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## entomology

### IPM CROP SURVEY STARTS IN ND AND MN

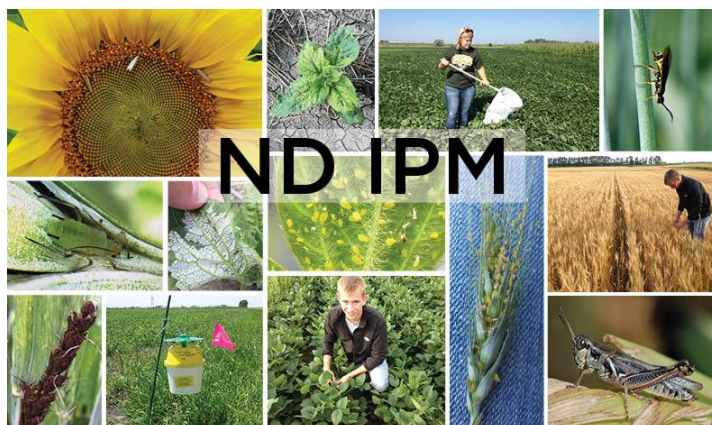
For the 2021 Integrated Pest Management (IPM) Crop Survey, six scouts and two insect trappers were hired in North Dakota and three scouts in Minnesota! Field scouts in North Dakota will survey for major diseases and insect pests on wheat, barley, sunflower and soybean. Minnesota scouts will survey mainly wheat and soybean. Two webinar trainings were conducted on May 31<sup>st</sup> and June 1<sup>st</sup> to discuss pest identification and scouting protocols for each crop.

The purpose of the survey program is to monitor for economic pests that negatively affect crop yields. Timely pest alerts will be provided for producers, crop consultants and agronomists to assist with pest management. Some of the scouting data also is used to support export of our crop commodities. GPS coordinates are recorded with pest data, and ArcView maps will be created to show incidence and severity of pests in North Dakota. Maps are posted weekly on the [NDSU IPM web page](https://www.ag.ndsu.edu/ndipm) (usually by Wednesday of each week). <https://www.ag.ndsu.edu/ndipm>

Important pest activity will also be summarized for the NDSU Extension *Crop and Pest Report* and other social media.



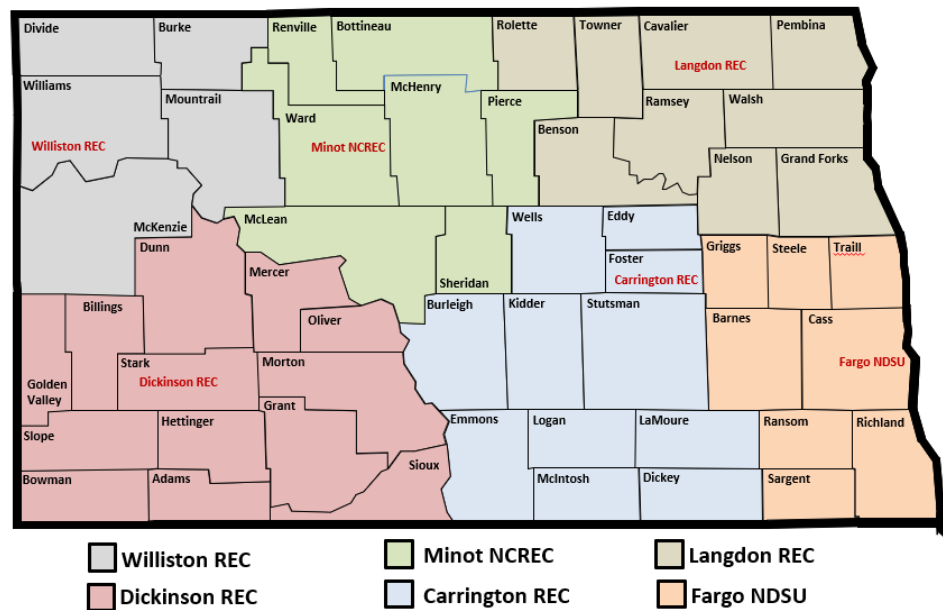
**Marc Michaelson, former NDSU IPM Scout, checks wheat field for insects and diseases (J. Knodel)**



The NDSU IPM scouts are:

- **Carrie Nichols**, central and south-central counties, working out of Carrington REC with Greg Endres
- **Iris Dukart**, southwest and west central counties, working out of Dickinson REC with Ryan Buetow
- **Alexius Holter and Riley Racine**, north central counties, working out of NCREC in Minot with Travis Prochaska
- **Scott Roseth**, northwest counties, working out of Williston REC with Claire Keene
- **Tommy Crompton**, southeast and east central counties, working out of NDSU campus, Fargo with Janet Knodel, Patrick Beauzay, Andrew Friskop and Sam Markell.
- **Nancy Feil and Jolena Lowery**, northeast counties, working out of Langdon REC with Anitha Chirumamilla (Cavalier County Extension Office), Scott Knoke (Benson County Extension Office) and Katelyn Landeis (Grand Forks Extension Office).

## IPM Scouting Areas



The IPM scouts working for the University of Minnesota Extension are:

- **Tyler Goplen**, Norman, Mahanomen, Clay, Becker, Wilkin, Otter Tail Counties, working out of Moorhead with Anthony Hanson, Regional Educator, IPM / Extension
- **Emily Schmiedeberg**, Kittson, Roseau, Lake of the Woods, Marshall, Pennington, Red Lake, Polk Counties, working out of Crookston with Angie Peltier, Regional Educator, Crops / Extension
- **Kyle Reese**, central and southern counties, working out of Morris with Jared Goplen, Regional Educator, Crops / Extension

This work is supported in part by the Crop Protection and Pest Management Program [grant no. 2017-70006-27144] from the USDA National Institute of Food and Agriculture, and the North Dakota Department of Agriculture.

