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entomology

GRASSHOPPERS INCREASING

Grasshopper nymphs (or young grasshoppers) are being observed in field edges of spring wheat and in the interior of soybean fields in southeast, southwest and north central areas of North Dakota. **So, it is a good time to get out and scout for grasshopper nymphs.** In North Dakota, grasshopper egg hatch normally begins in early May with peak hatch occurring into mid-June. Typically, egg hatch will approach completion by late June. **However, the cool spring this year has delayed the hatch, allowing it to potentially continue into mid-July.**

Crop fields should be scouted at least once a week. Since broadleaf crop seedlings (sugarbeets, sunflowers, canola, dry beans and soybeans) are more susceptible than small grains, these crops should be inspected at least twice a week. High densities of grasshopper nymphs can cause severe foliar defoliation on emerging seedling crops in a short time.

Newly hatched grasshoppers are extremely small (about the size of a kernel of wheat) and it is difficult to count the number of nymphs per square yard when populations are high. **Newly emerged grasshoppers do not usually need to be controlled unless the population is at the “threatening” level or action threshold** (see Table 1). A sweep net is a good tool to collect and count small grasshopper nymphs. Pest managers can use four 180-degree sweeps with a 15-inch sweep net, which is equivalent to the number of grasshoppers per square yard.



*First instar grasshopper nymph
(Patrick Beauzay, NDSU)*



*Grasshopper defoliation
(Paul Overby, Lee Farms)*

Table 1.

Rating	Nymphs per square yard		Adults per square yard	
	Margin	Field	Margin	Field
Light	25-35	15-25	10-20	3-7
Threatening	50-75	30-45	21-40	8-14
Severe	100-150	60-90	41-80	15-28
Very Severe	200+	120+	80+	28+

Grasshoppers are more easily and economically controlled while they are in the nymphal stages. A number of advantages in treating grasshoppers early include: (1) fewer acres will have to be treated and less insecticide is necessary to obtain control, thus reducing cost; (2) grasshoppers are killed before they have had the opportunity to cause significant crop loss; (3) smaller grasshoppers are more susceptible to pesticides than larger adult grasshoppers; (4) early treatment before grasshoppers reach maturity prevents egg deposition, which may help reduce the potential grasshopper threat for the following crop year.

Please see the [E1143-22](#) - *North Dakota Field Crop Insect Management Guide* for a list of insecticides registered for grasshopper control by crop.

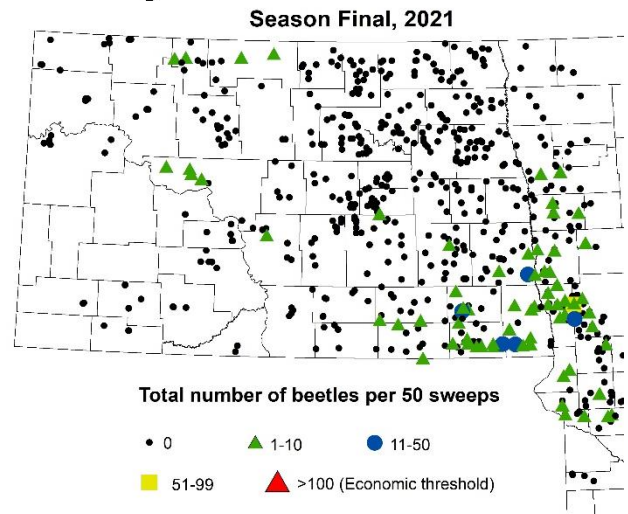
For the small grasshopper nymphs (<1 inch), **Dimilin® 2L**, a juvenile growth regulator, is recommended for locations west of US Highway 281, for nymphs in wheat, barley, oats, triticale, alfalfa, grassland or soybean. Dimilin® 2L (active ingredient diflubenzuron, MOA Group 15) interferes with molting and controls only immature grasshoppers (not adult grasshoppers) by interfering with their normal shedding of skin (exoskeleton) as they grow. It is most effective when applied on 2nd (¾ inch long) to 4th (1-inch-long) instar grasshopper nymphs. After Dimilin® 2L has been applied, growers should notice reduced feeding in three to seven days, and maximum control in 10 to 14 days. Dimilin® 2L has low toxicity to mammals and is safer to beneficial insects than many other insecticides. Dimilin® 2L should be applied with one to two pints of an emulsified paraffinic or vegetable crop oil. Canola oil is very effective as a feeding stimulant for grasshoppers (Source: University of Wyoming).

SCOUT FOR BEAN LEAF BEETLE IN SOYBEANS AND DRY BEANS

Bean leaf beetle has been slowly increasing in North Dakota along with the enlarged soybean acreage. See the *2021 IPM Crop Survey map* on bean leaf beetle number per 50 sweeps. This week's field reports for bean leaf beetle include Garrison, McLean County and Wyndmere, Richland County and Sargent County for soybean, and Delamere in Sargent County for dry beans.

Bean leaf beetle is about ¼ inch long and can vary in color from yellow-green to reddish-brown. Adults may have four to no black spots, and a black border on the edge of wing covers. There is always a black triangle behind head. Adults emerge from overwintering sites and move into bean fields as the seedlings emerge. Insecticide seed treatments frequently used on soybeans provide good protection against the overwintered adults. Beetles cause defoliation creating characteristic circular holes in leaves.

Soybean - Bean Leaf Beetle



Bean leaf beetle - Yellow-green on left and reddish-brown on right (James Kalisch, UNE-Lincoln)



Bean leaf beetle causing severe defoliation (>50%) on dry bean near Delamere in Sargent County (Bryan Hanson, NDSU)



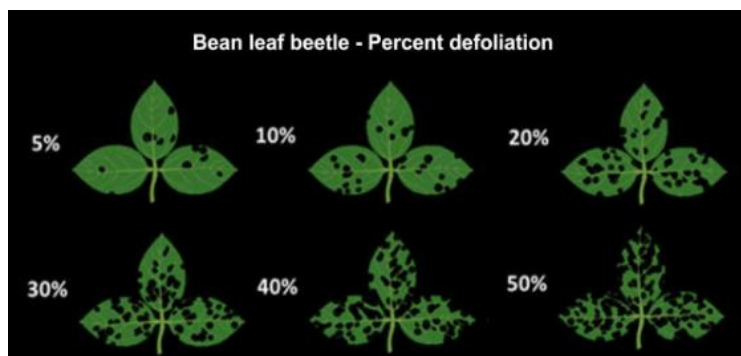
Bean leaf beetle defoliation (5-10%) on soybean near Garrison (Jason Thomas, Agvantage Solution Inc.)

The white larvae develop in the soil, feeding on the roots and nodules. New adults emerging in July feed on foliage and pods. The injury to pods results in secondary infections by fungi and bacteria, causing rotting and discoloration.

A sweep net is used to determine if bean leaf beetles are present since they are secretive and hard to visually observe in fields. **In soybeans, the treatment threshold is when three to seven beetles per sweep are found.**

Treatment threshold also can be based on foliar defoliation levels at different crop stages for soybeans:

- **30% defoliation from the vegetative stages to R2 (full bloom).** Soybean is less susceptible to damage and able to compensate for lost tissue.
- 10% defoliation from R3 (beginning pod) to R5 (beginning seed set) when soybean is most susceptible to yield loss from defoliation.
- 15% defoliation at R6 (full seed set).
- No treatment necessary at R7 (maturity).



Bean leaf beetle defoliation guide (Figure adapted from original by Robert Koch, University of Minnesota Extension.)



