North Dakota State University
CROP & PEST REPORT

NDSU EXTENSION

No. 11 July 8, 2021

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NDSU FIELD DAYS FOR 2021

The following is a list of 2021 annual Field Days events. Please visit the Research Extension Center and Agronomy Seed Farm websites for more details. Hope to see you there in person!

July 13 -**Hettinger Research Extension Center**
(5-7 p.m. MDT followed by supper)

July 14 - **Dickinson Research Extension Center**
(9 a.m. start MDT)

July 14 & 15 - **Williston Research Extension Center**
July 14: dryland tour - Williston Research Extension Center *(4-7 p.m.)*
July 15: irrigated tour - Nesson Research & Development farm, located 23 miles E of Williston on #1804 *(8:30 a.m.-12 noon)*

July 19 - **Agronomy Seed Farm** Casselton
(5 p.m. start)

July 20 - **Carrington Research Extension Center**
(9 a.m.-3 p.m.)

July 21 - **North Central Research Extension Center**
(tentatively 9 a.m.-12 noon)

July 22 - **Langdon Research Extension Center**
(8 a.m.-1 p.m.)

July 27 - **Central Grasslands Research Extension Center**
(10 a.m. - 3 p.m.)

Entomology

SCOUT FOR EUROPEAN CORN BORER

European corn borer (ECB) Z-race moths (univoltine) have started emerging in ND (Table 1). This past week, ECB-Z have started emerging in east central, north central and northeastern ND. Trap catches increased for the univoltine Z-race ECB moth in Ransom County near Shenford and Shelton. We also detected the first E-race ECB moth (bivoltine) in Ward county near Minot. Corn crop stages were V4 to V8.

Table 1. European Corn Borer Pheromone Trapping 2021

Area	County	Nearest town	Race	June 18-24	June 25-July 1
EC	Barnes	Cuba	Z	0	0
EC	Barnes	Cuba	E	0	0
EC	Cass	Casselton	Z	0	0
EC	Cass	Casselton	E	0	0
EC	Cass	Kindred	Z	0	0
EC	Cass	Kindred	E	0	0
EC	Griggs	Cooperstown	Z	0	1
EC	Griggs	Cooperstown	E	0	0
EC	Steele	Finley	Z	0	0
EC	Steele	Finley	E	0	0
EC	Traill	Alton	Z	0	0
EC	Traill	Alton	E	0	0
NC	Ward	Minot	Z	1	1
NC	Ward	Minot	E	0	1
NE	Grand Forks	Gilby/Mcanna	Z	0	1
NE	Grand Forks	Gilby/Mcanna	E	0	0
NE	Nelson	Lakota	Z	0	8
NE	Nelson	Lakota	E	0	0
SE	Ransom	Shenford	Z	28	106
SE	Ransom	Shenford	E	0	0
SE	Ransom	Sheldon	Z	3	30
SE	Ransom	Sheldon	E	0	0
SE	Richland	Colfax	Z	0	1
SE	Richland	Colfax	E	0	0
SE	Richland	Antelope	Z	0	0
SE	Richland	Antelope	E	0	0
			Total # of Z =	**32**	**148**
			Total # of E =	**0**	**1**

Figure 1. Shot-holes or pinholes on corn leaf caused by ECB larval feeding (Tracey Baute, Ontario Ministry of Agriculture, Food and Rural Affairs)

Now is a good time to start monitoring for ECB in corn fields, especially conventional corn or Bt corn without Bt-traits for ECB control. When corn is about 17 inches tall, fields should be scouted weekly for corn borers and continue scouting for another five weeks. Inspect plants for the presence of egg masses, whorl feeding (Figure 1), and active larvae. Pull up and unroll the whorls to find ECB larvae. Presence of shot-holes or pinholes (Figure 1) on leaves indicates ECB larval feeding. Observing moth (Figure 2) activity around field margins or within the field may alert you about possible ECB infestations in your field.

See the following Table for the Economic Threshold (E.T.) for corn borer per plant based on corn crop value and control costs. Using an expected yield of 125 bu per acre and the current price of corn at U.S. $5.70 per bu (MYA price for 2021/22), the value of the corn crop is $712 per acre. Using $12 per acre for the control costs, the E.T. is 0.43 corn borer larvae per plant (red square).

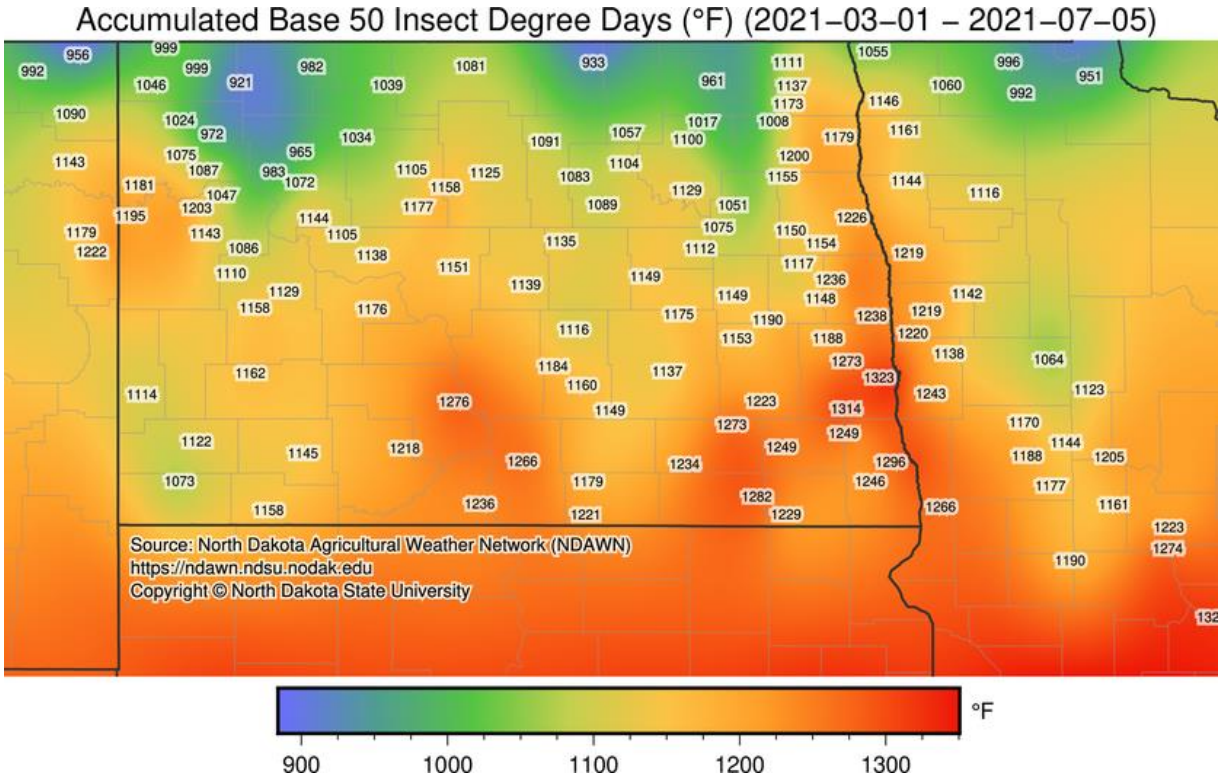
The accumulated degree days (ADD; base 50°F) for univoltine ECB-Z development range from 900 in northern area to >1300 ADD in southern area of ND (see map below). **This indicates that the univoltine ECB moths are 10-90% emerged depending on your location.**