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**SUGARBEET ROOT MAGGOT UPDATE: HOT WEATHER WILL ACCELERATE FLY EMERGENCE**

Despite relatively low sugarbeet root maggot (SBRM) fly activity at this time, the anticipated streak of hot weather is likely to produce major surges in fly emergence and subsequent movement into beet fields in the next couple of days. Until about one week ago, weather patterns had SBRM development following a very normal pattern, however, the processes of pupation and adult emergence are very flexible and are easily accelerated under warm conditions such as those anticipated in both short- and long-term forecasts for the Red River Valley (RRV). It will be important to closely monitor SBRM fly activity over the next couple of weeks to determine where the most concerning hotspots begin emerging. Fly counts for all monitoring sites can be viewed at: <https://tinyurl.com/SBRM-FlyCounts>.



*Fig. 1. Sugarbeet root maggot adult on sugarbeet seedling (note characteristic smoky-brown patches on wing margins).*

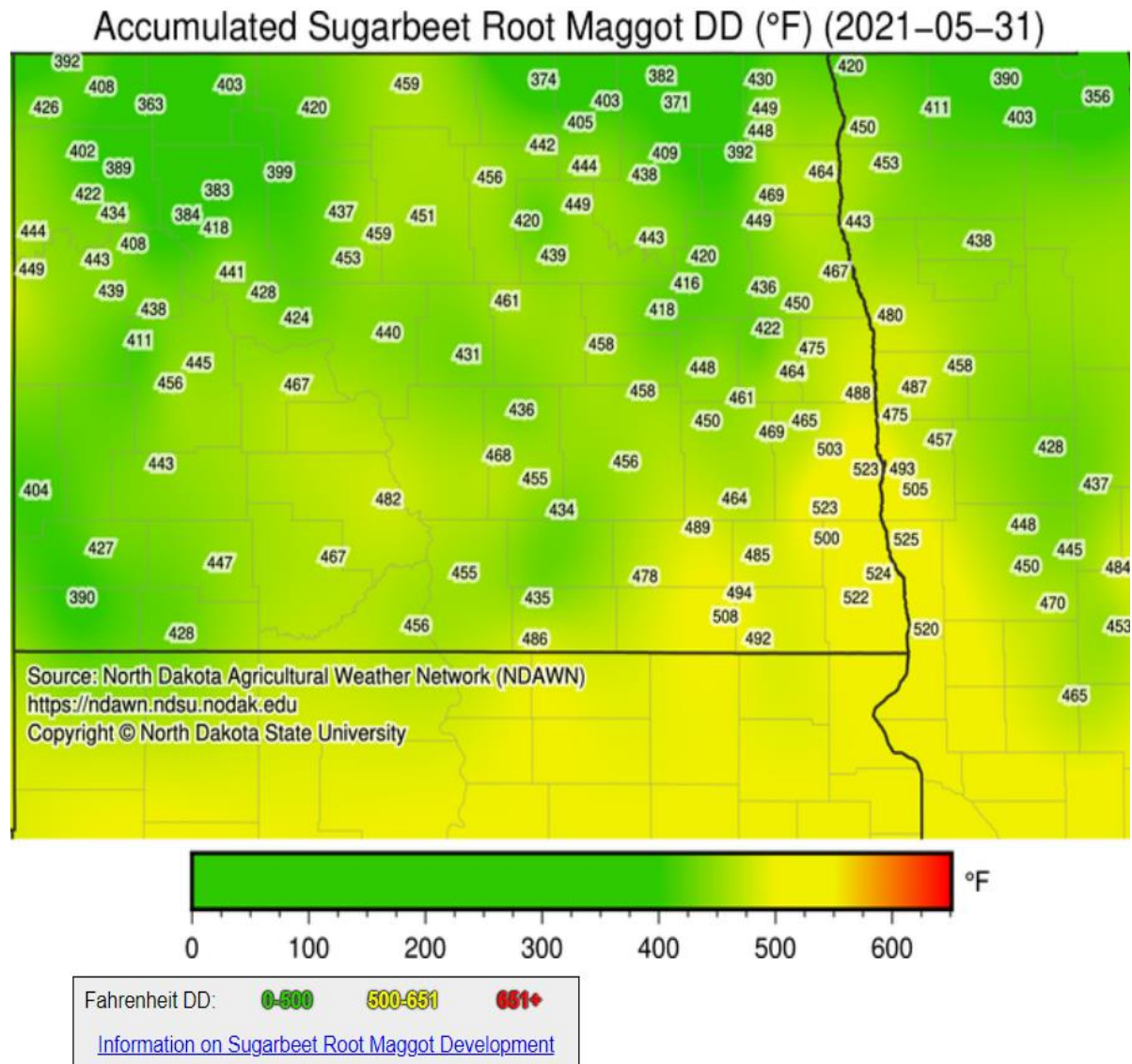
As shown in Table 1, SBRM degree-day (DD) accumulations in much of the RRV vary slightly among latitudes, with the highest accumulations occurring in southern parts of the growing area. However, the expected hot weather is likely to have somewhat of an equalizing impact on DD accumulations, which is illustrated by the similar forecasts for “Maximum Likelihood Peak Fly Date” in the table.

<b>Location</b>	<b>Total DD (as of May 31)</b>	<b>High Fly Activity Period</b>	<b>Maximum Likelihood Peak Fly Date*</b>
Fargo, ND	525	June 4-6 (+80°F, dry, and low winds)	June 5
Ada, MN	486	June 5-7 (+80°F, dry, and low winds)	June 6
Grand Forks, ND	466	June 6-8 (+80°F, dry, and low winds)	June 7
St. Thomas, ND	447	June 6-9 (+80°F, dry, and low winds)	June 7

\*Maximum likelihood for peak fly activity is based on extended weather forecasts for wind speed, air temperature, and precipitation.