Bean leaf beetle and defoliation near Wyndmere (Jessica Halverson, NDSU)

In dry beans, the treatment threshold is recommended when 40% to 70% defoliation is present.

See the new publications on [Common Arthropod Pests of Soybeans in North Dakota](#) (E2005, Dec. 2020) and [Common Arthropod Pests of Dry Beans in North Dakota](#) (E2023, June 2021) for more identification information.

CUTWORMS ACTIVE

As newly planted crops start to emerge, it is time to start routine scouting for cutworms. Field reports of cutworm activity have been reported in sunflowers near Kindred (Cass County), and pulse crops in western ND and Montana. Approximately 32 cutworm species are economic pest species of field crops in North Dakota! Cutworms damage plants in the larval stage (caterpillar) and cause plant injury by cutting stems near the soil line, chewing on the foliage and reducing plant stands. Cutworms often will move down a row as they continue to feed on plants. **Cutworms can do significant feeding injury during the early growth stages (seedling through 4-6 leaf stage) of field crops.**

There are three types of cutworms in North Dakota based on their biology:

- 1) Overwinter as a partially grown larva, usually one of the first cutworms to cause problems during crop emergence from early to mid-May. (e.g., dingy cutworm). The larval stage lasts for 8-9 months for these species since they overwinter as young larvae.
- 2) Overwinter as eggs, which hatch in mid to late May (e.g., red-backed cutworm and darksided cutworm). Larval feeding injury by these cutworms normally occurs in late May to mid-June, and it can last three to four weeks, depending on temperatures.
- 3) Migrate as adult moths called 'miller moths' into North Dakota from southern states (e.g., black cutworm).

Routine scouting for cutworm larvae is best in the evening, since they feed at night and hide underneath clumps of soil and debris during the day. If you find cut off plants, dig around these plants about two or more inches deep, and search for cutworms. When disturbed, cutworms curl up into a 'C-shape.' Row crops, such as soybean, canola, lentils, field peas and sunflowers, are more susceptible to cutworm damage than small grains, because cut plants do not grow back (grains compensate by tillering). Continue scouting until early July for late season cutworms or until crops have advanced beyond the susceptible period (seedling through 4-6 leaf stage).

All cutworm species are lumped together for the action thresholds. If cutworms are at or above the action thresholds listed below for different field crops, then a 'rescue' foliar insecticide application is warranted. An evening application is recommended to target the peak feeding of cutworms at night. Be sure to monitor for temperature inversion and do not spray during an inversion.

- Alfalfa – 4 or more larvae per square foot (new stands – only 2 larvae per square foot)
- Canola – 1 larva per square foot
- Corn - 3-6% of the plants are cut and small larvae (<3/4 inch) present
- Peas / Lentils – 2 to 3 larvae per square meter
- Small grain – 4 to 5 larvae per square foot
- Soybean - 1 larva per 3 feet of row or 20% of plants are cut
- Sugarbeet - 4-5% cutting of seedlings or 3-5 larvae per square foot
- Sunflower - 1 larva per square foot or 25-30% stand loss

You can often find both small and large larvae of the same or different cutworm species while scouting. **If the majority of the larvae are small, <¾ inch, they still have a lot of crop feeding to do before maturity, so an insecticide**



Dingy cutworm adult moth (top, G. Fauske, NDSU), dingy cutworm mature larvae (middle, J. Gavloski, Manitoba) and red-backed cutworm mature larvae (bottom, J. Gavloski, Manitoba)

treatment will be necessary when you are at or above the action threshold. If you are finding a mixture of some small cutworms, many large cutworms and some pupae, it may be too late for a foliar insecticide application since the majority of the larvae are mature (done feeding) and/or pupating (a non-feeding life stage). Remember most cutworms are difficult to kill, so they require the mid- to high labeled rates of an insecticide for effective control. A low rate of insecticide may not provide the efficacy or residual needed to get past the susceptible early crop stages. You may need to respray a field for late emerging cutworms. Another advantage of using the mid- to high labeled rates of insecticides is that you get a longer residual of 7-10+ days for most pyrethroid insecticides.

For insecticides registered for cutworm control by field crops, please consult the [E1143-22](#) - *North Dakota Field Crop Insect Management Guide*.

Article updated from past Crop & Pest Report - May 21, 2020.

[Janet J. Knodel](#)

Extension Entomologist

CANOLA FLEA BEETLES FEEDING ACTIVITY INCREASING

The recent stretch of dry, warm sunny weather has flea beetles hoppin' and poppin' in canola! **Scout canola fields now and regularly in the next few weeks for flea beetle feeding, especially in canola from the cotyledon through 6-leaf stages.** The higher the feeding pressure, the more frequently fields should be scouted. The cool, wet weather we had in mid-May in most of ND either delayed canola planting or slowed growth of canola that did get planted. Consequently, canola is in early growth stages that are most susceptible to flea beetle feeding injury. Insecticide seed treatment failure is a possibility, especially in earlier planted canola that experienced delayed growth. Economic feeding injury to seedlings will result in delayed plant development for the remainder of the growing season. In the photos, note that the protected seedling is already at 1-leaf, while the untreated seedlings are still in the cotyledon stage.



Economic flea beetle feeding injury, >25% defoliation, to canola cotyledons grown from untreated seed (Patrick Beauzay, NDSU)



Canola seedling protected by a systemic neonicotinoid seed treatment (Patrick Beauzay, NDSU)

When scouting, look for the presence of striped and crucifer flea beetles, and examine the cotyledons and emerging leaves closely for pitting and shotholes. Make note of which species is most dominant – current NDSU research has demonstrated that striped flea beetles are not as well controlled by neonicotinoid and diamide seed treatments as compared to crucifer flea beetles. A flea beetle population dominated by striped flea beetles could cause greater and more rapid seedling injury than a population dominated by crucifer flea beetles. **A foliar treatment is warranted if 20-25% defoliation has occurred on seedlings through the 6-8 leaf stage.** Foliar insecticides for flea beetle control in canola are limited to the pyrethroids: bifenthrin (Brigade, Sniper, other 2 lb. bifenthrin products), deltamethrin (Delta Gold), lambda-cyhalothrin (Silencer, Warrior II, other 1 and 2 lb. lambda-cy products), zeta-

cypermethrin (Mustang Maxx) and two premixes - bifenthrin + sulfoxaflor (Ridgeback) and lambda-cyhalothrin + chlorantraniliprole (Besiege). **Keep in mind that new growth after application will not be protected, so scouting after a foliar application is a must.**

Initial results from our insecticide seed treatment trials here in Fargo look promising so far. Canola was seeded on May 23 and is in the cotyledon to 1-leaf stage as of June 6. Flea beetles are feeding, and our Fargo population is about 75% striped flea beetle, and 25% crucifer flea beetle. We're testing commercial rates of thiamethoxam (Helix) alone and in combination with cyantraniliprole (Lumiderm, Fortenza), and clothianidin (Prosper) alone, in combination with cyantraniliprole and in combination with flupyradifurone (Buteo Start). Initial feeding injury ratings show that all seed treatments are performing well with no significant differences among treatments. However, we did note slightly more feeding injury when thiamethoxam and clothianidin were used alone compared to those same actives in combination with either cyantraniliprole or flupyradifurone. The untreated check plots are well past threshold. Ratings will be done every three days to evaluate continuing insecticide seed treatment performance.

For more information, please consult NDSU Extension publication [E1234 \(revised\)](#) - *Integrated Pest Management of Flea Beetles in Canola*, and [E1143-22](#) - *North Dakota Field Crop Insect Management Guide* for a list of insecticides for flea beetle control registered for use in canola.