Economic Threshold (corn borer per plant) when factoring crop value and control costs at late whorl.

Control Costs ($/acre)	Value of Corn Crop ($/acre)													
	200	250	300	350	400	450	500	550	600	650	700	750	800	850
6	0.75	0.6	0.5	0.43	0.38	0.34	0.3	0.27	0.25	0.23	0.21	0.20	0.19	0.18
7	0.88	0.7	0.58	0.5	0.44	0.39	0.35	0.32	0.29	0.27	0.25	0.23	0.22	0.21
8	1	0.8	0.67	0.57	0.5	0.45	0.4	0.37	0.34	0.31	0.29	0.27	0.25	0.24
9	1.12	0.9	0.75	0.64	0.56	0.5	0.45	0.41	0.38	0.35	0.32	0.30	0.28	0.26
10	1.25	1	0.83	0.71	0.63	0.56	0.5	0.46	0.42	0.38	0.36	0.33	0.31	0.29
11	1.38	1.1	0.92	0.79	0.69	0.61	0.55	0.5	0.46	0.42	0.39	0.37	0.34	0.32
12	1.5	1.2	1	0.86	0.75	0.67	0.6	0.55	0.5	0.46	0.43	0.40	0.38	0.35
13	1.63	1.3	1.08	0.93	0.81	0.72	0.65	0.59	0.54	0.50	0.46	0.43	0.41	0.38
14	1.75	1.4	1.17	1	0.88	0.78	0.7	0.64	0.59	0.54	0.50	0.47	0.44	0.41
15	1.88	1.5	1.25	1.07	0.94	0.84	0.75	0.68	0.63	0.58	0.54	0.50	0.47	0.44
16	2	1.6	1.33	1.14	1	0.89	0.8	0.73	0.68	0.62	0.57	0.53	0.50	0.47

[1] *Crop value = expected yield (bu/acre) x projected price ($/bu)*
[2] *Control costs = insecticide price ($/acre) + application costs ($/acre)*

Univoltine ECB-Z Degree Day Model (Lower base – 50°F)	
Accumulated Degree Days	**ECB Life Stage**
911	10%of moths emerged
986	25% of moths emerged
1078	50% of moths emerged
1100	Egg hatch, begin scouting
1177	75% of moths emerged
1274	90% of moths emerged
1300	3rd instar larvae, make final treatment decision



Although corn is the preferred crop of ECB, moths (Figure 2) are polyphagous and can infest other crops like dry bean, hemp, millet, potatoes and more. ECB infestations in dry beans and millet have been observed in ND in the past. Last week, **a millet field in Pembina County observed high numbers of ECB moths in field** (Source: M. Smith, Pembina County Extension Agent). Millet is often used by ECB moths as an aggregation site to congregate and mate. ECB larvae tunnel into the stem causing serious stem lodging (Figure 4) and yield loss in millet. Scout millet and dry bean fields for potential ECB infestations and treat when populations are high in field (sweep millet fields for ECB moths) or if nearby corn is infested above threshold. There are no developed scouting protocols or thresholds for ECB in millet or dry beans.

Figure 2. ECB moth (J. Knodel, NDSU)

Figure 3. Mature ECB larva in base of millet stem (J. Knodel, NDSU)

Figure 4. Lodging in millet by severe infestation of ECBs (J. Knodel, NDSU)

Veronica Calles-Torrez
Post-doctoral Scientist

TJ Prochaska
Extension Crop Protection Specialist
NDSU North Central Research Extension Center

Janet J. Knodel
Extension Entomologist

IPM CROP SURVEY - INSECT UPDATE

Cereal aphids were observed in 23% of the wheat fields scouted last week including SE (Ransom, Richland, LaMoure, Sargent counties); EC (Barnes, Cass counties); Central (Eddy, Stutsman, Wells counties) and NE (Grand Forks county). The percent of plants infested ranged from 1-100%. Hot spots were in Barnes and Cass counties; however, these fields were maturing wheat, Zadoks 80-82 (dough development). Growth stages of wheat are varying widely from only Zadoks 21 (main shoot and one tiller) to mature 83 (early dough). Cereal crops are quickly maturing due to extreme heat and drought, and aphids will be moving to other crops like corn. Only late-planted wheat in the heading stages (prior to Zadoks 59) are still susceptible to yield loss when >85% of the plants are infested with one or more aphids. See last week's *Crop & Pest Report* #10, July 1st for more information.