Peak fly in current-year beets usually coincides with the first rain-free, calm/low-wind day to reach 80°F after 650 DD are accumulated.





**Fig. 2. Accumulation of sugarbeet root maggot growing degree-day (DD) units through May 31, 2021.**

Peak fly activity typically occurs when an area reaches about 650 DD. However, flight activity is significantly impacted by weather. Warm weather (around 80°F) and calm to low-wind (i.e., less than 12 mph) conditions are most conducive to fly activity, whereas, flies tend to remain relatively inactive in cool, rainy, or windy conditions. Since the likelihood of rainfall events and associated winds is relatively low in the short-range forecast, a quick rise and a single, large peak in fly activity is expected for most areas where SBRM infestations are likely to occur.

**Control.** Growers in areas at high risk for damaging SBRM infestations should plan on applying a postemergence insecticide, especially if a moderately performing insecticide (i.e., insecticidal seed treatment, at-plant liquid insecticide, or a low to moderate rate of a granular insecticide) was used at planting. Although rare this year, any fields in which heavy rainfalls ( $\geq 3$  inches) occurred after at-plant insecticides were applied also may need additional postemergence protection, regardless of the insecticide used at planting time.

The entire RRV growing area has reached the 440 DD mark that is recommended for beginning to apply postemergence granules (Figure 2). Although granular products can provide excellent postemergence SBRM control,

they are less effective under dry soil conditions such as those commonly found in much of the growing area. Producers planning on using a granular product for root maggot control this year should do so immediately; however, if rain is expected within a few days, it will be advantageous to apply the material shortly (i.e., a day or less) before the anticipated rain. Effectiveness of granular applications can also be improved by lightly incorporating the product into the soil during the application.

Postemergence liquid insecticides work well under either moist or dry soil conditions. Applications should be targeted at 2 to 5 days before peak fly, but should provide some control if applied within a few days after peak as well. Sprayed fields should be monitored for potential resurgences of flies, and may require retreatment if subsequent infestations reach or exceed 0.5 flies per plant. For more guidance on postemergence control strategies, consult the “Insect Control” section of the [2021 Sugarbeet Production Guide](#) or the “Sugarbeet Insects” section of the [2021 Field Crop Insect Management Guide](#).

[Mark Boetel](#)

Research & Extension Entomologist



#### **FROST DAMAGE**

During the early morning of Friday May 28, 2021, frost occurred in many parts of North Dakota and northwestern Minnesota. Temperatures below 32 F will cause water in plant cells of susceptible crops to freeze and resultant ice crystals will kill cells by damaging cell membrane systems. How different crop species react to freezing temperatures depends on where the growing points are, and if the cells have built in anti-freeze systems to prevent ice crystal formation.

Environmental conditions before or immediately after a low temperature greatly influence the extent of freezing injury. If the temperature drop is gradual, plants are in better condition to resist injury and can stand surprisingly low temperatures. Similarly, slowly rising temperatures after a frost and satisfactory soil moisture conditions are desirable to aid recovery. However, drought conditions, wind, and high temperatures are likely to aggravate frost injury and lessen the chance of recovery.

Corn plants less than 6 to 8 inches tall (five-leaf stage or less) will recover from frost because the growing point is still below the soil surface and is usually not damaged. However, in some plants the damaged tissue may constrict the emergence of a new leaf.

Cereal grains may lose some leaf tissue due to frost. New growth will occur after frost damage since the growing point is protected below ground before jointing.

Soybean and dry bean are quite sensitive to frost. Soybean and dry bean plants may leaf out again after a light frost from axillary buds in the leaf axil, where the cotyledon or the unifoliate leaves and the stem meet. However, tissue damage below the cotyledons will result in plant mortality.



**Photo 1: Soybean frost damage.**  
Picture taken Noon May 28, 2021,  
after early morning frost.



**Photo 2: Soybean frost damage.** Several plants  
died, some survived. Picture taken June 1, 2021,  
four days after early morning frost.

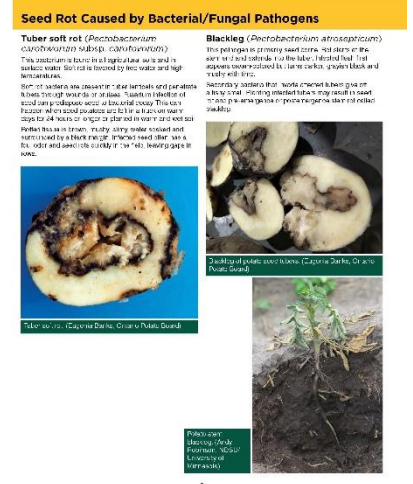
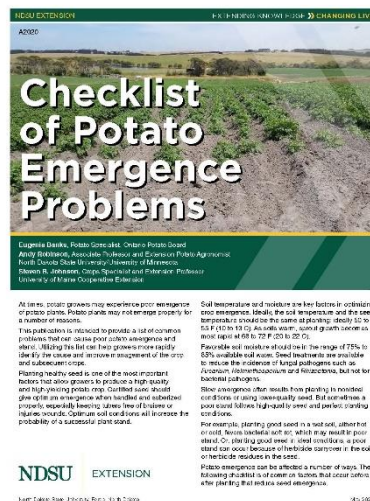
In evaluating frosted seedling fields, consider the percentage of plants killed and the percentage recovered. The surviving plants should be evenly distributed in a field. Even if many of the seedlings in a reasonable stand are frost killed, the field will usually produce more seed when left rather than if re-seeded, especially during the current drought conditions. The surviving plants will take advantage of the reduced competition for light, moisture and nutrients, and grow larger, producing more branches, pods and seeds per pod, thereby compensating for the lost plants. The remaining plants may require five to eight days longer to mature; but a re-seeded crop will require an even longer period to reach maturity.