[Patrick Beauzay](#)

Research Specialist, Extension Entomology
State IPM Coordinator



Crucifer and striped flea beetles feeding on canola cotyledon (Patrick Beauzay, NDSU)

[Janet J. Knodel](#)

Extension Entomologist

GET READY TO BATTLE THE SUGARBEET ROOT MAGGOT!

Last year, sugarbeet root maggot (SBRM) populations were at the highest levels recorded in the past 15 years. Producers in areas affected by the pest are therefore advised to plan on aggressive measures to protect their fields from what could otherwise end up being significant economic loss due to SBRM feeding injury. The use of effective SBRM management strategies could also help reduce regional populations to more manageable levels for next year.

Corresponding with the relatively slow start to the 2022 growing season, SBRM fly emergence has been substantially delayed. NDSU Entomology and American Crystal Sugar Company are collaborating to monitor over 100 grower fields this year to provide sugarbeet producers and crop management advisors with timely information on the location and intensity of root maggot fly activity levels throughout the RRV growing area.

The first newly emerged SBRM fly observed by NDSU personnel occurred in late May; however, no flies were detected on sticky-stake traps until June 1, and those observations were made in the Reynolds, ND area. Thus far, the earliest-developing potential hotspots include Auburn, Cashel, Crystal, Drayton, Reynolds, East Grand Forks, Oakwood, and St. Thomas. However, that list is expected to get substantially larger in the coming week. Root maggot fly counts



Fig 1 SBRM Adult on seedling (Photo: M. Boetel, NDSU)

can be viewed at <https://tinyurl.com/SBRM-FlyCounts>. Click on the dated link to open an Adobe Acrobat (pdf) file containing fly counts for all locations being monitored this year.

Although the entire Red River Valley growing area is far below the average number of SBRM growing degree-day (DD) unit accumulations for this time of year, fly activity will likely increase considerably in the next week to 10 days, and several days of warm weather could increase the growing degree-day accumulation quickly. Peak fly activity in beet fields occurs, on average, at about **650 Degree-Day** (DD) units.

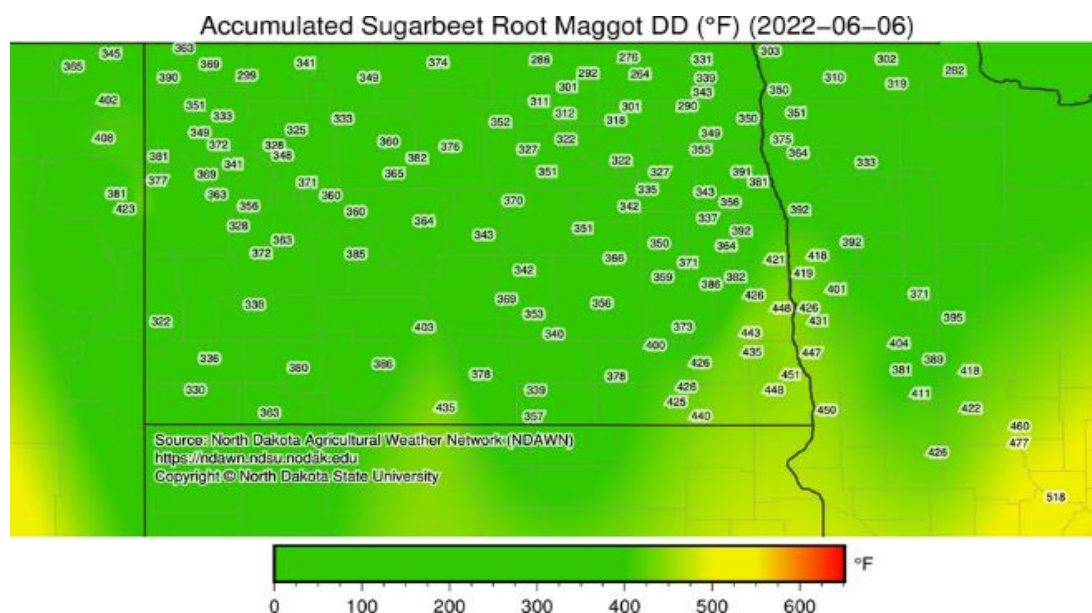


Figure 2. Map of DD accumulations for the Red River Valley sugarbeet production area (Courtesy, North Dakota Agricultural Weather Network (NDAWN)).

An application based on our model for monitoring DD accumulations and forecasting peak fly activity is located on the NDAWN website at: <https://ndawn.ndsu.nodak.edu/sugarbeet-root-maggot.html>. The site also includes a “help sheet” with information on how to use the model and how to optimize root maggot control efforts. It is important to note that warm weather (around 80°F), and calm to low-wind conditions are most conducive to fly activity. Cool, rainy, or windy conditions can substantially reduce fly activity, even if the required degree-day accumulations have occurred.

An extended, **preliminary** forecast of expected DD accumulations and peak fly activity dates for four representative RRV sites is presented in Table 1. Updated, more accurate forecasts will be provided during the next couple of weeks.

Table 1. Accumulated degree-days (DD) and predicted peak activity dates for sugarbeet root maggot flies in four Red River Valley sites

Site	June 6 DD accumulation	Peak fly activity forecast*
Fargo	448	June 15-17 (+80° and low winds)
Ada/Hillsboro	418	June 17-19 (+80° and low winds)
Grand Forks	383	June 19-21 (+80° and low winds)
St. Thomas	343	June 21-23 (+80° and low winds)

*Peak fly activity in current-year beets is most likely on the first calm to light-wind day to reach 80°F after 600 air DD are accumulated.

CONTROL: It is important to note that sugarbeet planting was significantly delayed for many growers this year. As such, sugarbeet plants will be smaller than normal when flies lay eggs and larvae begin feeding on roots. These small plants will be more likely to die because of larval feeding injury. Therefore, growers in hotspots or high-risk areas for SBRM infestation should plan on applying a postemergence insecticide, especially if an insecticidal seed treatment, an at-plant liquid insecticide, or a low to moderate rate of an at-plant granular insecticide was used for initial protection. Fields that received heavy downpours of rainfall after at-plant insecticides were applied also could need additional postemergence protection.

Postemergence granules are usually effective in moist soils and if applied between 1 and 2 weeks before peak fly. Granules will also likely be beneficial if applied within about 4 to 5 days before peak. As such, postemergence granules can be applied immediately, or within the next 7 to 10 days to achieve good control. Light to moderate rainfall after the application can help incorporate the insecticide into the soil where it will be most effective. However, seedlings in many fields could be too small for granular insecticide applications typically made with a rotary hoe or similar implement, because such devices can cause unwanted mechanical injury to young seedlings or even inadvertently remove them from rows.

Postemergence liquid sprayable insecticides can also be effective SBRM management tools, however, liquid applications should be made within 2-4 days before and/or after peak fly. For more guidance on postemergence control strategies, consult the “Insect Control” section of this year’s [Sugarbeet Production Guide](#).

