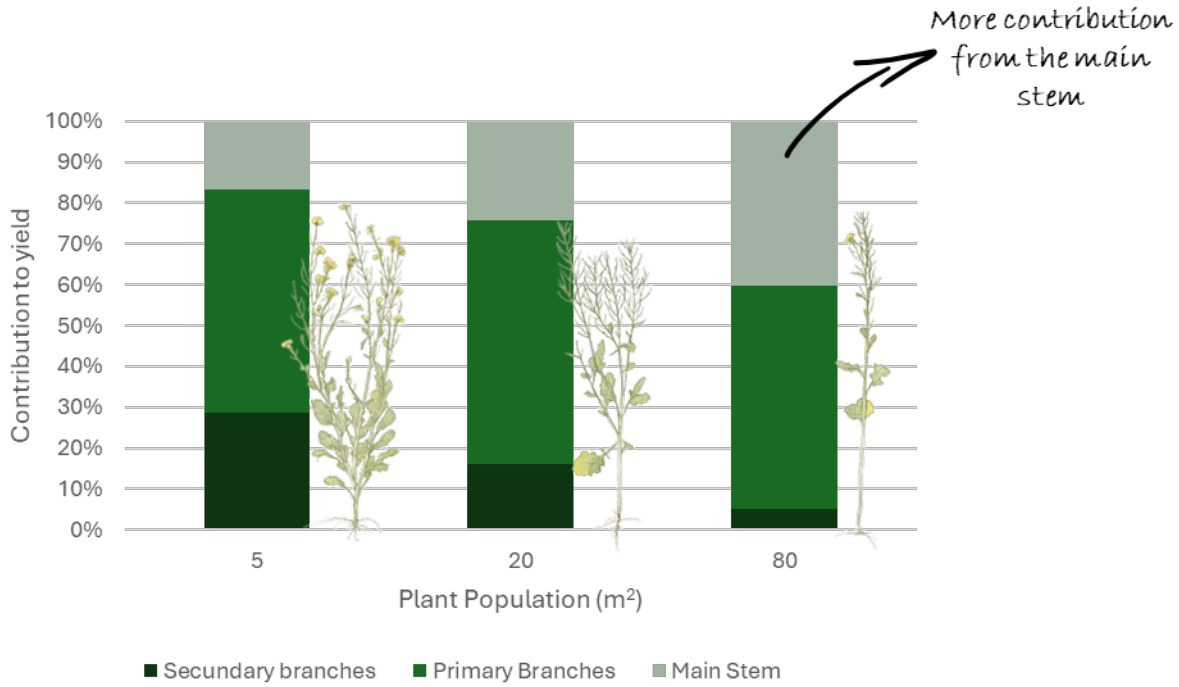


Figure 2. Contribution of different plant parts to yield across plant populations. Data from Yield Adjustment by Canola Grown at Different Plant Populations under Semiarid Conditions - Angadi - 2003 - Crop Science - Wiley Online Library

Key Challenges in Thin Stands

While canola has impressive compensatory ability, low and uneven stands come with some important challenges:

- **Lack of uniformity**: A field with highly variable plant densities—for example, fewer than one plant per square foot in some areas and 5–10 in others—will likely yield less than a field with a more uniform distribution, even if the average plant count is similar. **A uniform stand is crucial at low plant populations**!
- **Weed pressure**: Gaps left by missing plants are prime real estate for weeds. Effective weed management becomes more difficult and more critical in these situations.

At this stage, especially in fields still in vegetative growth, it's too early to estimate potential yield losses. However, **scouting and stand assessments** remain essential tools for making informed management decisions in the coming weeks.

Other resources to read!

How to work through the reseeding decision | Canola Council of Canada

How to count canola plants and explain low numbers | Canola Council of Canada

Ana Carcedo
Broadleaf Agronomist

Victor Gomes
DREC Extension Cropping Systems Specialist'

soils

TOP- AND SIDE-DRESSING NITROGEN

As we round the corner from spring into summer, from planting into "crop growth" season, we are also approaching prime top- and side-dress season as well for corn, sunflower, and perhaps small grains. Since many farmers used differing approaches to pre-plant N applications, it is difficult to give blanket recommendations for in-season applications; however, there are a few guiding principles to be followed to increase the chances of success and positive economic returns.

Right Time:

The main goal of in-season N application is to reduce the chances for nutrient losses prior to the greatest period of plant demand and uptake—increasing total N use efficiency (NUE). However, waiting until peak demand also has to be balanced with ensuring N from the fertilizer is available to the plant (either through chemical transformation, as is the case with urea, or "watering in" of surface applied N, for example). For corn, V5 is generally considered an ideal time to start in-season application as it is previous to the sharp increase in crop demand (Figure 1) and should still ensure the nutrient is transformed into a plant-available form or translocated into the root zone. If top dressing small grains, sooner is generally better than later due to their shorter time to grain fill compared to corn

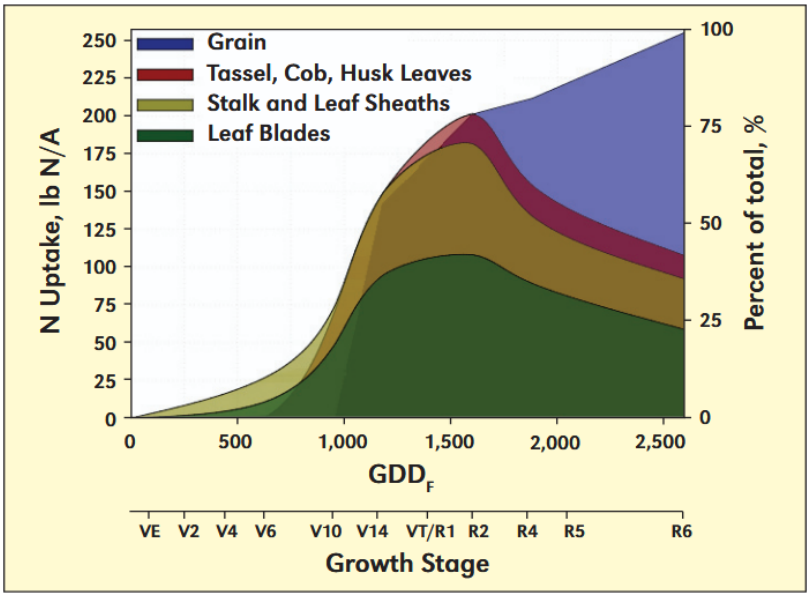


Figure 1. Corn N uptake and partitioning. Source: Bender et al., 2013

Right Source:
When choosing a source of N for in-season applications, available equipment, cost of fertilizer, and potential damage to the crop all need to be considered. Urea-ammonium nitrate (UAN), granular urea, and anhydrous ammonia are the three most common fertilizer N sources for in-season applications. Slow-release formulations, while a good option for pre-plant N, should be avoided for top- and side-dress applications.