Grasshoppers also are maturing quickly with the heat last week and some nymphs are already late instar nymphs, which will be molting into adult grasshoppers, probably in the next one-two weeks. We are at least two weeks ahead in grasshopper development. About 80% of the fields scouted had grasshoppers present at field margins and the density of grasshoppers ranged from 1-16 nymphs per square yard. There has been reports of edge spraying by growers in hot spots. Needless to say, continue to scout for increasing and yield-robbing grasshopper infestations frequently this year. Economic threshold for nymphs is 30-45 nymphs per square yard in field and 50-75 nymphs per square yard in field margins. If you are having trouble counting that many, use a 15-inch sweep net and four 180-degree sweeps equals one square yard. Or, convert to the number per square foot - 3-5 nymphs per square yard in field and 6-8 nymphs per square foot in field margins.

Soybean aphids were observed in 9% of the soybean fields scouted last week and found only in Cass and Grand Forks counties of ND. The percent of plants infested was 3-19% and the average number of aphids per plant was 1-32 in

infested fields. Growth stages of soybeans ranged widely from only V4 to R2 (full bloom). Continue to scout soybean fields at least weekly through R6 (full seed).

Spider mites are hard to find and were observed in only 2 fields located in Grand Forks and Pembina counties. The forecast for rains and cooler temperatures will help mitigate any increases in populations for at least the next week.

IPM maps of insect pests and diseases are posted on the IPM website: https://www.ag.ndsu.edu/ndipm

ARMYWORM AND BLACK CUTWORM TRAPPING NETWORK

A pheromone trapping network for true armyworm and black cutworms was set-up in June in North Dakota. Trap catches are summarized in Table 1. Armyworm numbers have recently doubled for Cass, Ransom, Traill and Towner trap sites. However, drought is not favorable for armyworm reproduction. Areas with recent rains and lodged wheat should be scouted for armyworm larvae in about 2 weeks. Low trap catches for black cutworm were observed at all trap sites since inception.

For more information on armyworm, see the NDSU Extension publication on ***The Armyworm and the Army Cutworm E830***.

Armyworm Economic Thresholds:

Small Grains (wheat, barley, oats)
- ***Preheading:*** Four or more larvae per square foot
- ***Heading (head clipping):*** Two or more larvae per square foot

Corn
- ***Seedling corn:*** 10 percent of the plants are damaged and larvae are less than ¾ inch
- ***Whorl stage:*** 25 percent of plants have two larvae per plant or 75 percent of plants have one larva per plant
- ***Tassel stage:*** Minimize defoliation at or above the ear leaf. Protect pollinators from insecticide poisoning by spraying in the late evening or early morning in tasseling corn.

Janet J. Knodel
Extension Entomologist

Table 1. Summary of pheromone trap catches for true armyworm and black cutworm in wheat, 2021.

Area	County	Insect Pest	June 7-18	June 21-25	June 28-July 2
Central	Foster	Armyworm	-	0	0
Central	Wells	Armyworm	-	0	0
EC	Cass	Armyworm	4	17	13
EC	Traill	Armyworm	-	11	18
NC	Pierce	Armyworm	-	0	0
NE	Cavalier	Armyworm	0	0	1
NE	Ramsey	Armyworm	-	0	0
NE	Towner	Armyworm	-	1	18
NE	Walsh	Armyworm	-	0	0
NW	Mountrail	Armyworm	-	1	0
NW	Renville	Armyworm	-	0	1
NW	Ward	Armyworm	-	0	0
NW	Williams	Armyworm	-	1	1
SE	McIntosh	Armyworm	-	-	0
SE	Ransom	Armyworm	-	3	14
SW	Golden Valley	Armyworm	0	0	1
SW	Hettinger	Armyworm	0	2	0
WC	Dunn	Armyworm	0	0	0
WC	McKenzie	Armyworm	-	0	0
		TOTAL #	**4**	**36**	**67**
Area	**County**	**Insect Pest**	**June 7-18**	**June 21-25**	**June 28-July 2**
Central	Foster	Black cutworm	-	0	2
Central	Wells	Black cutworm	-	0	0
EC	Cass	Black cutworm	0	1	1
EC	Traill	Black cutworm	-	0	1
NC	Pierce	Black cutworm	-	1	0
NE	Cavalier	Black cutworm	0	0	0
NE	Ramsey	Black cutworm	-	0	0
NE	Towner	Black cutworm	-	0	0
NE	Walsh	Black cutworm	-	0	0
NW	Mountrail	Black cutworm	-	0	0
NW	Renville	Black cutworm	-	0	1
NW	Ward	Black cutworm	-	0	0
NW	Williams	Black cutworm	-	0	1
SE	McIntosh	Black cutworm	-	-	0
SE	Ransom	Black cutworm	-	0	1
SW	Golden Valley	Black cutworm	2	0	0
SW	Hettinger	Black cutworm	1	0	0
WC	Dunn	Black cutworm	0	0	0
WC	McKenzie	Black cutworm	-	1	0
		TOTAL #	**3**	**3**	**7**

plant science

SOYBEAN REACHING R1

Soybean plants in our area are transitioning from the vegetative growth stages to the reproductive phase of their crop development cycle. Thus far, the 2021 growing seasons has been dry with warm to hot growing conditions. The higher than normal Growing Degree Day units have accelerated the crop development and the production of the first soybean flowers. Flowering was observed in some of my research plots during the last days of June. The soybean plant usually begins the reproductive period after the 4-6 trifoliolate leaf stage (Photo 1) has been reached. The first flower can be found lower on the stem and this stage is called reproductive one (R1) and is depicted in photo 2.

Photo 1. Soybean trial at Casselton ND, at the V5-V6 growth stage with 88% canopy cover and transitioning to the R1 growth stage, July 1, 2021. (Jose D. M. Bais).

Photo 2. Soybean plant at R1 at Casselton, ND, July 1, 2021 (Jose D. M. Bais).

Full flowering or bloom (R2 growth stage) is reached when many nodes on the stem have flowers and a flower is open at the one of the two uppermost nodes on the main stem. Soybean is mostly self-pollinating with natural crossing occurring at a rate of less than 0.5 percent. Pollination usually occurs the day before the full opening of the flower. The stigma is receptive to pollen about one day before opening of the flower and remains receptive for two days. Shortly after pollination, the pod formation phase starts. The pod development stage (R3) is reached when the pods are 3/16 inch long at one of the four uppermost nodes on the main stem with fully expanded trifoliolate leaf. Lack of moisture during the pod development and grain filling growth stages will result in lower yield. Description of soybean growth stages can be found in the Soybean Growth and Management Quick Guide at https://www.ag.ndsu.edu/publications/crops/soybean-growth-and-management-quick-guide.