[Mark Boetel](#)

Research & Extension Entomologist



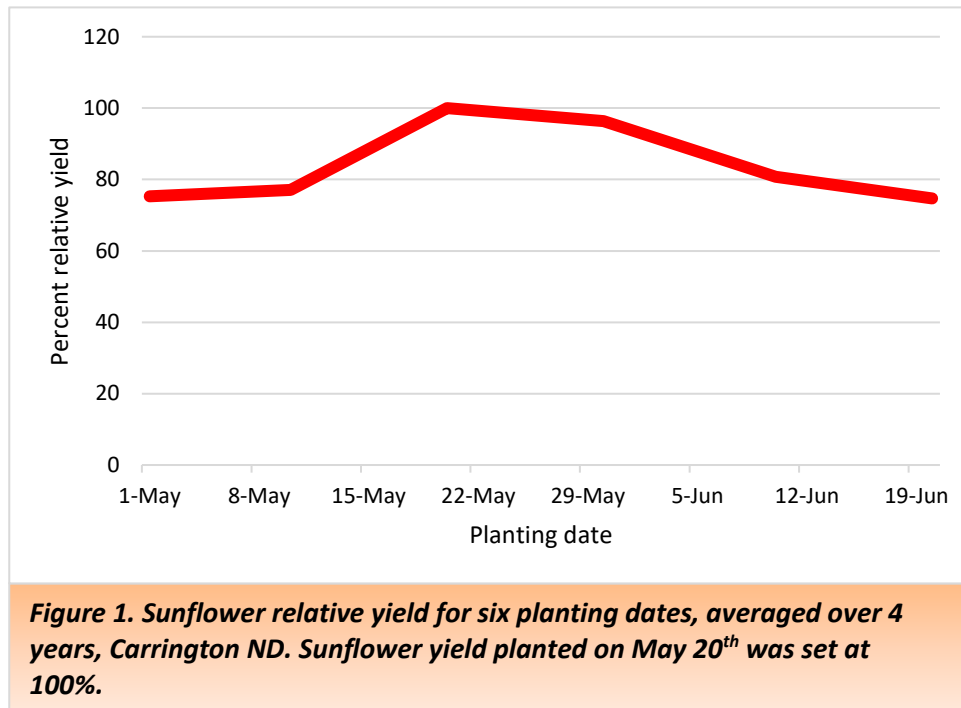
SUNFLOWER LATE PLANTING CONSIDERATIONS

Sunflower may be planted during a wide range of dates. In the northern Great Plains, planting extends from May into June. However, early maturing hybrids should be selected for late planting or replanting.

Growing conditions during the season will affect yield, oil content and fatty acid composition. High temperatures during seed formation have been identified as the main environmental factor affecting the ratio of linoleic and oleic acid content.

High yield may be obtained from May planting dates and may result in reduced bird damage and reduced late-season loss from *Sclerotinia* head rot due to early plant maturity.

Late June plantings often result in lower yields, lower oil content and possibly lower test weight. In addition, when harvest is delayed by weather or field conditions, mechanical drying of seed is required, thus adding to production expenses. Figure 1 provides the relative yield obtained at Carrington averaged over 4 seasons for six planting dates. The yield obtained when sunflower was planted on May 20th was set at 100%. The June 10th planting date resulted in about 80% of the May 20th yield potential.



A few sunflower hybrids are available that mature a bit earlier than others, so earlier maturing hybrid selection would be a good strategy to consider when planting sunflower late. For data on maturity of hybrids see the NDSU [sunflower hybrid trial](#) results.

Sunflower growth and development is mostly driven by heat units, so as planting is delayed, the temperatures are going to be higher and crop development is quicker. The sunflower growing degree model will predict the growth stages when using the actual planting date to run the model, see <https://ndawn.ndsu.nodak.edu/sunflower-growing-degree-days.html>.

[Hans Kandel](#)

Extension Agronomist Broadleaf Crops



COVER CROP OPTIONS FOR 2022 PREVENTED PLANT ACRES

Despite high crop prices, some acres in North Dakota may still be prevent planted during the 2022 growing season. It is essential to establish covers in 2022, at least to use excess soil moisture, otherwise, there will be a high chance of 2022 prevent plant acres going into prevent plant again in 2023. In addition, cover crops can be used for grazing, haying, baleage, preventing erosion, adding plant and microbial diversity, and keeping soils healthy and productive.

Like any other decision, selection of cover crops, whether a single species or a species mix, should meet the objectives of the landowners or producers. Premixes may serve some purposes, but they might not meet all. Custom mixes are better suited for farm specific or, even better, field specific objectives.

Here are some potential questions one should ask to finalize a cover crop mix:

1. Is the field affected by excess levels of water-soluble salts and/or sodicity?
2. What will be the next crop on the field where cover crop is going to be planted in 2022, to consider and avoid volunteer issues?
3. What could be the herbicide and weed considerations?
4. Are there any disease considerations?
5. Is grazing an option?
6. Is haying or baleage an option?
7. Do the objectives include a species that over-winters and greens-up in 2023?
8. Do we just want a cover to use excess moisture this year or would we like to increase organic matter, stimulate biology and improve fertility?
9. Do the objectives include attracting pollinators?
10. What is the maximum cost per acre we are willing to pay for seed and planting?
11. What is the plan for managing crop residue or plant biomass in case of no grazing, haying and baleage?

And there could be other considerations as well.

Given below are some of the most common scenarios and cover crop choices without any specific considerations:

A Single species to Use Excess Soil Water and Provide Soil Cover

If planted immediately after the “final planting date”, sorghum, sorghum Sudangrass or a millet would be good options for producing maximum biomass, as these are warm-season species. Stand-alone seeding rates could be 25 to 30 pounds per acre. Another option could be stand-alone oats and barley or a mix of them for providing an effective cover. Seeding rate for stand-alone barley or oats could be 40 to 60 pounds per acre, whereas, in case of a mix, it could be 50% barley with 50% oats (20 to 30 pounds of barley and oats).

A Three-species Mix to Achieve Multiple Objectives

A simple mix could be comprised of a warm-season, cool-season, and a legume. Examples could include sorghum, barley, and field peas. Seeding rates could be 2 pounds or less of sorghum, 15 to 20 pounds of barley and 20 pounds of field peas. If grazing is an option, forage sorghum can be planted with forage barley and forage peas. Seeding rates will remain the same. Another example could be sorghum, radish, and field peas. Seeding rates could be 2 pounds or less of sorghum, 3 pounds per acre of radish and 20 pounds of field peas.

Another Three-species Mix That Can Achieve Multiple Objectives

A mix of barley or oats combined with radish or turnips and chickling vetch can also help improve soil health, use excess moisture, and prevent erosion. Seeding rates could be 20 pounds of barley or oats, 1.65 pounds of radish or 1 pound of turnips and about 6 pounds of chickling vetch. Please note that areas affected by Clubroot should avoid brassicas.

A Three-species Mix for Moderately Saline and Sodic Areas

A mix of barley, oats and beets can work well on areas that have soil saturated paste electrical conductivity or EC levels of 6.00 (dS/m) or less and a sodium adsorption ratio or SAR of 7.00 or less. Please note that beets do not compete well with other species, so beet percentage in the mix should be 40 to 50%. That will mean 1.4 to 1.5 pounds of beets combined with 15 to 18 pounds of barley and oats.

NDSU Extension has a publication of how to start growing cover crops in North Dakota (<https://mccc.msu.edu/north-dakota-cover-crop-recipe-starting-cover-crops-north-dakota/>). Information about the basics, functions and goals of cover crops can be found in this publication.

NDSU Soil Health website has a great tool called *Searchie* for quickly getting information on cover crops for prevent plant. Just follow the steps below:

- 1) click on this link: <https://www.ndsu.edu/soilhealth/searchie/>
- 2) type in “prevented plant”
- 3) the search tool will show you where we talk about this topic in videos and podcast episodes. When you click on the link, it will take you directly to the relevant information mentioned in the video or the podcast

Also, NDSU Extension has a 2022 Prevented Planting Analysis Tool, which can be found on this link:

<https://www.ndsu.edu/agriculture/ag-hub/ag-topics/crop-production/tools/2022-prevented-planting-analysis-tool>

For advice about specific cover crop mixes, please contact your local Agriculture and Natural Resources Extension County agents.