In addition to the fertilizer source, the use of Nitrogen Extenders and Additives should also be considered. If using surface applied urea, an NBPT-containing urease inhibitor should be used to reduce the amount of N lost to volatilization—protecting the urea until a rain of ¼ inch or greater is received or for approximately 10 days following application. If a urease inhibitor is not used, losses from volatilization are likely to begin within 4 days of application.

Right Place:
Much like the right fertilizer source, the right placement depends on equipment and potential crop damage resulting from the application. In row crops, side-dress application methods that place the fertilizer 2 inches or deeper into the soil (or 5-6 inches deep with anhydrous ammonia) will have greater efficiency than surface applied products. In areas with adequate surface moisture and/or timely rainfall, streamed or Y-drop UAN will have similar effectiveness to the sub-surface applications, areas with dry surface conditions will likely have lower effectiveness.

Top-dressing urea with a broadcast or airflow spreader is also an economical option (again, being sure to take advantage of urease inhibitors). When top-dressing urea into corn, care should be taken to minimize damage to the plant by only applying when the leaves are dry and when the corn is small (V5-V6). As the corn crop continues to grow and the whorl increases in size, the risk of crop damage increases significantly; top-dress rates of urea should be limited to around 100 lb/ac to reduce the risk of significant damage to the whorl.

Right Rate:
Unless no, or little, N was applied to the crop at planting, the most difficult thing to determine when making in-season N applications is the rate. Possible for crop response, weather conditions, previous N applications, and potential previous losses need to be taken into consideration. If no previous N applications were made, simply following the base fertility recommendations is necessary. Areas of the state that received “normal” amounts of precipitation following pre- or at-planting N applications, and expect little previous N loss to have occurred, can follow the published corn, sunflower, and

small grain N recommendations, simply subtracting the amount of fertilizer previously applied. In areas where N losses were experienced, choosing the right rate becomes more nuanced.

In fields where N losses were experienced early in the growing season (or through the fall-winter, as may be the case with fall-applied N), there are three options for making a rate recommendation for in-season applications: 1) a pre-side-dress nitrate testing (PSNT), 2) optical sensing, and 3) making a guess. While NDSU does not have any published recommendations for determining N rate from a PSNT, neighboring states of Minnesota and South Dakota have recommendations that may be useful to North Dakota farmers as well. The key to taking good samples for the PSNT follows similar guidelines to other soil N tests: take multiple cores per field or zone, keep the sample cold, and deliver it to the soil testing lab as quickly as possible.

The second approach for determining in-season N rates is through the use of optical sensors such as the GreenSeeker™ (Trimble) or Crop Circle™ (Holland Scientific). This approach, however, does require a non-N limited area of the field to use as a comparison. More information on optical sensing and the NDSU-researched algorithms for corn and wheat can be found in Active-optical Sensor Algorithms for Corn Yield Prediction and as a Corn Side-dress Nitrogen Rate Aid and Active-optical Ground-based Sensor Algorithms as Tools for Determining Wheat Top-Dress Nitrogen Rate.

The final approach (which is less than ideal, but admittedly the most widely used) is to make a guess on the amount of N needed to compensate for early-season N losses. To estimate the amount of N which may have been lost due to leaching or saturated conditions, see the article *Is My Nitrogen Leaching?* in the May 22nd, 2025 Crop and Pest Report.

Brady Goettl
Extension Soil Specialist

weeds

ZERO TOLERANCE FOR WATERHEMP ESCAPES IN FIELDS IN SEQUENCE WITH SUGARBEET

Sugarbeet growers are toiling to control waterhemp and waterhemp escapes in sugarbeet fields in 2025. Sugarbeet growers deploy a soil residual herbicide strategy. Unfortunately, waterhemp escapes occur for reasons that can be explained or go unexplained.

I am coming to the realization that the best waterhemp control in sugarbeet are to plant in fields that have low or no levels of waterhemp to begin with. That means optimizing waterhemp control in the corn,

soybean, and small grains years in the crop sequence. And it's not only about herbicides. Waterhemp control is an integrated strategy including potentially narrow row soybean and hand removal of waterhemp escapes.

Seed from waterhemp escapes is viable for four to six years in fields. I suggest beginning a zero weed control escapes strategy for waterhemp control in 2025 fields in sequence with sugarbeet.

CONSIDER A THIRD IN-SEASON CHLOROACETAMIDE APPLICATION IN FIELDS WITH FRAGMENTED SUGARBEET STANDS

I have driven a thousand miles in the past seven days working with the cooperative agronomist and sugarbeet growers. Sugarbeets look good from the road and are closing rows. Unfortunately, some of our fields have gaps in stands related to challenges from the weather in May. I often state that the sugarbeet canopy is a defense against late-emerging waterhemp. Unfortunately, late emerging waterhemp emergence in response to rainfall events in areas of the field with an open canopy will be a distinct possibility in 2025.

Most of our growers use what we call a 'split layby' program for waterhemp control. That is, either Outlook, an *S*-metolachlor product, or Warrant applied at the 2-lf and 6- to 8-lf stage. What about making a third in-season chloroacetamide application in fields with fragmented stands?

I reviewed the labels and confirmed Warrant must be applied to the 8-lf stage. However, Outlook and *S*-metolachlor can be applied later provided the grower acknowledges the preharvest interval (PHI). The Dual Magnum label states a 60-day PHI, and the Outlook label states a 95-day PHI for applications made up to 12 leaves.