(table on next page)

Table 1. Soybean Reproductive Stages.

Stage	Description
R1	Beginning bloom – One open flower at any node on the main stem.
R2	Full bloom – Open flower at one of the two uppermost nodes on the main stem with a fully developed leaf.
R3	Beginning pod – Pod 3/16 inch long at one of the four uppermost nodes on the main stem.
R4	Full pod – Pod ¾ inch long at one of the four uppermost nodes on the main stem.
R5	Beginning seed – Seed 1/8 inch long in a pod at one of the four uppermost nodes on the main stem.
R6	Full seed – Pod containing a green seed that fills the pod cavity at one of the four uppermost nodes on the main stem.
R7	Beginning maturity – One normal pod on the main stem has reached its mature pod color.
R8	Full maturity – 95% of the pods have reached their mature pod color.

The soybean plants will continue to develop new leaves during the flowering period. As weeds are still emerging, it is important to recognize that herbicides can only be applied before a designated growth stage is reached. It is important to always follow labeled herbicide use instructions to prevent any crop damage or yield loss.

SOYBEAN FOLIAR FERTILIZER APPLICATION

Producers are always interested in increasing soybean yield but of course there should be a return on investment. Agronomists often receive questions about foliar fertilization in soybean. Based on these requests, a large national research project was set up. Six foliar fertilizer products were applied and compared with an untreated control, in a randomized complete block design, with at least 4 replicates. This experiment was conducted at 20 sites throughout the US during the 2019 season, and 26 sites during the 2020 growing season (Figure 1), for a total of 46 site years. Data from North Dakota, South Dakota, and Minnesota were included in this experiment. The sites were fields without known nutrient deficiencies and represent average soybean growing conditions. Products were applied at soybean growth stage R3, aligning with commonly used fungicide and insecticide application timings. Nutrients applied per acre for each product are listed in Table 1.

Table 1. Nutrients applied in pounds per acre.

	N	P	K	S	Mn	Fe	Mo	Zn	B	Other
Product	----------Pounds per acre----------									
1	3.5	0.9	0.9	0.5	0.02	0.03	-	0.03	-	-
2	0.6	0.3	1.7	-	-	-	-	-	-	-
3	0.1	0.25	-	-	0.01	-	0.002	0.01		Ca,Mg,B,Co,Cu
4	-	-	-	-	-	-	0.006	-	0.07	-
5				0.04	0.08	-	0.003	0.08	0.06	-
6	1.9	-	1.9	-	-	-	-	-	-	-
7 Control	-	-	-	-	-	-	-	-	-	-

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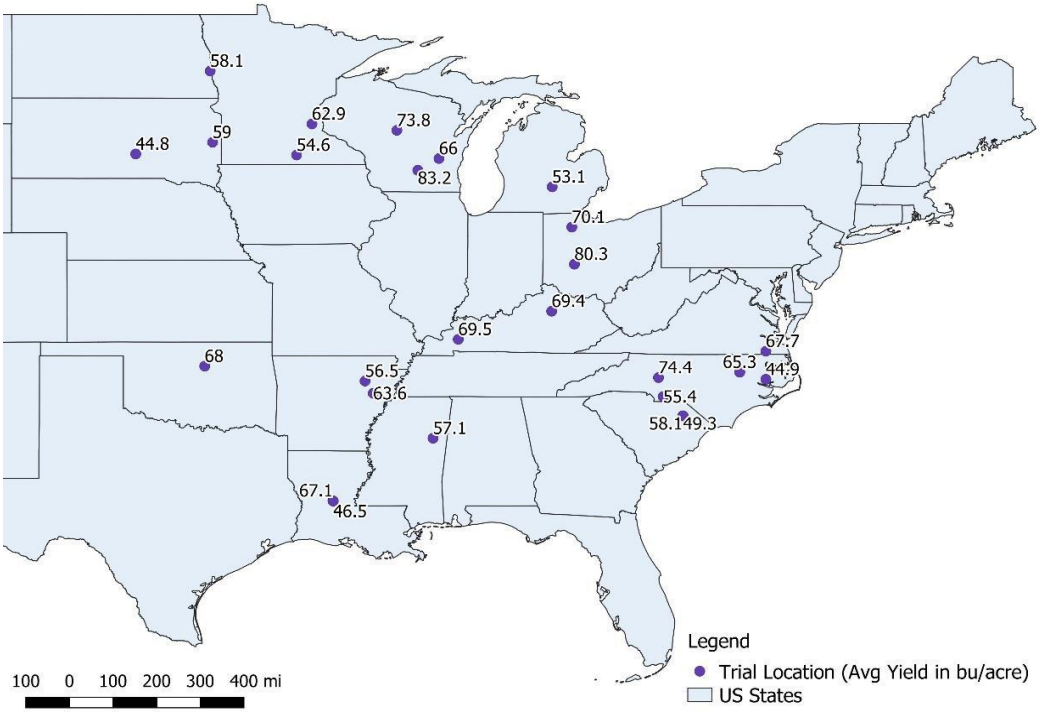

Figure 1. Map of sites in 2020 with their average yield (bu/acre).

There was a significant difference in yield among sites (Figure 1), but no significant difference in yield among treatments (Figure 2) and there was no treatment by site interaction.

Overall results show that prophylactic foliar fertilization decreased the profitability of soybean production (no increase in yield but a cost for application and the product). Foliar fertilizer products, similar to those tested, are not recommended for use by North Dakota soybean producers in the absence of symptoms of nutrient deficiency.

For information about soybean fertility recommendations see publication Soybean Soil Fertility SF1164 . For additional information about in-season application of foliar sprays of N, P, and K see link.