[Hans Kandel](#)

Extension Agronomist Broadleaf Crops

## CHECKLIST OF POTATO EMERGENCE PROBLEMS

Many factors can affect potato emergence and cause a reduced stand. This certainly is worrisome when considering potato tuber yield and quality. Because there are many different problems that can cause poor emergence, we have developed an Extension bulletin that briefly explains and shows common emergence problems in potato. This bulletin can be found at [z.umn.edu/emergence](https://z.umn.edu/emergence).



**Figure 1. Pictures of the Checklist of Potato Emergence Problems article.**

[Andy Robinson](#)

NDSU/U of M Extension Potato Agronomist





## POSTEMERGENCE HERBICIDES IN WHEAT: WHAT A YEAR

What a week of temperature extremes. Many were still scouting for frost and freeze damage by the time forecast highs in the mid to upper 90's were announced. Herbicide application questions over the last week have ranged from "is it too cold to spray herbicides" to "is it too hot to spray herbicides". Add in many uneven crop stands and it has been a stressful week (and year) for making postemergence herbicide decisions.

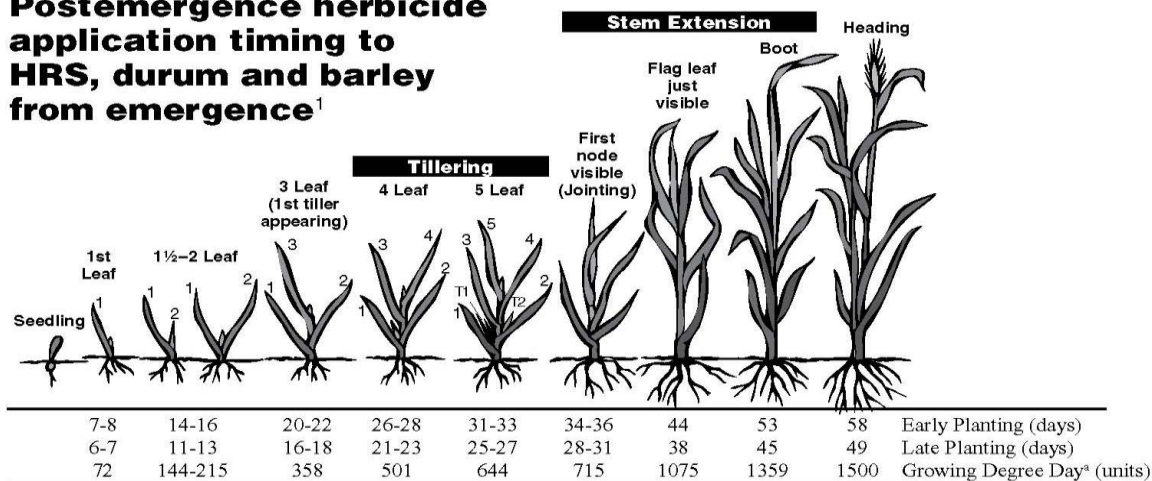
The temperature question is always a difficult one. Herbicides work best when weeds are actively growing. In general, ideal temperatures for herbicide performance are the 70's to mid 80's for a high, with overnight lows not too cold. We can expect less weed control when temperatures are on the cool side and plant growth slows down. Spraying after a morning frost will provide poor results. On the other hand, weed growth slows down in extreme heat (especially if accompanied by dry conditions). So now we can expect reduced weed control as temperatures soar above the 90 degree mark late this week.

Increased crop injury from herbicides is also a concern in extreme cold or hot conditions. Most questions coming in this week have been about spraying wheat in the heat since many wheat fields are reaching the critical time to spray POST herbicides. Spraying wheat in the heat of the day when temperatures are above 90 will certainly increase the risk of crop injury. If possible, it would be best to park the sprayer during the peak of the coming heat wave when temperatures are forecasted to be in the mid to upper 90's. If a field has to be sprayed, then applications made in the morning or evening when temperatures are cooler can help mitigate some of the injury. Keep in mind that we do not want to spray during a temperature inversion in order to avoid off-target movement of the chemical. I'm no meteorologist, but the forecasts I have seen at this writing (evening of June 1<sup>st</sup>) indicate there will be some temperature relief early next week. Weed control and crop injury will be more acceptable if applications are delayed until that time.

Now for the other bugger this year: growth staging a wheat field for herbicide application. Many areas that finally received some rainfall two weeks ago are now looking at wheat anywhere from seedling to jointing...all within the same field. Some wheat herbicides have very narrow application windows, while others are flexible enough to allow application anywhere from emergence to boot. Knowing the growth stage window of your herbicides will be important to avoid crop injury and/or unacceptable herbicides residues if pre harvest intervals are not properly followed. Page 16 in the 2021 North Dakota Weed Control Guide has a handy table showing the application timing for many small grain herbicides. Keep in mind that the herbicides with the widest window of application will not necessarily be the best herbicide for your given weed spectrum. Tight supply chains may also limit the ability to switch out a herbicide option. Many fields will need to be evaluated on a case by case basis in the coming days to determine the best time to pull the trigger on herbicide applications.