The other challenge growers may have is getting product on the soil surface. I would recommend this strategy only in fields with a fractured stand, areas of the field with small replant beets, or areas of open canopy. Work with your agriculturalist or call me if you consider this strategy.

Tom Peters
Extension Sugarbeet Agronomist
NDSU & U of MN

around the state

AROUND THE STATE

NORTHEAST ND

Field Conditions and Crop Progress Update

Crop conditions across the region remain highly variable. Northern counties are experiencing moisture stress due to a lack of recent rainfall, in contrast to southern counties that received some precipitation. While crops are currently relying on subsoil moisture reserves, a timely rainfall would significantly benefit overall crop development.

Spring wheat at boot stage. Photo: Anitha Chirumamilla, LREC

Cool-season crops such as small grains are advancing rapidly, with many fields approaching the boot or heading stages. Cereal aphids are becoming increasingly prevalent, with higher populations reported in more fields. Last week's favorable weather (moderate temperatures and dry conditions) created ideal circumstances for aphid populations to multiply quickly.

Weather related leaf tip rolling and browning in wheat. Photo: Hayden Anderson, ANR Extension Agent, Towner County

Corn development is lagging behind average progress due to persistent overcast skies and cooler-than-normal temperatures. Soybeans are progressing, with growth stages ranging from cotyledon to V2. Dry beans are currently at the VC stage, showing cotyledons and visible unifoliate leaves. Canola ranges from emergence to the 1–3 leaf stage.

Canola flea beetle activity has intensified across the region. Despite seed treatments with insecticides, many growers are reporting visible injury. Late-sown canola remains particularly vulnerable, and farmers are urged to monitor fields closely for flea beetle populations and defoliation levels. Another pest of concern in canola is the diamondback moth (DBM). High numbers of adult moths have been captured in pheromone traps in Ramsey County. DBM does not overwinter in North Dakota and is known to

migrate from southern regions, often via wind and storm systems. Yield loss may occur if high larval populations feed on canola flowers and pods.

Grasshopper nymphs are now appearing along field edges and in ditches. Producers should watch for early signs of feeding damage, especially in soybeans and edible beans planted near these areas.

Grasshopper nymph feeding on soybean leaf. Photo: McKenna Schneider, IPM Scout, LREC

Soybeans emerging through wheat stubble. Photo: Scott Knoke, ANR Extension Agent, Benson County

Dry beans in Walsh County. Photo: Anitha Chirumamilla, LREC

Canola flea beetle injury. Photo: Anitha Chirumamilla, LREC

Anitha Chirumamilla
Extension Cropping Systems Specialist
Langdon Research Extension Center

SOUTH-CENTRAL/SOUTHEAST ND

Only slightly warmer conditions this past week, with areas from Griggs County to the east in the region looking the best overall. Planting is nearly completed for all crops, and if not done, it is too late to plant most crops now. Soybean, dry bean, sunflower, and some late-planted canola in the far southern parts of the region are still germinating and emerging.

Hard red spring wheat stage in the region ranges from 2-leaf to flowering, with flowering occurring in the counties along the South Dakota border, as seen in **Photo 1** from Emmons County, and hard red spring wheat is heading out as far north as Griggs County. All spring-seeded small grain crops are mostly good to excellent condition throughout the region, as seen in **photo 2** in Sheridan County at full flag leaf emergence. I still have not seen any leaf diseases in hard red spring wheat in the region.

Photo 1: Hard red spring wheat flowering already in Emmons County, ND. (photo by NDSU Extension ANR Emmons County Agent, Nancy Deis)

Corn in the region varies from V1 to V7 (7 collars) in Sargent and Richland Counties, and corn emerged before May 15th is still at the V5 (5 collars) stage as seen in **photo 3.** Corn looks much better across the region than last week, as seen in **photo 4,** with most of the corn good to fair and a few excellent fields, but no very poor fields. There are corn fields showing nutrient issues as seen in **photo 5** in Emmons County.

Photo 2: An excellent crop of hard red spring wheat in the full flag leaf emergence stage in Sheridan County. (photo by Jeff Stachler)

Photo 3: V5 (5 collar) corn stage in Wells County. (photo by Jeff Stachler)

Photo 4: A good corn crop in Wells County at the V5 stage. (photo by Jeff Stachler)

Photo 5: Corn struggling with nutrient deficiencies in Emmons County (photo by Nancy Deis)

Photo 6: Soybeans at V2 (second trifoliate and VC (unifoliate) in the same field in Wells County. (photo by Jeff Stachler)

Soybean stage in the region varies from planted to third trifoliate (V3) in Sargent and Richland Counties. Many fields planted and starting to emerge prior to May 15th are still at the second trifoliate stage (V2) as seen in **photo 6**, but unifoliate soybeans are in the same row in the same field as well. Most soybeans in the region are in poor to fair condition at this point in time as seen in **photo 7**. Most counties are reporting soybeans as their poorest crop. I have not seen an excellent soybean field in my travels in the region, but maybe some of the latest planted soybeans may look excellent yet. Bean leaf beetles have now been found in the region in Dickey, Emmons, and LaMoure counties with the most severe soybean injury observed in Dickey and Emmons Counties.

Photo 7: Non-uniform and poor soybean stand planted and started emerging prior to May 15th in Wells County. (photo by Jeff Stachler)

Canola stage is from just planted in the southern counties to a field starting to flower in Wells County this past Friday. Canola condition in the region is variable, with most fair to good.

Photo 8: Good stand of dry beans in Wells County. (photo by Jeff Stachler)

Dry beans are emerging now. Most are at the unifoliate stage at this time and stands are looking really good overall the region as seen in **photo 8** in Wells County. There are some emergence issues, as seen by the seedling blight in **photo 9** from Wells County.

Sunflowers are emerging now as well in the region with most at the two-leaf stage as seen in **photo 10** from Emmons County. Most sunflowers are in good condition at the moment, but stands may be a little more variable than dry beans now.