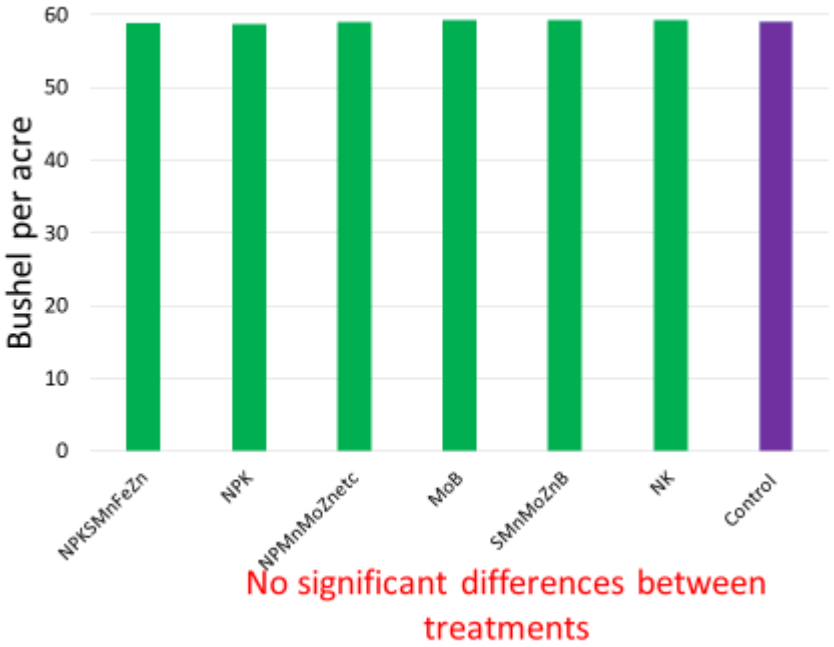

Figure 2. Average soybean yield per acre for each treatment across 46 environments in the USA, during the 2019 and 2020 growing seasons.

Hans Kandel
Extension Agronomist Broadleaf Crops

plant pathology

GOSS'S WILT - YIELD LOSS QUESTION

The NDSU Plant Diagnostic Lab received its first Goss's wilt sample last week, and one common question is how much yield loss can we expect from this disease? To begin, Goss's wilt is our most important corn disease in ND (found in 65% of scouted fields in 2020) and has two primary symptoms; systemic wilt and leaf blight. Systemic wilt results from an early infection (V2-V6) leading to discolored vascular tissue and plant death. Leaf blight is more common and can occur at any point in the growing season. Leaf blight symptoms begin as irregular water soaked lesions running along the leaf veins (Figure 1). As the lesions mature, the lesions will turn brown, "freckles" can be observed (Figure 1 and 2), and photosynthetic activity of plants is disrupted.

Figure 1. Corn leaf with the leaf blight symptoms of Goss's wilt. Note leaf has water-soaking (light green), necrosis (brown tissue), and freckles.

Figure 2. Goss's wilt freckles.

The yield loss of a single systemically infected plant is 100%. The yield loss from the leaf blight phase will depend on the level of susceptibility in a corn hybrid, growth stage when infection occurs, and the prevalence of the disease in the field. Small plot research funded by the ND Corn Utilization Council indicated that yield losses between 34-41% occurred on a susceptible corn hybrid when infected at V6 to V10. In that same study, yield losses of 6%-11% were observed on a resistant hybrid when infected at V6 to V10. Infections that occur at the R1 stage result in yield losses of 2%-3% for both resistant and susceptible hybrids.

Andrew Friskop
Extension Plant Pathology, Cereal Crops

WEED CONTROL IN ROW CROPS, A JULY 1 ASSESSMENT

The Monday rain event meant some much-needed office time for administration. The rain event also created an opportunity to compared weed management observations with Dr. Joe Ikley. Joe made the first provocative statement of the conversation by declaring soil residual herbicides may have over-performed despite the very limited number of rainfall events to incorporate herbicides into the soil. I agreed!

My team and I installed experiments at three locations near Fargo/Moorhead to evaluate waterhemp control in sugarbeet, utilizing a program approach for weed management including preemergence, early postemergence, and postemergence herbicides. Waterhemp control continues to range from 80% to 90%, 55 to 70 days after planting despite erratic sugarbeet emergence due to dry soils at planting and soil residual herbicides remaining on the soil surface two to three weeks after planting. The key in sugarbeet was at least partial incorporation of preemergence herbicide enabling control of the first flush of waterhemp as compared to no preemergence herbicide. The laybys and postemergence herbicides without preemergence herbicides at planting provided less than 85% waterhemp control.

Joe observed similar results from preemergence followed postemergence combinations in corn, soybean, and dry bean. Joe stated postemergence herbicides alone have provided erratic weed control due to a combination of factors including cooler than normal air temperatures in May, warmer than normal air temperatures, low humidity conditions, and drought conditions that has thickened the plant cuticle and/or have altered plant architecture. We both have observed less than acceptable common lambsquarters control, even with glyphosate products. Finally, we discussed reduced control of weed in sprayer wheel tracks and adjacent areas due to poor spray deposition, excessive dust, or a combination of both.

Why surprisingly good weed control from a program approach? We believe the preemergence herbicides, although not adequately incorporated by rainfall into the soil provide just enough control of early germinating small seeded broadleaf weeds. The lack of rainfall in May and June likely reduced germination and emergence of small seeded broadleaf weeds like common lambsquarters and waterhemp that emerge from the surface to up to 1-inch deep in soil. And soil residual herbicides remained on the soil surface, or the layered application of soil residual herbicide was incorporated by pop-up storms and controlled subsequent small seeded broadleaf weed flushes.

Sugarbeet rows are closing in many areas signaling the transition from weed management to control of leaf diseases in sugarbeet. However, corn, soybean and dry bean crops have not canopied, especially in drought-stricken areas meaning the final evaluation of #weedcontrol2021 will not occur for 4 to 6 weeks. Stay tuned for further weed control assessment and a data focused final assessment of weed control during late fall and winter meetings.