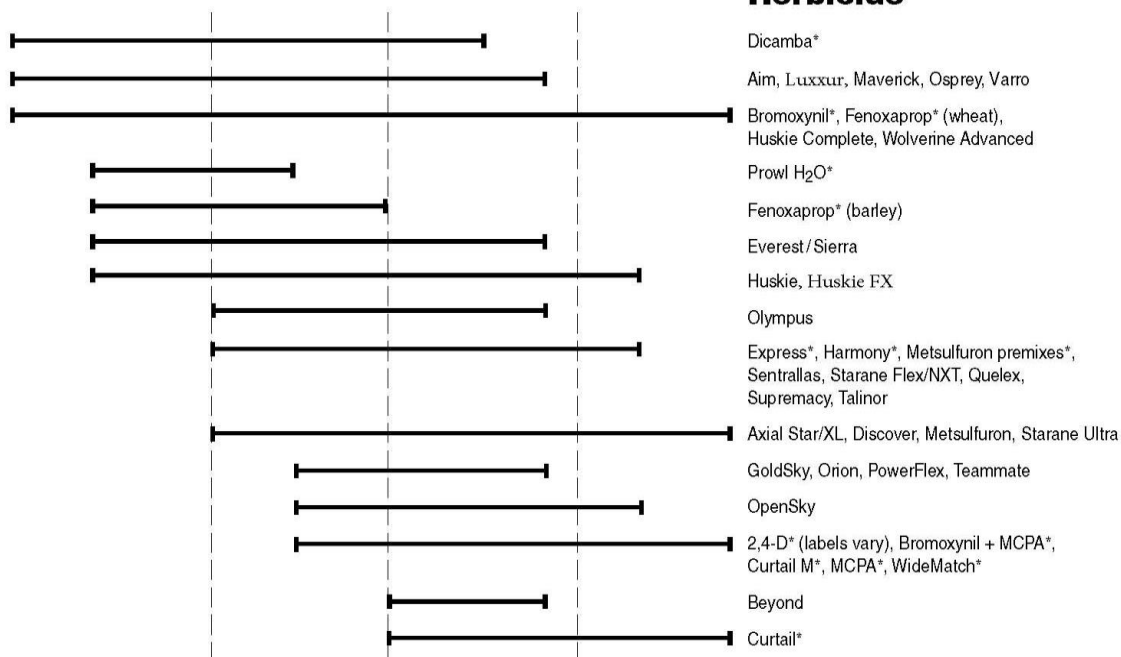
*(Continued on next page)*

## Postemergence herbicide application timing to HRS, durum and barley from emergence<sup>1</sup>



The lettering on the drawing represents the following: 1=1st leaf on the main stem of the plant; and so forth to 5=5th leaf on the main stem; and T=Tiller – not counted as a leaf when determining leaf stages.

\*Growing Degree Day Units =  $\frac{(\text{Maximum Day Temperature} + \text{Minimum Day Temperature})}{2} - 32$



<sup>1</sup> Herbicide may have different application timings for individual crops. Use specific label information for individual crops.

\* or generic equivalent

**Remember to always follow the label — it's the law!**

12/2021

**Postemergence herbicide application timing for small grain herbicides.**

[Joe Ikley](#)

Extension Weed Specialist





# around the state

## AROUND THE STATE

### NORTH CENTRAL ND

Despite the rain observed over the weekend, it only offered partial relief for the North Central region. Although the rain was timely, high winds played an important role to dry the topsoil, especially in areas with low soil cover by plant residues. Hit-and-miss showers were a common scene across the region with some farmers wrapping up planting activities. In general, area crops in the field are in good development (Figure 1). Last week, a noticeable frost was experienced in some areas of the state. In our region, information was received about frost damage in canola (Figure 1). The NCREC did not observe frost damage in crops already planted. The damage caused by frost on crops depends on several factors, such as crop, crop stage, duration of the frost among others. Some spray activities were seen in the region; however, the windy conditions in the past week made it difficult to find a proper time frame for spraying applications. Here are some quick precipitation reports as observed by area NDAWN stations over the last week (beginning May 25<sup>th</sup>): Minot: 0.15"; Bottineau: 0.05"; Garrison: 0.11"; Karlsruhe: 0.20"; Mohall: 0.22"; Plaza: 0.13"; and Rugby: 0.07". Additionally, the bare soil temperature at the NCREC is observed at 69 degrees F.

Canola flea beetle activity has been fairly low so far during the 2021 growing season around the Minot area. This is likely due to cooler overnight temperatures experienced over the last 7-10 days. However, a warmer forecast lies ahead. Some quick observations at the NCREC saw increased flea beetle activity Tuesday morning, especially in canola not protected with a seed treatment. Similar observations have been made in some area gardens. For more information on canola flea beetle, please refer to the May 20<sup>th</sup> addition of the Crop & Pest Report.



**Figure 1. Well established yellow field pea (left) and canola with frost damage (right).**

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Extension Crop Protection Specialist  
NDSU North Central Research Extension Center

[Leo Bortolon](#)

Extension Cropping Systems Specialist  
NDSU North Central Research Extension Center

**NORTHEAST ND**

Producers are wrapping up with planting of canola, soybean, dry bean and sunflower. Small grain fields are looking much better as last week's rain helped with filling in some bare spots. However, very dry in most of the areas with tough looking wheat stands and bare patches. Growers are worried about uneven emergence which would lead to potential challenges for sprayings and harvesting down the road. Concerns of frost damage in soybeans and talks of anticipating re-planting beans are emerging in some areas. Some fields of sugar beets were affected by wind damage last week. Canola flea beetle populations are high with canola fields emerging. Wireworm damage in a spring wheat field has been reported. Pastures are extremely bare and need rain badly. Producers are worried about cow herds and feed shortages.