Weed control in small grain crops may not be very good this year at this point in time. Weeds seem to be surviving many of the HPPD wheat herbicides, particularly pigweed species such as the Powell amaranth seen in **Photo 11** from the Carrington Research and Extension Center. Some corn fields are a mess with weeds at this time and corn yield will likely suffer in most of these fields. Early planted soybean fields are becoming weedy as well. Please make postemergence herbicide applications

Photo 9: Seedling blight in dry beans in Wells County. (photo by Jeff Stachler)

targeting kochia at less than three inches in height. If applying Enlist One with Liberty Ultra, a MSO, HSMOC, or SHCOS oil adjuvant must be added to the mixture according to the Enlist One label. In Enlist (E3) soybeans, apply glufosinate plus Enlist One plus glyphosate to control most weeds. The addition of a residual herbicide such as Dual, Outlook, Warrant, or Zidua will improve later season waterhemp emergence, especially since the soybean crop is behind schedule and waterhemp is likely to emerge later yet this season. If volunteer Roundup Ready corn is present in a field, please add a high rate of clethodim to control the volunteer corn. Apply maximum rates of glufosinate and glyphosate. Remember, glufosinate applications may not legally be applied to soybeans after the R1 stage (first flowers), which may occur in soybeans at or after the V4 (fourth trifoliate) stage.

Photo 10: Two-leaf sunflower in Emmons County. (photo by Nancy Deis)

Photo 11: Powell Amarnath surviving HPPD herbicides in hard red spring wheat at the Carrington Research Extension Center. (photo by Jeff Stachler)

Of the 27 NDAWN stations chosen this season for this region, the average maximum daily air temperature from June 10 to June 16, 2025 ranged from 70 degrees Fahrenheit near Hurdsfield, Lisbon, and Streeter to 75 degrees Fahrenheit near Gardner and Hillsboro with an average this past week of 72 degrees Fahrenheit, only 1 degree Fahrenheit warmer than last week! Based upon the average daily high temperature near Cooperstown, the average daily high temperature was 5.1 degrees Fahrenheit below normal for Cooperstown. The average daily minimum air temperature for the past week at the 27 NDAWN stations across the region ranged from 49 degrees Fahrenheit near Mayville to 55 degrees Fahrenheit near Livona with the daily average minimum air temperature for the week being 53 degrees Fahrenheit, 5 degrees Fahrenheit warmer than last week.

The daily average four-inch bare soil temperature for these stations in the region ranged from 57 degrees Fahrenheit near Robinson to 68 degrees Fahrenheit near Livona, with an average for the region of 62 degrees Fahrenheit, one degree Fahrenheit greater than last week. Based upon the Cooperstown NDAWN station during June 7 to June 15, 2025, the average daily four-inch bare soil temperature was only 61 degrees Fahrenheit, a whopping 8.2 degrees Fahrenheit below the average for this period and a new record low average four-inch bare soil temperature since 2015. This beat the 2024 record by 2.5 degrees.

Rainfall for these stations across the region for last week ranged from 0.23 inch near Mayville to 2.55 inches near Brampton, with an average for the week of 0.97 inch, 0.51 inch greater than last week. In this region, the McKenzie area has received the greatest rainfall since May 1, 2025 at 7.31 inches.

As of June 16, 2025 the Skogmo NDAWN station again had the lowest four-inch depth of soil moisture at 5% compared to Oakes having the greatest four-inch soil moisture at 38%. The average four-inch soil moisture at these stations over the region was 23%, a 4% increase over last week. As of June 16, 2025, the Pickardville NDAWN station had the lowest 39-inch depth of soil moisture content again at 7%, with the Cooperstown NDAWN station having the greatest at 51%, with an average for the region of 29%, again the same as last week. The Griggs, Steele, and Trial Counties are currently the driest in the region, with Griggs County being submitted as mildly dry. Lack of water stress is showing up in crops, gardens, and lawns now, but only in small areas at the moment.

The wind across the region this past week ranged from 5.8 miles per hour near Casselton to 10.4 miles per hour near Linton, with the average daily wind speed for the week 7.8 mph, one mile per hour less than last week.

Disclaimer: Pesticides are given as examples only and do not imply endorsement of one product nor discrimination against any product not mentioned by the author or the university.

Jeff Stachler
NDSU Extension Cropping Systems Specialist at Carrington Research Extension Center

SOUTHWEST ND

Another week of much-needed rain has benefited our region! Across southwest North Dakota, precipitation over the past seven days ranged from 0.46 inches in northern Dunn County to 3.45 inches in southern Dunn County, with most areas receiving at least 1 inch. While this rain is encouraging, there were no changes in the U.S. Drought Monitor as of June 12 (Figure 1). However, most of the rainfall occurred between June 15–16, so we may see updates in the drought monitor map this week.

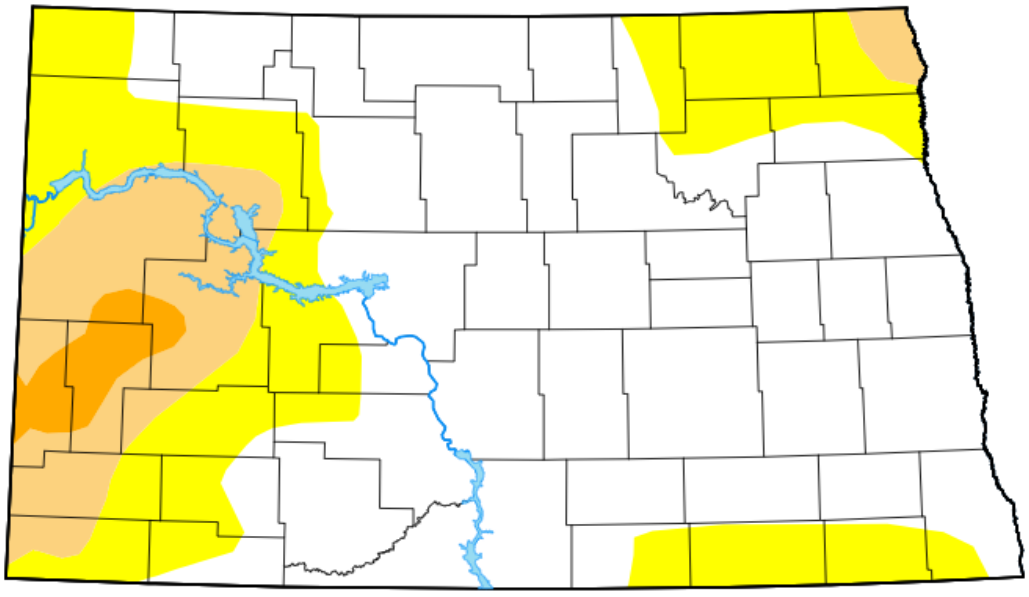


Figure 1. Drought monitor map as of June 12th. No changes in relation to the previous week.