Tom Peters
Extension Sugarbeet Agronomist
NDSU & U of MN

around the state

AROUND THE STATE

NORTH CENTRAL ND

Scattered rain was observed this past week bringing some relief to the area. However, a dry pattern is still in place in the region with crops still dealing with drought conditions. Here are some quick precipitation reports as observed by area NDAWN stations over the last week (beginning June 29th): Minot: 0.35" (NCREC: 0.47"); Bottineau: 0.84"; Garrison: 0.19"; Karlsruhe: 0.07"; Mohall: 0.56"; Plaza: 0.05"; and Rugby: 0.43". Bare soil temperature at the NCREC is observed at 84 degrees F.

Wheat midge numbers appear to be fluctuating. Many traps remain at a threshold of less than 10 midges observed over the past few weeks. However, a couple traps have reported higher numbers. One trap in the region was observed with 2500+ over the last week, however, the growing degree day (GDD) model for wheat planted on April 29th is at 1863 GDD days which is suggestive that control is no longer needed, except in some no till situations if economic thresholds are met. If thresholds are met in no till situations, control may only be needed until around 1900 GDD. Please keep in mind, trapping by the NDSU IPM network is not connected to economic thresholds, rather, it is suggestive that scouting should be underway in the region to determine if thresholds are met. Grasshoppers are being observed in the region as well. Reports of increased nymph numbers seem to be rising. A grower in NW North Dakota called in and reported they were above economic thresholds with damage to the flag leaves.

Figure 1. Top left clockwise: soybeans under no-till; canola field; alfalfa field; sunflower field.

Warmer temperatures coupled with low amounts of rain are allowing small grains to progress rapidly. Small grains, on average, are in anthesis with some variable locations further along and others being a little behind. Canola fields are uneven, ranging from the 4th leaf stage to flowering. Soybeans are observed from the V2-V6 leaf stage (Figure 1) and corn observed from V4-V8 and with symptoms of drought stress.

TJ Prochaska
Extension Crop Protection Specialist
NDSU North Central Research Extension Center

Leo Bortolon
Extension Cropping Systems Specialist
NDSU North Central Research Extension Center

NORTHEAST ND

Rains were spotty in the region ranging from 0.01 to 2.5 inches. In some areas, rain was too late for some crops to recover from drought damage. Small grains for the most part evened out and are at heading stage. Producers are reluctant to spray fungicides in small grains due to low risk of scab and poor crop. Sugarbeets and potatoes are at the critical stages of moisture need. Canola is turning to look good with majority of the fields at flowering stage. With the risk of Sclerotinia in canola growing high with weekend rains, producers are spraying fungicides. Row crops are looking better and are progressing well. Grasshoppers are becoming a problem. Blister beetles continue to be a concern in alfalfa. Not enough rain for pastures. Hay crop this year amounted to only 20-25% of the normal year. Water is being hauled to cows. Producers are starting to bale hay in the ditches. Annual forages are being planted this week in some areas.

Anitha Chirumamilla
Extension Agent Cavalier County

NORTHWEST ND

The Northwest had hot temperatures to finish out last week and over the 4th of July weekend with Williston seeing 100°F on Saturday, July 3rd. Temperatures dropped on Monday with a high of 82 and a high Tuesday of only 69. Scattered light showers moved through Monday and Tuesday with most places picking up 0.1" or less but a few places getting as much as 0.3". The forecast for the coming week has highs in the mid 80's and chances of scattered thunderstorms on Thursday and Friday. Rain is welcome and is needed to help all crops make seed.

Winter wheat at the Williston REC is in early milk, spring wheat and other small grains are flowering, pea and lentil are flowering to early pod and canola is winding down on flowering. I had the chance to drive up to Divide County today and it looks like a lot of pea and lentil fields are flowering with some in early pod, canola anywhere from bolting to full flower, and small grains flag leaf, heading, or flowering depending on when they were planted. The more moderate temperatures are a welcome relief from last week's heat, but moisture is needed to help crops meet their yield potential.

A reminder that the WREC dryland field day is next Wednesday, July 14th at 4 pm followed by the irrigated field day at Nesson Valley on Thursday, July 15th at 8:30 am.

Clair Keene
Extension Cropping Systems Specialist
NDSU Williston Research Extension Center

SOUTH-CENTRAL/SOUTHEAST ND

The high daytime temperatures during the first five days of July were hard on all crops and especially small grain. Our current cool period is welcome but substantial weekly rain is needed for our rows crops as most are nearing (dry bean and sunflower) or have entered (soybean) reproductive growth stages. According to NDAWN, the region's April 1 to July 5 rainfall ranges from 3.3 inches (Dazey and Oakes) to 10.4 inches (Jamestown), with the Carrington REC at 3.7 inches.

Winter rye is in the hard dough stage. Spring-seeded small grain range from flowering to dough stages. Plants are rapidly losing leaves well before seed fill is complete. Advanced corn is nearing the 12-leaf stage – number of seeds per row begins to be determined at this stage. Advanced soybean are at the R2 stage (blossoms on upper 2 nodes of plant), sunflower at R1 and dry bean will soon be at R1 (initial blossoms present).

Upcoming crop tours planned by the Carrington REC:

*Field Day: July 20; 9:30 a.m.

(photos on next page)

Contrast in Carrington REC plant conditions on July 6 between dryland durum-left and irrigated spring wheat-right variety trials.

Greg Endres
Extension Cropping Systems Specialist
NDSU Carrington Research Extension Center

SOUTHWEST ND

According to NDAWN from June 20th to July 5th Dickinson received 0.76 inch of rain, Beach 0.58, Amidon 0.36, Bowman 0.58, Hettinger 0.33, Mott 1.02, Carson 0.55, Mandan 1.58, Hazen 1.09, and Dunn 0.21. Short but timely rains have kept corn and sunflowers in the region looking relatively fair while it's too little, too late for most canola and small grains. Drought stress is evident across the region. First cutting of alfalfa was baled over the past week with reduced yields across the region. The drought and heat along with in-field variability has amplified herbicide issues with potential carryover, insufficient control, and misapplication. Secondary issues that impact water uptake such as acidity and salinity are more visible now than previous years, use this as an opportunity to create zones for soil sampling to be better prepared for future drought.