[Anitha Chirumamilla](#)

Extension Agent Cavalier County

**NORTHWEST ND**

We are starting to see the effects of the rain that fell over a week ago on the landscape. The ditches are greening up and crops are now visible in the fields. Early planted small grains have spotty stands with early-emerging plants having a few leaves to 1 tiller and later emerging plants at V1. Many of the fields with spotty stands just didn't have consistent enough moisture to get all the seedlings out of the ground. Later planted crops are just starting to emerge. Scattered light showers moved through the area over the Memorial Day weekend but did not result in measureable rainfall in most places. Farmers who have not already finished planting wrapped up over the holiday weekend and are transitioning from planting to spraying.

Unfortunately, this week's forecast is predicting difficult conditions for already struggling crops. The high for Wednesday is 87, 96 Thursday, and possibly upper 90's or even 100°F on Friday, and mid 90's on Saturday before getting back into the 80's next week. There are no strong chances of rain during this heat wave, so crops that have just emerged will be subject to heat stress. Hopefully thunderstorms will develop with the heat, but if not, crop damage seems likely.

[Clair Keene](#)

Extension Cropping Systems Specialist  
NDSU Williston Research Extension Center

**SOUTH-CENTRAL/SOUTHEAST ND**

According to NDAWN, since last week's report (May 27), this region's southern and eastern counties received the 0.1 to 0.7 inch of rain. Total rainfall during May ranged from 0.6 inch (Robinson) to 5.7 inches (Jamestown), and the Carrington Research Extension Center (CREC) received 1.4 inches. More rain is needed, especially with recent high winds and forecasted extreme air temperatures later this week! Also, crops that potentially can recover from damage caused by the May 28 frost are hindered by minimal topsoil moisture plus pending heat.

*(Continued on next page)*





***Damaged corn and terminated soybean from May 28 frost at the CREC.***

Alfalfa regrowth at the CREC is at  $\leq 15$ -inch height and flower buds are present. Advanced winter rye is heading and spring-planted small grain are jointing. Corn is in the 2- to 3-leaf stage and early planted soybean in the unifoliate (VC) stage. Dry bean and sunflower planting should be near completion this week.

[Greg Endres](#)

Extension Cropping Systems Specialist  
NDSU Carrington Research Extension Center

## **SOUTHWEST ND**

According to NDAWN from May 1<sup>st</sup> to June 1<sup>st</sup> Dickinson had 4.18 inches of rain, Mott had 5.92 inches, Hettinger 4.46, Bowman 2.60, Amidon 4.39, Beach 2.07, Dunn 2.48, Hazen 1.63, and Mandan with 1.68 inches. There are pockets especially in a stretch from New England over to Mott that have water saturation stress along field edges. Thanks to no-till practices those that have received less than 3 inches in the past month still have decent stands of small grains. Due to a wide range in planting dates and moisture levels, wheat is varying in growth stage from just emerging, to 4 leaf, to tillering. While crop stands are looking surprisingly decent in areas low on moisture, with the upcoming heat it could really push into major crop stress.

Alfalfa and hay fields are looking decent in the Dickinson area, however growth is behind from previous years. Sunflower planting is going strong. There has been a large amount of activity on the weed control front with weeds emerging following the timely rainfall.

While the season is looking more optimistic for some in the region, there are still major concerns about drought stress, especially for those with livestock with some pockets receiving minimal rain compared to neighboring areas.

[Ryan Buetow](#)