With last week's rains, precipitation averages in southwest North Dakota are above normal for June already. However, due to prolonged low temperatures and overcast skies, we are behind in accumulating growing degree days by at least a week. Aside from early-planted small grains, most crops and forages are showing delayed growth. For example, some soybean fields planted a month ago are still between VC and V1 stages (Figure 2).

Figure 2. Soybean seeded in May 12 is still in the VC stage one month later in Stark County. Photo: Victor Gomes.

Slow development render crops more susceptible to pest attacks that can either further hinder plant development or kill the plant. In Figure 3, you can see that some plants in this soybean field got chopped off, probably by a rabbit, right above the cotyledonary node. Now, luckily soybeans are a fairly resilient crop. A soybean plant will usually regrow when the main stem has been cut off above the cotyledonary node, provided that there is sufficient cotyledon tissue to provide the plant with energy to regrow. In this case, one or more axillary buds may develop after the main stem has been cut. On the other hand, if the soybean plant was cut below the cotyledon that plant will not recover.

Figure 3. Soybeans cut above the cotyledonary node in Stark County. Photo: Victor Gomes.

On Monday (6/16) Adams County was hit by a wind gust of almost 95 mph, setting a new record for the state. Wind gusts as intense as this can cause major crop damage; however, since most crops are still fairly young and short, significant crop damage was not reported in the area. Infrastructure damages, however, were reported throughout the region (Figure 4).

Figure 4. Broken utility pole in Adams County. Photo: Aspen Lenning, ANR Extension Agent.

Spring wheat crop stages in the region are all across the board, from early tillering to booting stage. For winter wheat, a major concern this season was whether the crop vernalized properly, as many fields didn't emerge until April due to the dry fall and winter. Some growers even terminated their winter wheat and replanted with spring wheat. I received good news from a few farmers in the area saying that their winter wheat had successfully vernalized and were either booting or heading (Figure 58), although, surprisingly, in some cases, winter wheat is lagging behind spring wheat in development.

Figure 5. Winter wheat heading in Stark County. Photo: Victor Gomes.

Canola fields are starting to bud/bolt (Figure 6) and will soon make up for poor stand establishment, which has been prevalent in canola fields across the region, by branching out. However, the poor stand establishment creates ideal conditions for weed to thrive and challenges to control them, as seen in the picture below.

Sunflowers are currently between the cotyledon and V2 stages, while corn ranges from the 3-leaf to 6-leaf stages.

Figure 6. Canola field in the bolting stage in Stark County. Photo: Victor Gomes.

On the forages side, there have been reports of older alfalfa stands being killed by frost this year. A combination of factors—including stand age, a dry fall and winter, low snow cover for insulation, cold winter temperatures, and multiple spring frost events—created suboptimal conditions that many of these stands could not survive. As a result, alfalfa hay availability will be a concern this year, with production potentially reaching only half of last year's levels.

Correction: In the last edition of the *Crop & Pest Report* (June 12, 2025), my *Around the State* article included photos of pheasant damage in a field, showing holes where birds had pecked seeds out of the ground. The article incorrectly stated that the damage occurred in a wheat field. After confirming with the source, I can clarify that the affected field was actually planted to corn.

Victor Gomes
Extension Cropping Systems Specialist
NDSU Dickinson Research and Extension Center

weather

WEATHER FORECAST

The June 19 to June 25, 2025 Weather Summary and Outlook

Rainfall this past week included several locations with 1 inch or more falling across southern North Dakota (Figure 1). Much of northeastern North Dakota continues to be missed by recent storms where some location recorded no rain or only a trace. Drought conditions will likely be expanded or introduced into that part of the state with the new drought monitor being released today (Thursday).

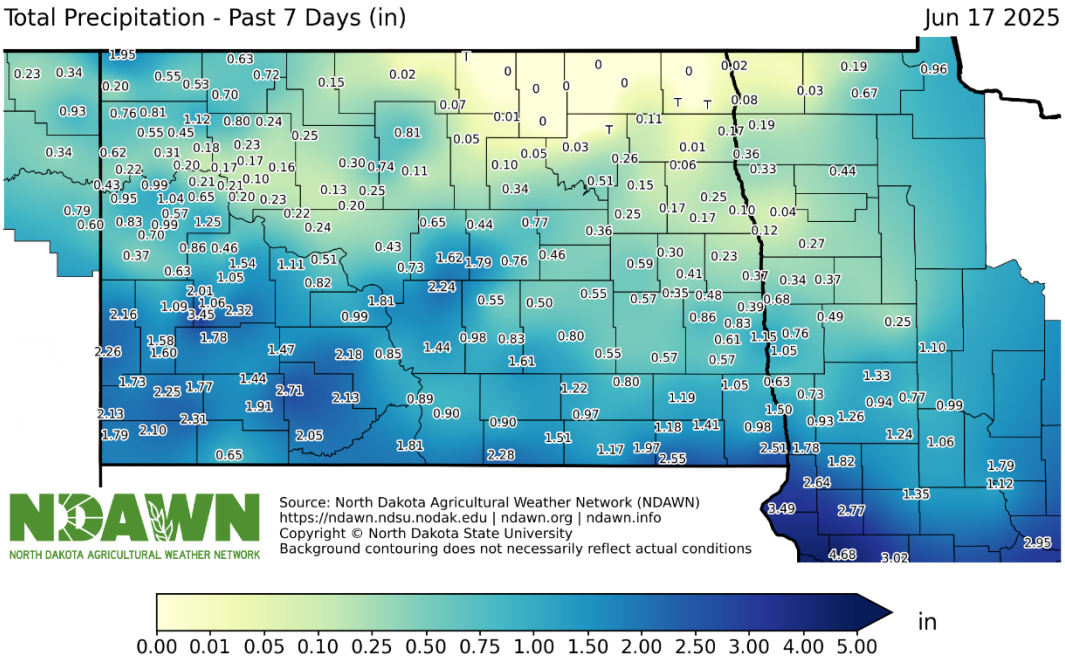


Figure 1. Total Rainfall for the Period of June 11 through June 17, 2025.