Coming up on Wednesday July 14th from 8am-12pm mountain time we will have our agronomy field day at the NDSU DREC. Following a lunch provided by the Dickinson Chamber of Commerce Ag Committee we will have a soil sampling workshop from 1-4pm. For the field day and soil workshop 2.5 Nutrient Management, 1.5 Soil & Water Management, and 2.5 IPM CEU's have been approved for CCA's.

Ryan Buetow
Extension Cropping Systems Specialist
NDSU Dickinson Research Extension Center

(Agronomy Field Day Announcement on next page)


EXTENDING KNOWLEDGE ›› CHANGING LIVES
2021 Agronomy Field Day
NDSU Dickinson Research Extension Center
FIELD DAY TOPICS
SPEAKERS
Registration starts at 8 a.m. (Mountain Time)
Introduction to the Dickinson REC
Chris Augustin
2021 Agronomy Projects and Soil pH Overview
Ryan Buetow
Weather, Soil, Disease and Interactions
Dave Franzen and Andrew Friskop
Combine Cleanout, Weeds and Factors Impacting Control
Joe Ikley and Caleb Dalley
Resistance and Issues of Concern in Broadleaf Crops
Sam Markell and TJ Prochaska
Current and Emerging Markets
Dave Ripplinger
Soil Sampling Workshop
After lunch join NDSU experts Ryan Buetow, Dr. Chris Augustin, Dr. Leo Bortolon, Dr. Dave Franzen, Doug Landblom and experts from AGVISE, for a soil sampling workshop. Held from 1 to 4 p.m., the workshop will cover impacts of season and weather on sampling decisions, biological benchmark testing, ND trends and the value of zone testing, along with an exercise on sampling for stratified acidity and using a pH probe.
For more information contact Ryan Buetow at 701-456-1106 or check our website https://www.ag.ndsu.edu/DickinsonREC
Wednesday
July 14, 2021
Agronomy Field Day
8 a.m. to 12 p.m.
Soil Sampling Workshop 1 to 4 p.m.
All times Mountain
NDSU Dickinson REC
1041 State Ave
Dickinson, ND 58601
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weather

WEATHER FORECAST

The July 8 to July 14, 2021 Weather Summary and Outlook

Temperatures were well above average during the period of June 30 through July 6 across the region (Figure 1). Certainly not all locations, but several NDAWN (North Dakota Agricultural Weather Network) stations recorded a high temperature at or above 90° for the first five days of July. This forecast period will start off cool, with temperatures expected to slowly raise to average or above average Sunday into early next week.

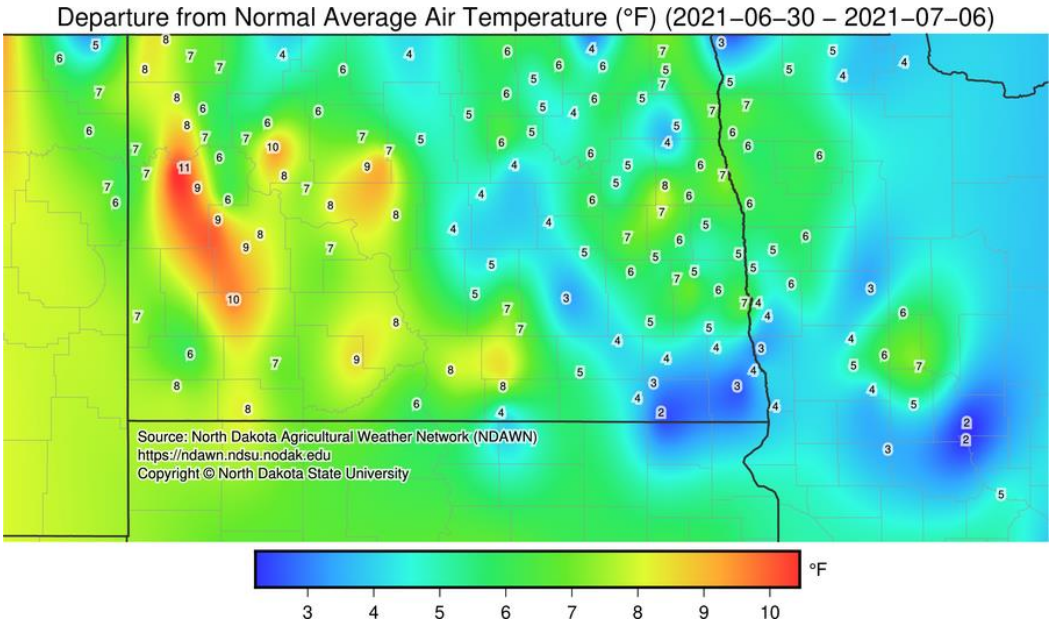

Figure 1. Temperature departures from average at selected NDAWN for the period of June 30 through July 6, 2021

An upper air disturbance brought rain from southwestern to northeastern North Dakota on Saturday, July 3. It moved into northeastern North Dakota on Saturday afternoon and with help from the peak heating of the day, some significant rains fell in that region. Most other locations recorded rain from the cold front that past through the Northern Plains on Monday into Tuesday (July 5-6). Total rain from July 1 through 10:44 AM on July 7, 2021 can found in Figure 2.