Extension Cropping Systems Specialist  
NDSU Dickinson Research Extension Center



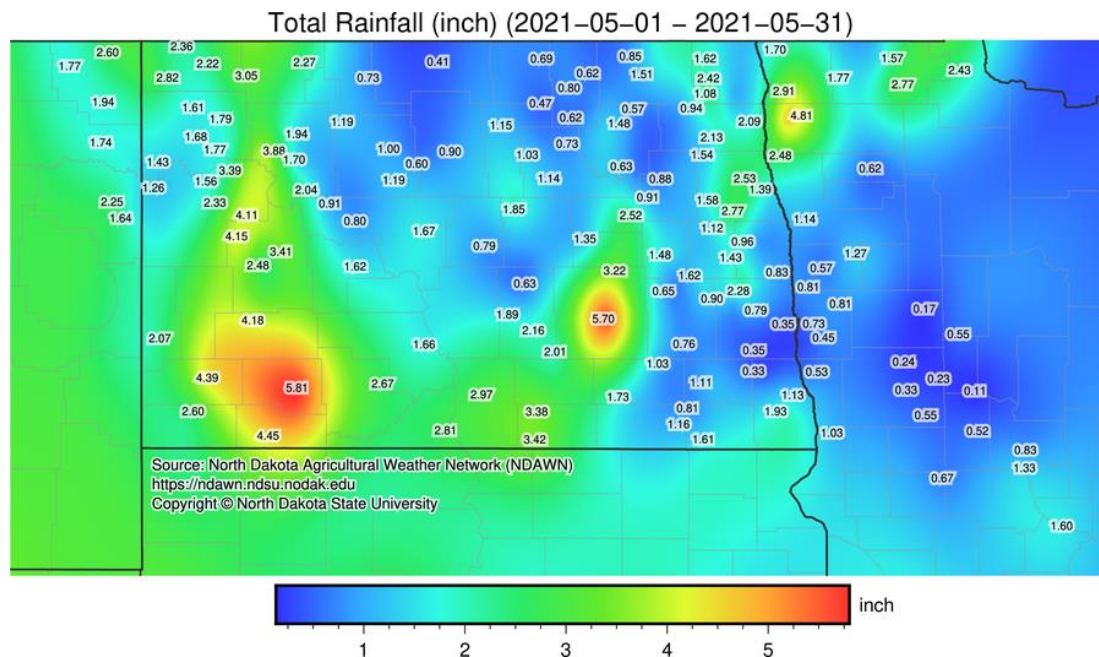


## WEATHER FORECAST

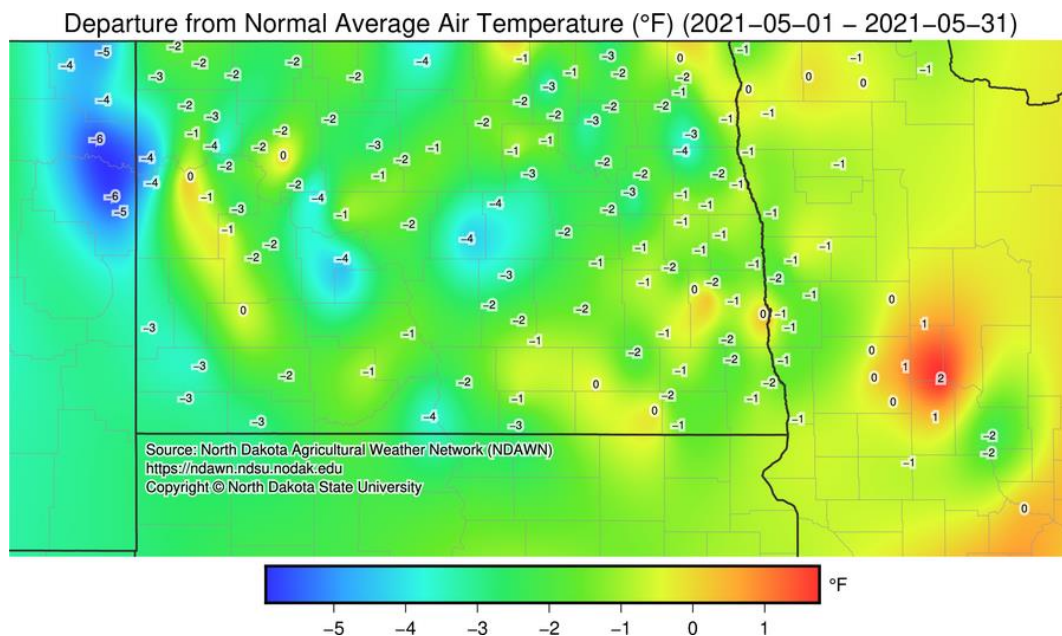
### The June 3 to June 9, 2021 Weather Summary and Outlook

June 1 marked the first day of meteorological summer. Any forecasts you may have heard for this summer would be for the period of June 1 through August 31. The first week of summer looks to be very warm. Temperatures are expected to be well above average. You may recall June 2020 also started very warm with temperature approaching 100°. June 2021 will be similar, but the heat this year will be longer lasting than a year ago. Plus, last year most areas still had adequate or above normal soil moisture associated with the extremely wet autumn of 2019. This year, most areas have a dry soil profile, especially in the upper 6 inches. What this will mean is extreme crop stress as this several day stretch of high temperatures will also come with little or no rainfall. Saturday and maybe early next week look to be the best chances for rain, but the odds favor scattered, not widespread, precipitation. Plus, with soils still mostly exposed, the topsoil temperatures could exceed the air temperatures in the afternoons with relative humidity values very low.

Instead of looking at last week's rain and temperatures, Figures 1 and 2 this week have the statistics for May. May was overall a cool month with most NDAWN stations recording temperatures 1° to 3° below normal. Rain was a mixed bag, with some locations above average, some near average and others below average. A reminder that background contouring does not necessarily reflect any spot outside of the North Dakota Agricultural Weather Network (NDAWN) station.