Even with the rains in the past week, the first 17 days of June were drier than average across much of North Dakota (Figure 2). The big exception was the southwestern part of the state. There will be mainly hit and miss thunderstorms in the next week, meaning we may record some widely varying rain totals during this forecast period. With that said, odds favor more below than above average rain amounts across the region.

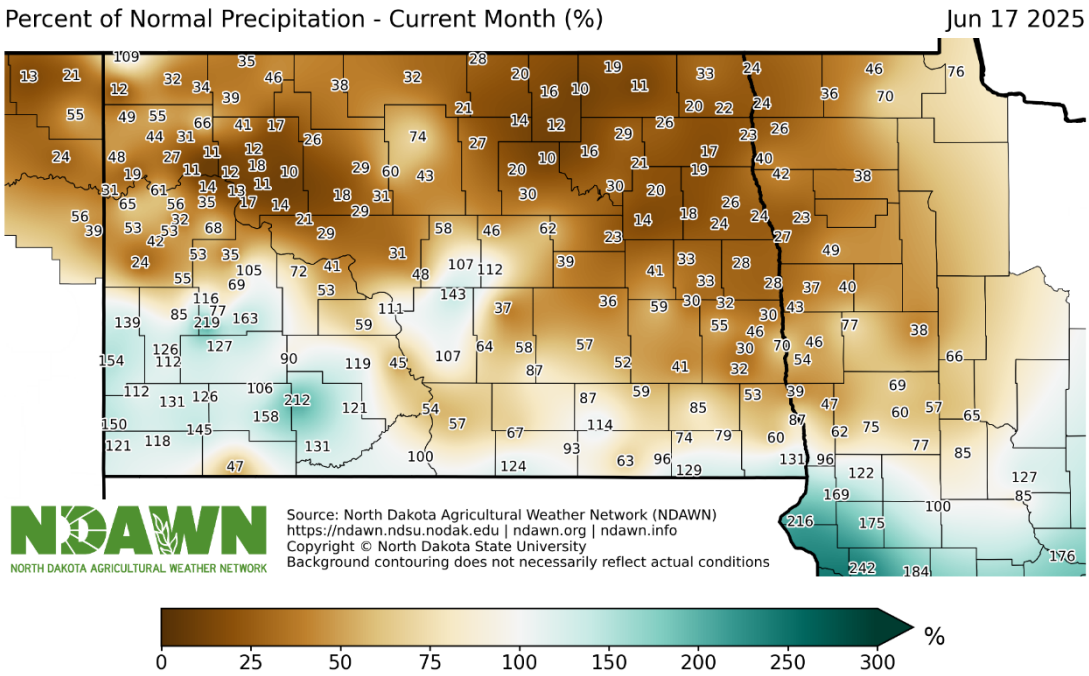


Figure 2. Percent of Normal Precipitation for the Period of June 1 through June 17, 2025.

Temperatures continue to be colder than average for June. With the exception of areas near the Canadian border, a high percentage of North Dakota was below average this past week (Figure 3). These next 7 days should be above average with 90° or warmer temperatures this weekend.

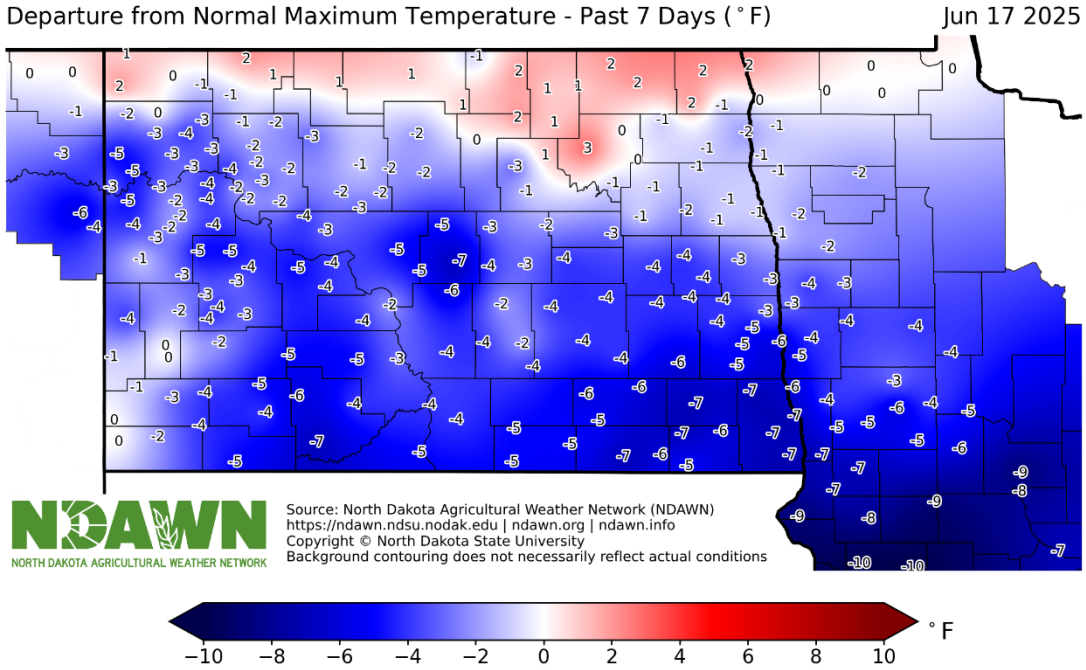


Figure 3. Departure from Average Air Temperature for the Period of June 11 through June 17, 2025

Figures 4 and 5 show forecasted growing degree days (GDDs) for base 32°F (wheat and small grains) and base 50°F (corn and soybeans) during this forecast period. The most GDDs since early May are expected during the next week allowing crops, where there is adequate soil moisture, to catch up a bit on their growth stage.