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MANAGE NURSE CROPS IN SUGARBEET

Barley, oat, or wheat are often planted as nurse or companion crops with sugarbeet to reduce damage from wind or blowing soil. I can tell you that nurse crops protected sugarbeet last Wednesday and Thursday (June 1 and 2) when the wind blew in many locations in eastern North Dakota and western Minnesota. However, nurse crops must be carefully managed after emergence. We suggest terminating nurse crops when sugarbeet are at the 2 to 4-leaf stage (Table) since ground cover of nurse crops reflect heat units from sugarbeet seedlings, potentially delaying growth and robbing yield (Figure 1). Nurse crops (and cover crops) also have an extensive root system that take moisture and fertility away from sugarbeet (Figure 2). Moreover, the carcasses from terminated nurse crops will continue to protect sugarbeet after they have been treated with Roundup PowerMax.

Table. Sugarbeet yield, percent sugar, and extractable sucrose in response to timing of spring wheat nurse crop removal, Prosper, ND, 2015.^a

Sugarbeet stage at wheat termination	Wheat height at termination	Root Yield	Percent Sugar	Extractable Sucrose
Num. of leaves	inch	Ton/A	%	lb/A
No Cover Crop	n/a	35.3 ab	17.0	11,050 ab
2	2	36.0 a	16.9	11,255 a
3	4	36.6 a	16.5	11,175 ab
4	6	35.5 ab	16.8	10,930 abc
5	8	33.8 b	16.7	10,375 c
6	10-12	34.0 b	16.9	10,645 bc
LSD (0.10)		1.6	NS	540
CV		5	3	6

^aMeans within a rating that do not share any letter are significantly different by the LSD at the 10% level of significance.



Figure 1. 6-leaf sugarbeet are difficult to identify in field near St. Thomas, 2021.



Figure 2. Massive winter rye root system is reminiscent of an iceberg, 1/3 of biomass above ground and 2/3 of biomass below ground.

GET READY FOR CHLOROACETAMIDE APPLICATION LAYBY IN SUGARBEET

The majority of sugarbeet are planted and fields are at or approaching the 2-If stage for chloroacetamide application. A reminder, Outlook and Dual Magnum have a 60-day preharvest interval (PHI). Warrant has a 70-day PHI. Producers using a split application strategy usually wait 17 days between application. So, do the math: if you make your first application on June 10 and the second application on June 24, the earliest date the sugarbeet could be harvested is August 23. An alternative might be Outlook, an S-metolachlor product, or Warrant at 18 fl oz, 1.5 pt or 3.5 pt/A, respectively, in a single application.

The following are answers to this week's questions.

- Question. I applied a PRE herbicide 2 or 3 weeks ago. When do I need to apply a lay-by herbicide? Answer. It depends on what herbicide was applied PRE and at what rate. Producers using Dual Mangum PRE or ethofumesate mixtures with Dual Magnum should apply a chloroacetamide herbicide at the 2 If stage. Producers using ethofumesate at 4, 5 or 6 pt/A have more application flexibility due to longer residual from ethofumesate.
- Question. Outlook, Dual Magnum and Warrant are examples of chloroacetamide herbicides. Which one is best? Answer. It depends on your risk factors. Consider Dual Magnum if you have concerns about replanting. Consider Outlook if you desire a product easily incorporated into soil. Consider Warrant if you desire a product with broad spectrum activity or perhaps longer residual activity.

- Question. Can I use other S-metolachlor products besides Dual Magnum layby? Answer. Absolutely. There are several S-metolachlor products including Brawl, Medal, Moccasin, and Charger Basic approved for use layby.
- Question. Can I mix my chloroacetamide herbicide with glyphosate, ethofumesate and Stinger HL? Answer. Sugarbeet herbicides may be tank mixed if all herbicides in the mixtures are registered for use in sugarbeet. Chloroacetamides can be mixed with glyphosate, ethofumesate and Stinger for control of emerged weeds in addition to residual control.

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Tent Caterpillars on Trees and Shrubs

We're already seeing damage from tent caterpillars in eastern North Dakota and western Minnesota. Tent caterpillars eat foliage and in the worst cases, can defoliate entire trees, like this chokecherry in picture below.



Chokecherry shrub entirely defoliated by eastern tent caterpillars. If the shrub was otherwise healthy before this infestation, it will send out new leaves and should recover quickly. If the shrub was defoliated last year or has other pest problems, it could become stressed.

Eastern tent caterpillar (*Malacosoma americanum*) is the damaging agent on this chokecherry. These insects feed on the leaves during the day, but spend the night back in the communal nests, located in branch crotches. These nests provide a great place to apply control efforts. Some trees attacked by the eastern tent caterpillar include chokecherry, pin cherry, and occasionally other hardwood species. The simplest method of control is to simply remove the nests and destroy them. The bacterial-based pesticide *Bacillus thuringiensis* var. *kurstaki* (Btk) works well to control young larvae, while pyrethrins or synthetic insecticides are needed for older larvae. Do not take a blow torch to the nest, as that will also damage the tree.



Close-up of an eastern tent caterpillar. Note the single, solid white line down the middle of its back. Photo by Pat Beauzay.

Forest tent caterpillars (*Malacosoma disstria*) are another defoliator found throughout North Dakota. These insects appear at about the same time as eastern tent caterpillar, but they have a much broader host range and no communal nest in trees. We've seen them on linden, ash, apple, oak, maple, lilac, rose and other deciduous trees and shrubs. Populations of this insect cycle up and down, so some areas are experiencing large outbreaks right now, while other areas have very little pest pressure.

Control measures for forest tent caterpillar are the same as those for eastern tent caterpillar. For small infestations, the larvae can easily be picked off the tree and destroyed. Other insecticides available to homeowners include: acephate (Orthene), azadirachtin (Azatin), carbaryl (Sevin – old formulation), esfenvalerate (Bug-B-Gon), malathion, permethrin, spinosad (Conserve), or other insecticides registered for trees. *Always read, understand, and follow the insecticide label directions.*

The caterpillars will complete their feeding in mid-to-late June, so control measures should be applied as soon as possible.



Forest tent caterpillar feeding on a rose bush. These insects don't actually produce tents but instead form large masses of larvae that congregate together on tree stems. The keyhole-shaped markings on the back are the key identifier for forest tent caterpillars.

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around the state

NORTH CENTRAL ND

Some welcome dry weather finally arrived across the north central region last week allowing many growers to get into the field for extended periods of time. At the NCREC, 0.01" of rain was observed since last Monday (May 30th). The following are precipitation observations across the area as noted by local NDAWN stations from May 30th through June 6th: Bottineau: 0.00"; Garrison: 0.04"; Karlsruhe: 0.11"; Mohall: 0.01"; Plaza: 0.00"; and Rugby: 0.91".

Soil conditions may have been the toughest obstacle this last week for area growers. In many locations, fields appeared dry, but some growers learned how soft many field sites were. A dry weekend should have allowed for further drying. As mentioned in the Crop & Pest Report last week, canola flea beetle is beginning to expand. Dr. Bortolon observed a highly infested field in the Pick City, ND area last Friday. Scouting should begin in area canola field sites.

For more information, please refer to last week's issue of the Crop & Pest Report. Additionally, grasshopper nymphs are being reported in the area, however, populations are small at this time.