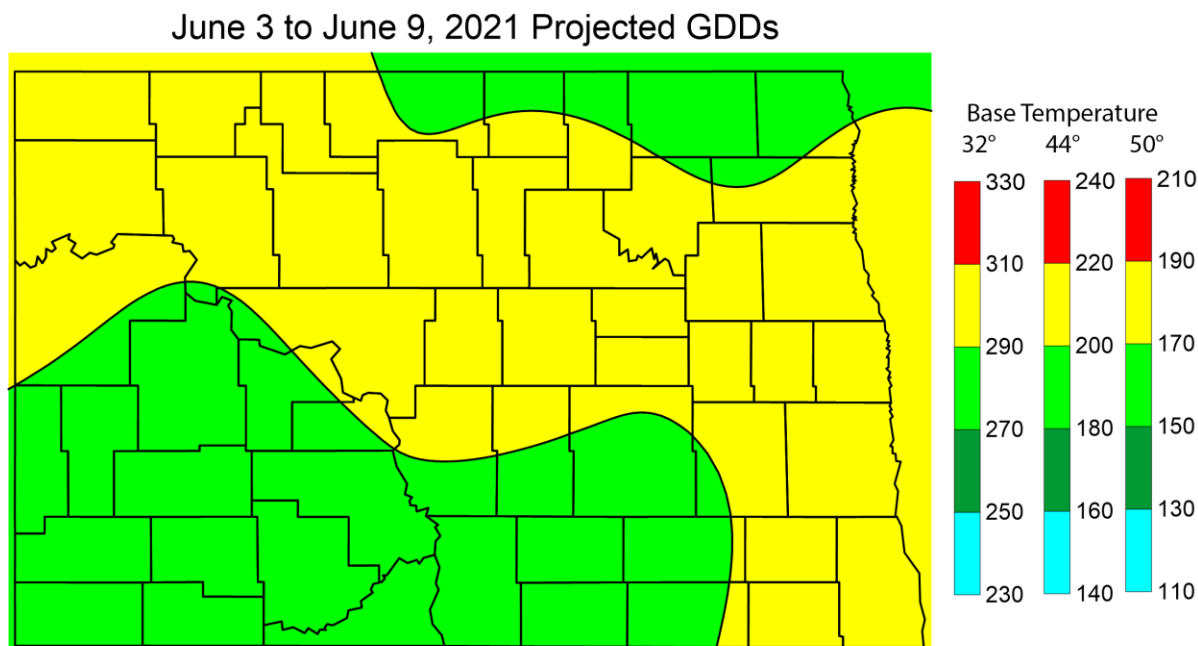


**Figure 1. Total rain at selected NDAWN stations during May, 2021**



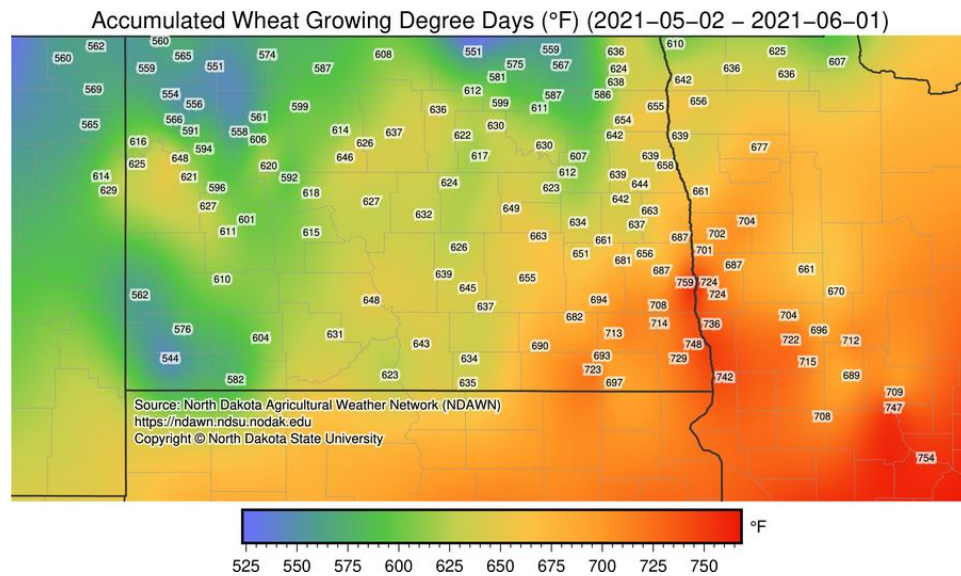
**Figure 2. Departure from average temperature at selected NDAWN weather stations for the month of May 2021.**

The projected growing degree days (GDDs) base 32°, 44° and 50° for the period of June 3 through June 9, 2021 can be found in Figure 3. A reminder that most growing degree computations do not give credit for high temperatures above 86°. Meaning the number of growing degree days calculations in Figure 3 are based on a maximum high temperature of 86°. This means there will be only small GDD differences across North Dakota during the week with the main variations associated with the minimums each day.



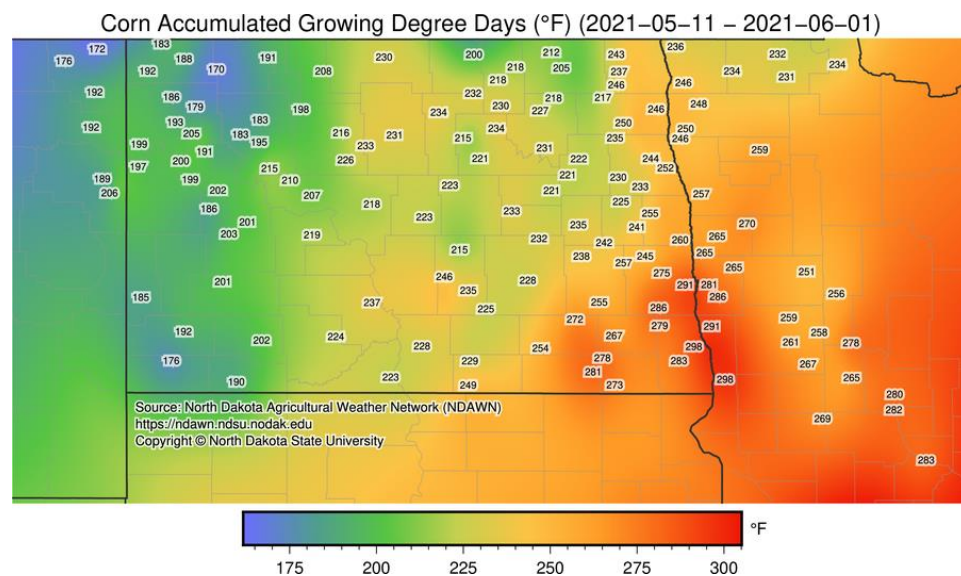
**Figure 3. Projected Growing Degree Days, Base 32°, 44° and 50° for the period of June 3 to June 9, 2021**

Using May 1 as a planting date, accumulated growing degree days for wheat (base temperature 32°) is given in Figure 4. 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 4. Accumulated Growing Degree Days for Wheat (Base 32°) since May 1, 2021**

Using May 10 as a planting date, accumulated growing degree days for corn (base temperature 50°) is given in Figure 5. 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 5. Accumulated Growing Degree Days for Corn (Base 50°) since May 10, 2021**



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 your planting date(s) you set. That tool can be found here: <https://ndawn.ndsu.nodak.edu/soybean-growing-degree-days.html> Because of the replanting of soybeans associated with the freezing temperatures on May 28 in particular, this tool might be especially useful this year. If you have never used it before, you should check it out.

[Daryl Ritchison](#)

Meteorologist

Director of the North Dakota Agricultural Weather Network

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