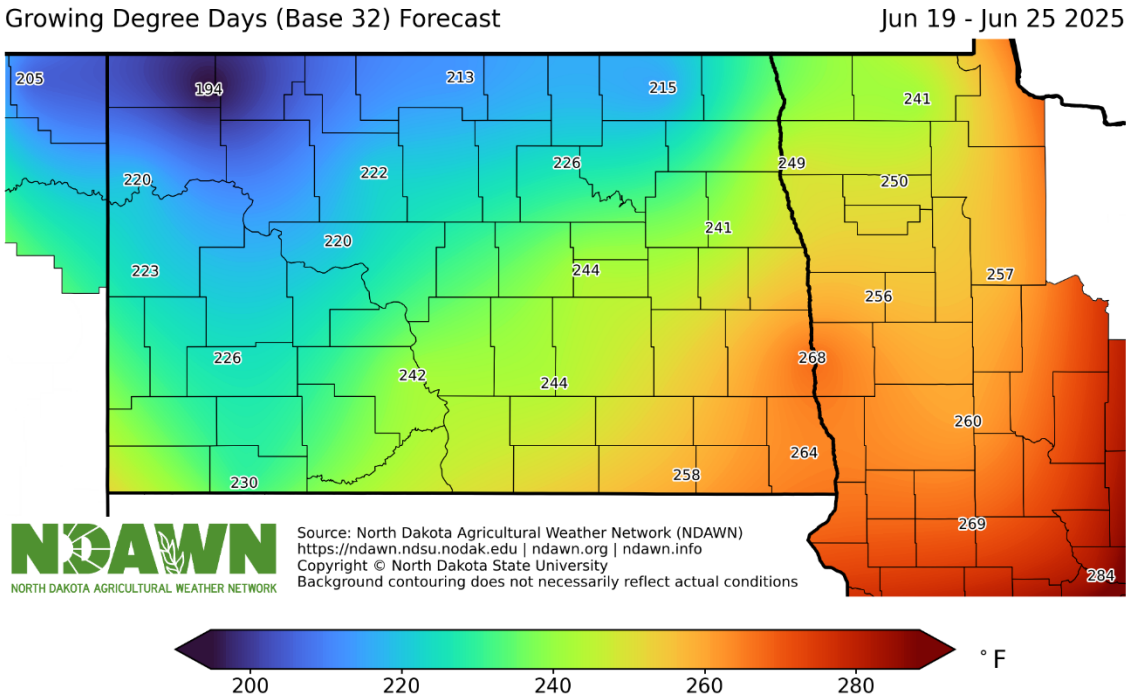


Figure 4. Estimated growing degree days base 32° for the Period of June 19 to June 25, 2025.

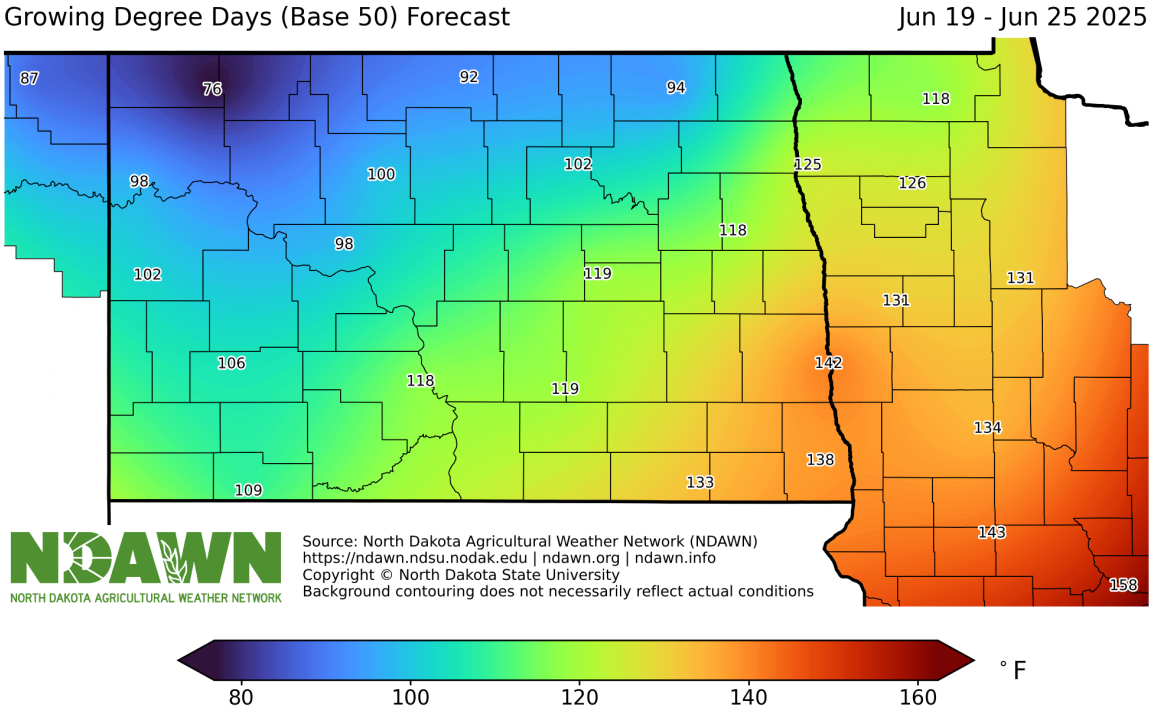


Figure 5. Estimated growing degree days base 50° for the Period of June 19 to June 25, 2025.