Spring wheat is found in a wide range of stages in the region, but mostly are in the 2-3 leaf stage. Canola stage is found ranging from seedling to rosette (2.1 to 2.3) stages. Flax is found in stages 1 to 3. Corn is ranging from V1-V4 stage. Soybeans is found in VC to V1 stages. The wet soils during seeding/planting caused some issues in the seed row that negatively affected plant establishment.

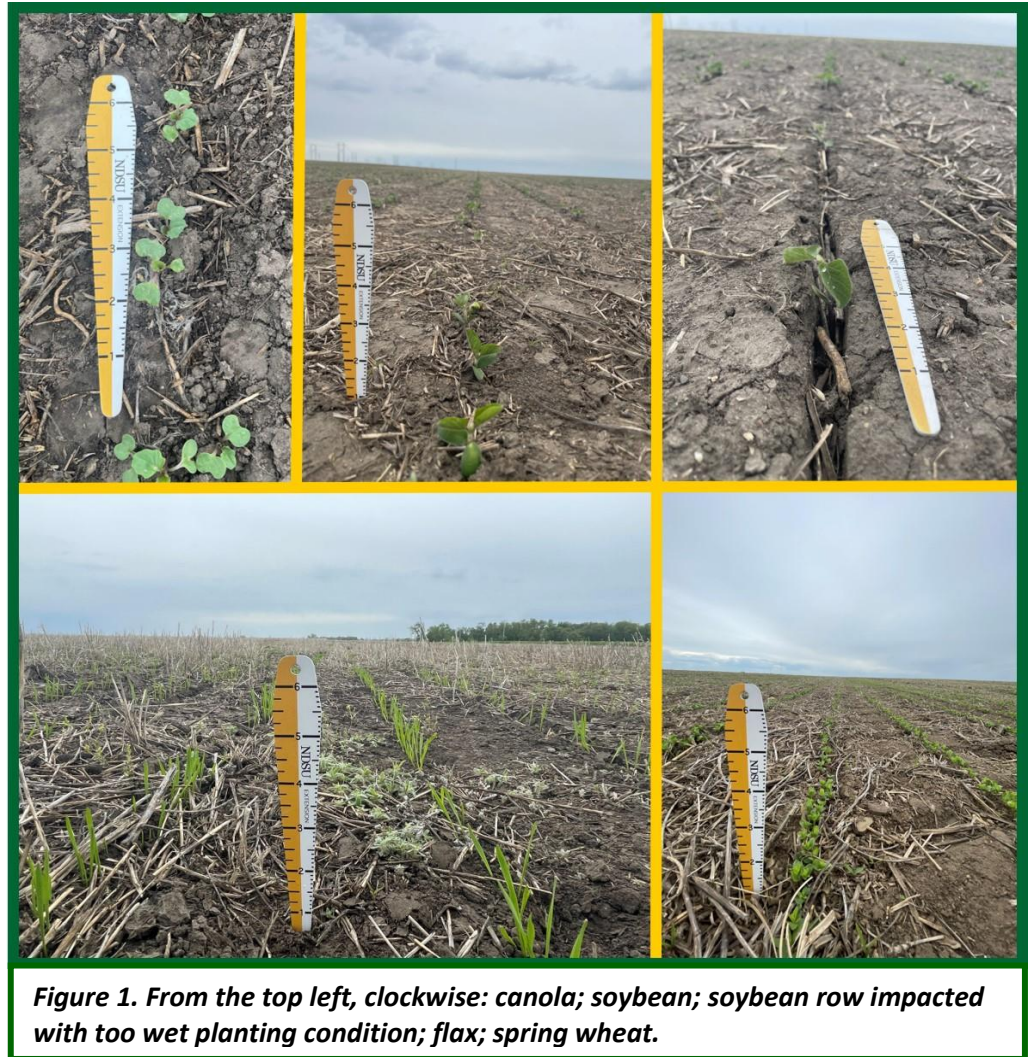


Figure 1. From the top left, clockwise: canola; soybean; soybean row impacted with too wet planting condition; flax; spring wheat.

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NORTHEAST ND

This was the first rain free week for the NE region, giving the producers a chance to work and catchup on plantings. Field activities ranged from cultivation to planting in many areas (*Figure 1*). However, continued cold temperatures and lack of heat pose challenges in certain fields that are too wet to enter. Producers are still lagging behind in planting canola and soybeans. Some producers have opted to plant canola aerially and later harrow them in. Small grain fields are greening up with good and even emergence. The growth stages ranged from 1 to 3 leaf stages (*Figure 2*).



Figure 1. A producer working his field in Nelson County



Figure 2: Spring wheat seedlings

Most of the research trials and foundation seed acres have been planted at the Langdon Research Extension Center. Considerable acres of foundation seed of flax, soybeans and barley were delayed in planting due to wet fields. Small grain trials have started emerging at the station (*Figure 3*). Canola flea beetles are increasing in numbers and early planted canola fields should be scouted for beetle populations. No sight of grasshoppers yet.



Figure 3. Small grain trials at the Langdon Research Extension Center

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SOUTH-CENTRAL/SOUTHEAST ND

According to NDAWN, the region's rainfall during May 1-June 6 ranges from 2.7 inches (Denhoff; Sheridan County) to 7.6 inches (McHenry; Eddy County), with the Carrington REC receiving 6.7 inches. The majority of remaining cropland to be planted, primarily soybean, dry bean and sunflower, should be completed by the end of this week.

Winter rye is flowering, and winter wheat has emerging flag leaves. Emerged spring-seeded small grain and other cool-season crop stands have adequate densities. However, in the Carrington area, conventional-tilled soil has crusted from the heavy Memorial Day rain but late-seeded small grain and soybean are emerging OK (see pictures). Mid-May seeded small grain are tillering and corn has 2 leaves (V2 stage).

Upcoming June field events at the Carrington REC:

- Durum Day – June 22; 10 a.m.
- Crop Management Field School – June 24; 9 a.m.

See the following website for information: <https://www.ndsu.edu/agriculture/ag-hub/research-extension-centers-recs/carrington-rec/events>



Barley stand after harrowing of crusted soil.



Spring wheat emerging through crusted soil (pictures taken June 7).

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SOUTHWEST ND

According to NDAWN, from May 30th to June 6th Dickinson received 0.74 inch, Dunn 0.02, Beach 0.77, Hettinger 1.75, Mott 2.0, and Mandan 0.17 inches. With cool and wet weather, continue to scout for disease to make timely fungicide applications. Remember that some diseases such as ergot can be spread from grassy weeds in the field edge. Be sure to plan for mowing or other management as these grassy weeds approach heading.

Small grains are in a wide range of growth stages across the region, winter wheat and winter rye are ranging from early boot to heading and spring wheat and other cereals range from just poking out of the ground to jointing for early planted fields. The majority are in the tillering stage. We're beginning to see some insect pressure in areas with grasshopper nymphs present. In canola, flea beetles were reaching threshold in some areas. There are some areas that are still planting broadleaf crops and even a few farmers are still putting in wheat. Mid-May planted sunflowers are emerged and in the VE to V2 stages. Rains have continued and some are considering Prevent Plant. However, a large majority of fields in this region are planted. Some low spots have standing water, and many of the saline areas will likely grow worse this year. Remember that soil salinity is a water management issue and can be managed by reducing evaporation with ground cover and a living root to reduce the water table. For more information on saline soils check out the publication "[Managing Saline Soils in North Dakota SF1087](#)"

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**WEATHER FORECAST****The June 9 to June 15, 2022 Weather Summary and Outlook**

Most of North Dakota caught a break from the rain these past 7 days (Figure 1). The one notable exception was in areas south and west of the Missouri River. There were a number of "upper air disturbances" that moved through bringing rain or thunderstorms on several occasions. Elsewhere, precipitation was spotty or non-existent. There will be at least 2 or 3 disturbances in the next week bringing rain and thunderstorms. The best days seem to be Saturday and then again next Monday and Tuesday. It is doubtful that all locations will record precipitation from each disturbance.

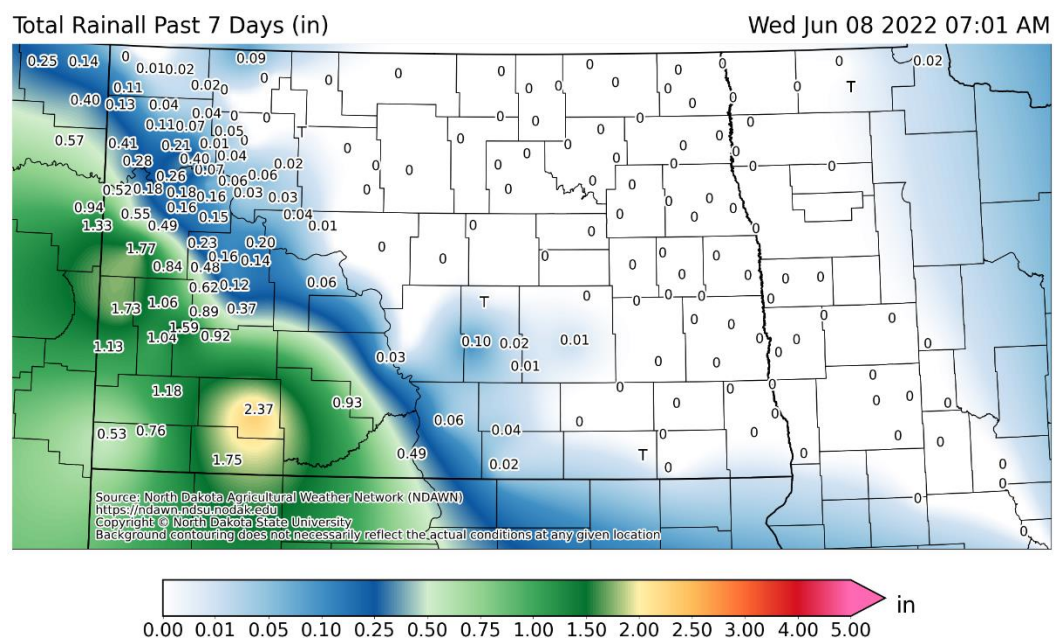
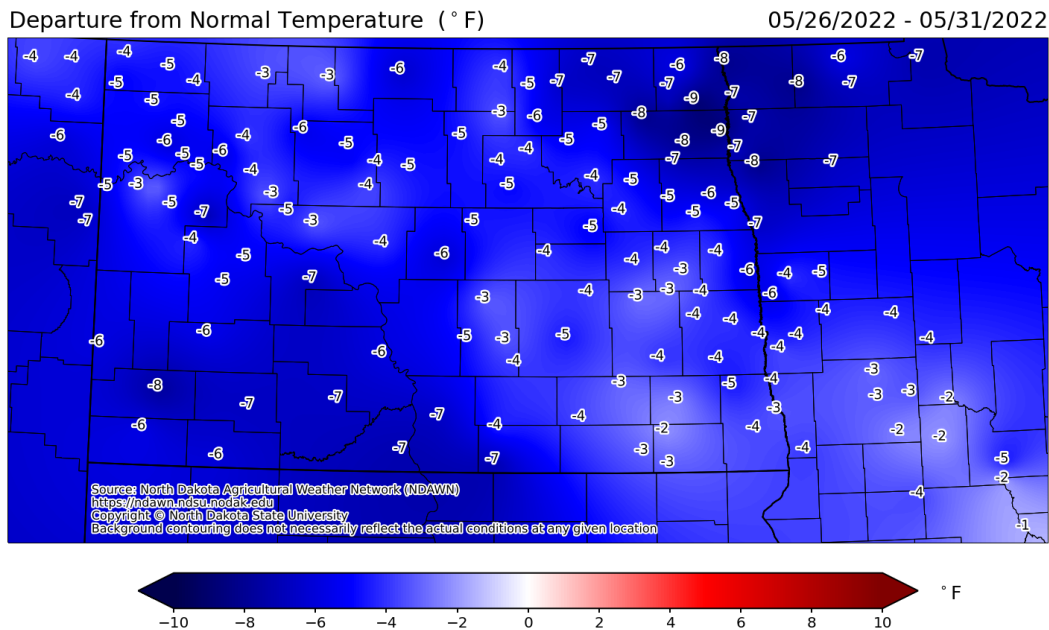
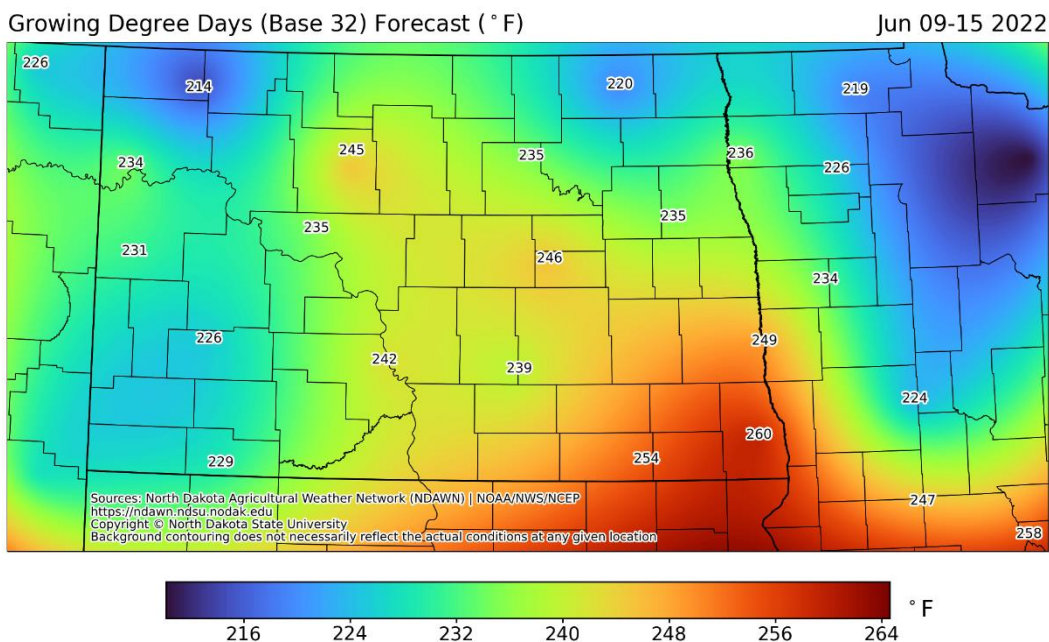


Figure 1. Total rainfall for the 168-hour period ending at 7:00 AM on June 8, 2022 at NDAWN stations

Temperatures this past week were below average (Figure 2). If you live in southeastern North Dakota that may come as a surprise. Although maximums were near or even above average on several days, the minimums were well below average meaning the overall average was below normal for early June. These next 7 days are expected be near or a bit above average. There are signs of a major warmup coming to the northern plains, but it may hold off until after this forecast period.