Using May 1 as a planting date, the accumulated growing degree days for wheat (base temperature 32°) is given in Figure 6. You can calculate wheat growing degree days based on your exact planting date(s) here: https://ndawn.ndsu.nodak.edu/wheat-growing-degree-days.html

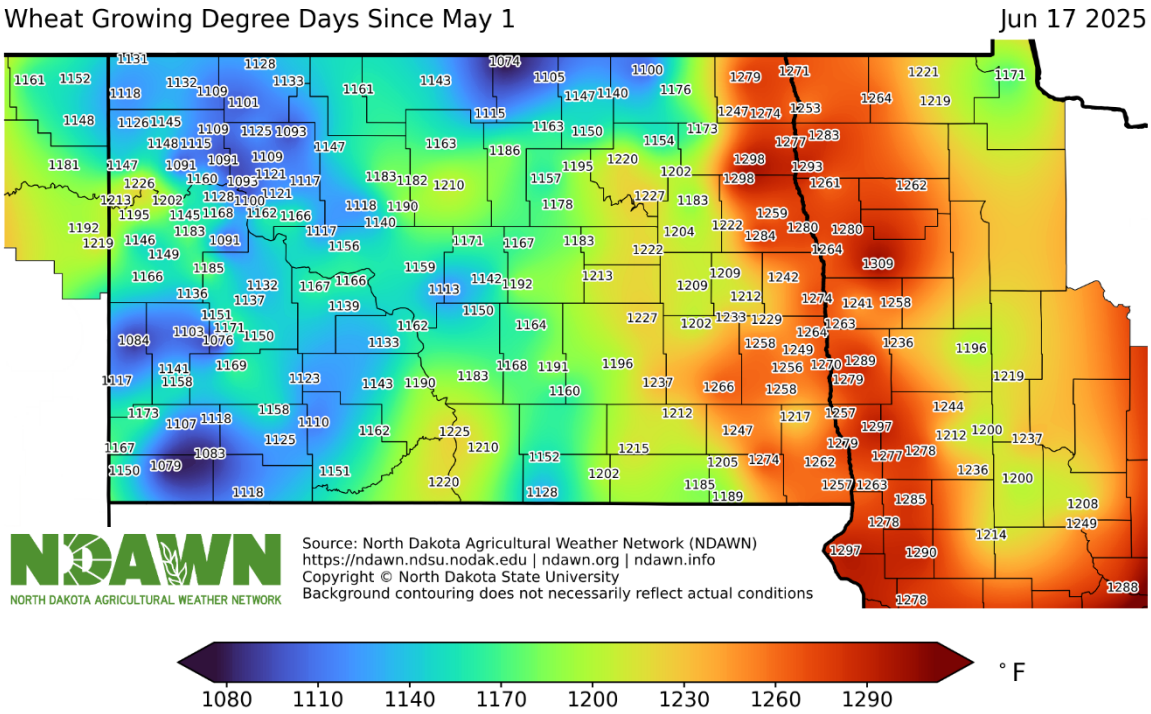


Figure 6. Wheat Growing Degree Days (Base 32°) for the Period of May 1 through June 17, 2025

Using May 10 as a planting date, the accumulated growing degree days for corn (base temperature 50°) is given in Figure 6. You can calculate corn growing degree days based on your exact planting date(s) here: https://ndawn.ndsu.nodak.edu/corn-growing-degree-days.html.

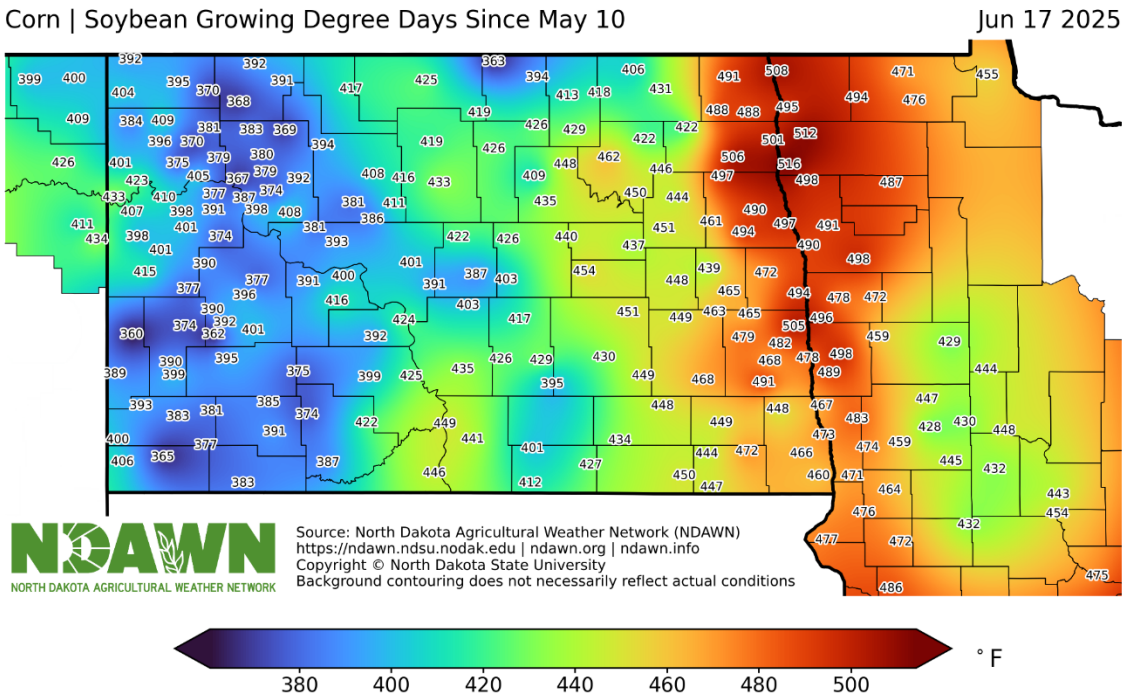


Figure 6. Corn Growing Degree Days (Base 50°) for the Period of May 10 through June 17, 2025

For sugarbeet growers, Cercospora guidance started on June 15. If you want to see the latest infection values in a mobile complaint format, you can go to https://ndawn.info/agriculture_gdd.html, click on the sugarbeet tab, and go to the Cercospora button. All guidance is also available on the NDAWN main website: https://ndawn.org

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EXTENDING KNOWLEDGE ❯❯ CHANGING LIVES

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