Figures 3 and 4 below are forecasted Growing Degree Days (GDDs) base 32° (wheat and small grains) and 50° (Corn and Soybeans). Because temperatures look to be near or above average for this forecast period, GDDs will be more plentiful this week. In fact, it appears the period from June 9 through June 16 will record by far the most heat units of any 7 day period this growing season.



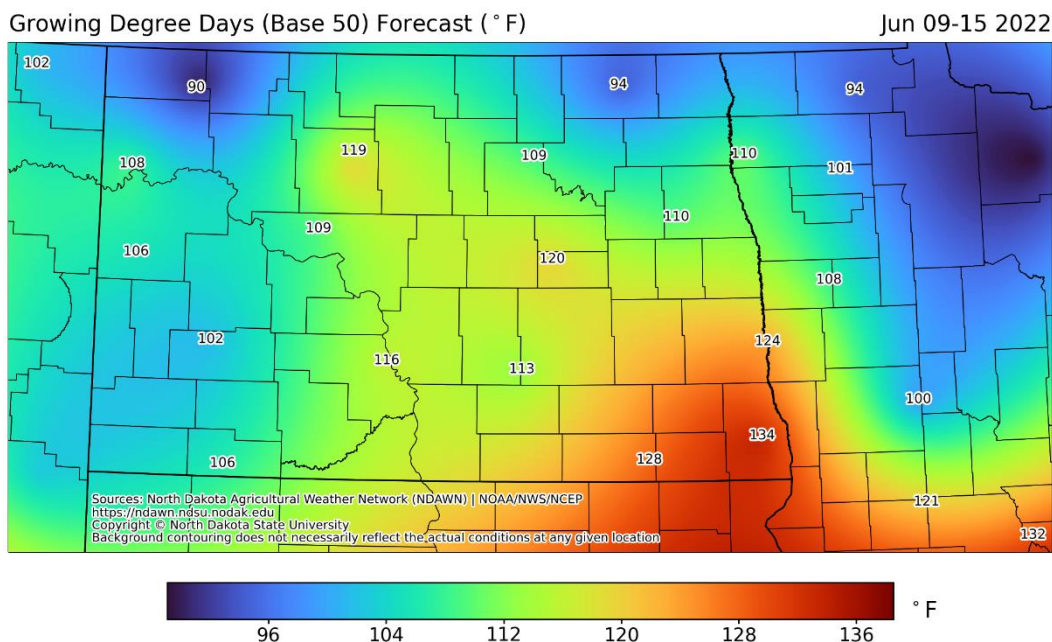


Figure 4. Estimated growing degree days base 50° for the period of June 9 to June 15, 2022.

Using May 15 as a planting date, the accumulated growing degree days for wheat (base temperature 32°) are given in Figure 5. 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>

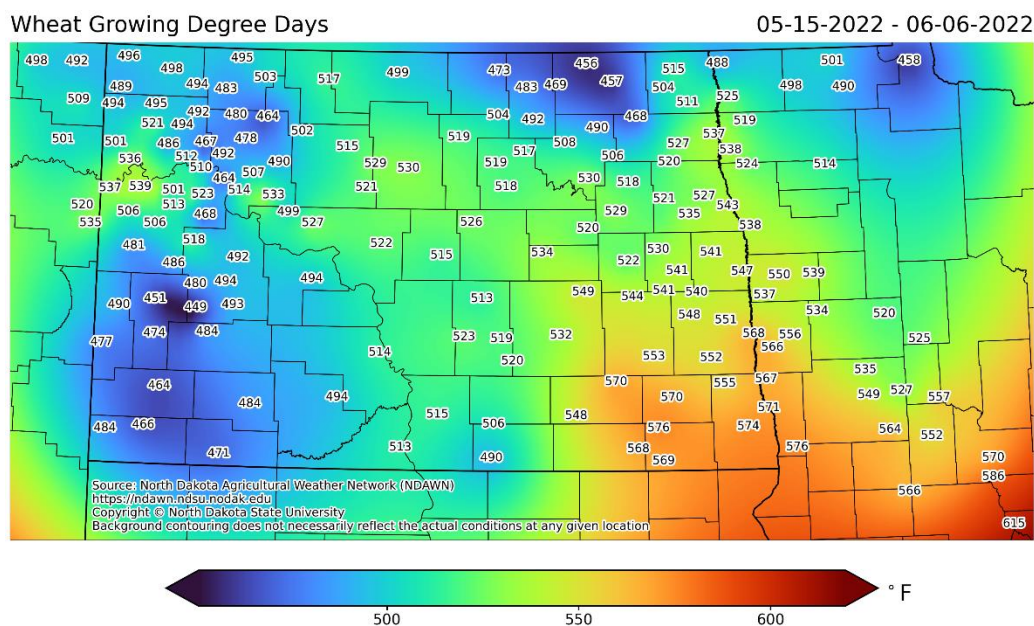


Figure 5. Wheat Growing Degree Days (Base 32°) for the period of May 15 through June 6, 2022.

Using May 20 as a planting date, the accumulated growing degree days for corn (base temperature 50°) are 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>

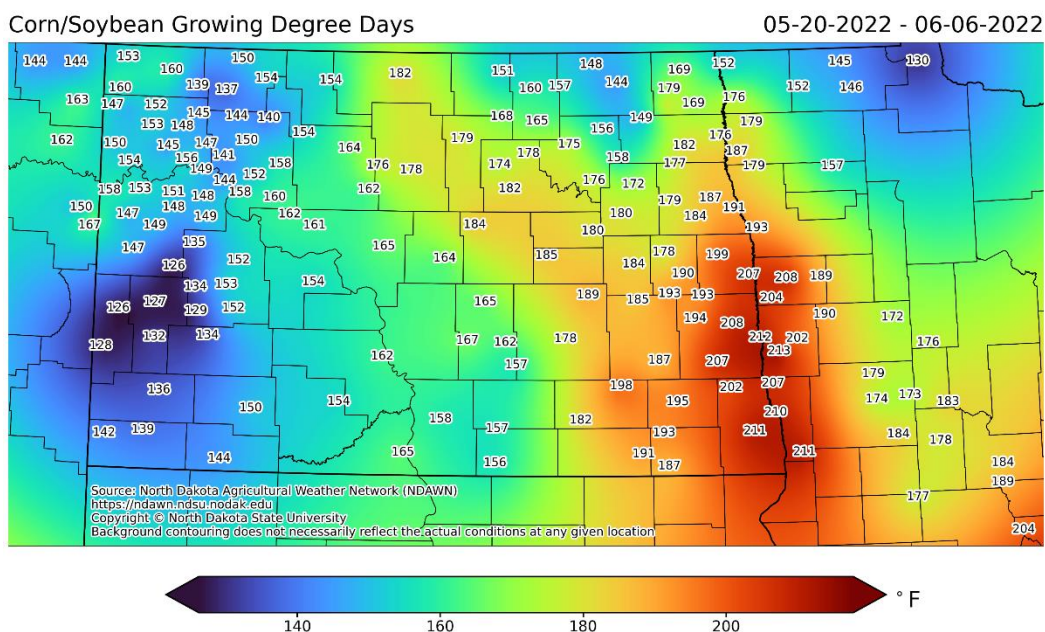


Figure 6. Corn Growing Degree Days (Base 50°) for the period of May 20 through June 6, 2022.

Soybeans also use base 50° like corn, but NDAWN has a special tool for soybeans that, based on your planting date and cultivar, can estimate maturity dates based on average temperatures, as well as give you GDDs based on the planting date(s) you set. That tool can be found here: <https://ndawn.ndsu.nodak.edu/soybean-growing-degree-days.html>

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