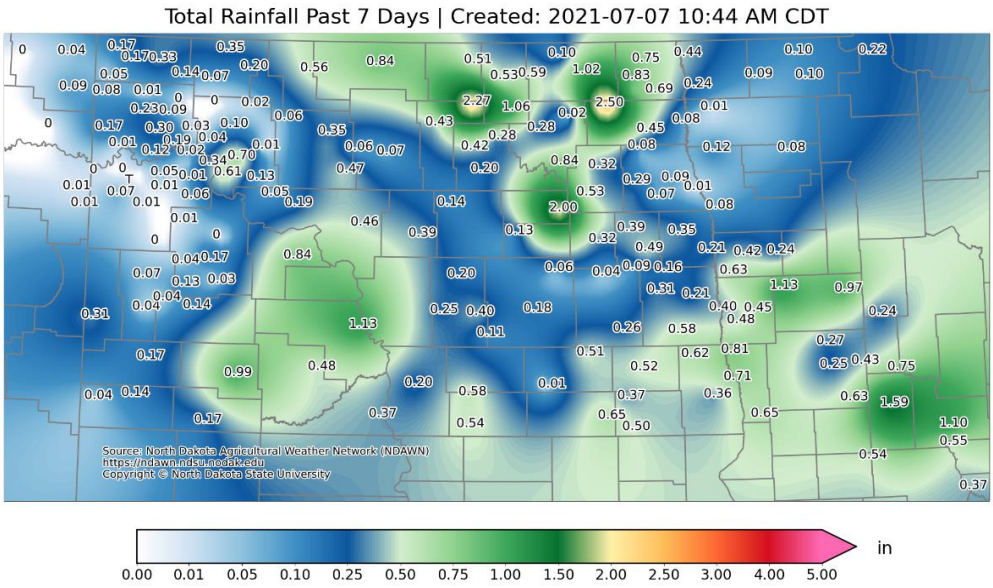

Figure 2. Total rainfall for 168-hour period ending at 10:44 AM on July, 7, 2021 at selected NDAWN weather stations

This forecasting period looks to have a few rain opportunities. Today (Thursday) and Friday the best chances appear to be in western North Dakota with those storms potentially moving into parts of central to southeastern North Dakota. Another period of potential thunderstorms looks to be early next week when an upper air disturbance moves through the region. As has been the case with most of our rain events this summer, odds are there will be "winners and losers" when it comes to amounts with probably some locations being missed. Because western North Dakota looks to be having slightly better odds of rain, western and parts of central North Dakota look to be recording the highest number of hours with relative humidity (RH) above 85% in the next 7 days. My forecasted number of hours with high RH can be found in Figure 3.

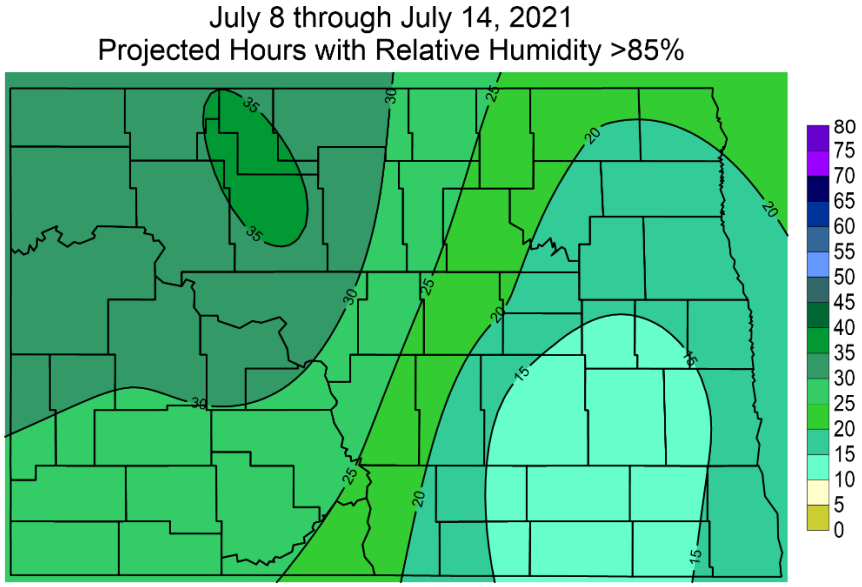

Figure 3. Estimated number of hours with Relative Humidity above 85% from July 8 through July 14, 2021

The projected growing degree days (GDDs) base 50°, 44° and 32° for the period of July 8 through July 14, 2021 can be found in Figure 4. This period is expected to record fewer GDDs than what was recorded during the first week of July.

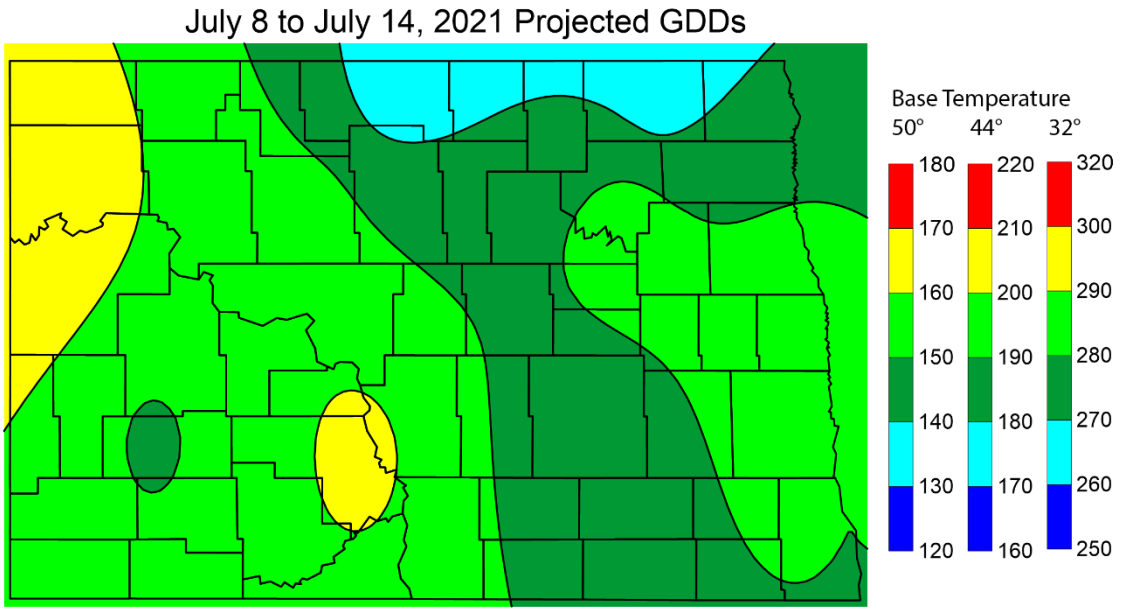

Figure 4. Projected Growing Degree Days, Base 50°, 44° and 32° for the period of July 8 to July 14, 2021

Using May 1 as a planting date, the accumulated growing degree days for wheat (base temperature 32°) is 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

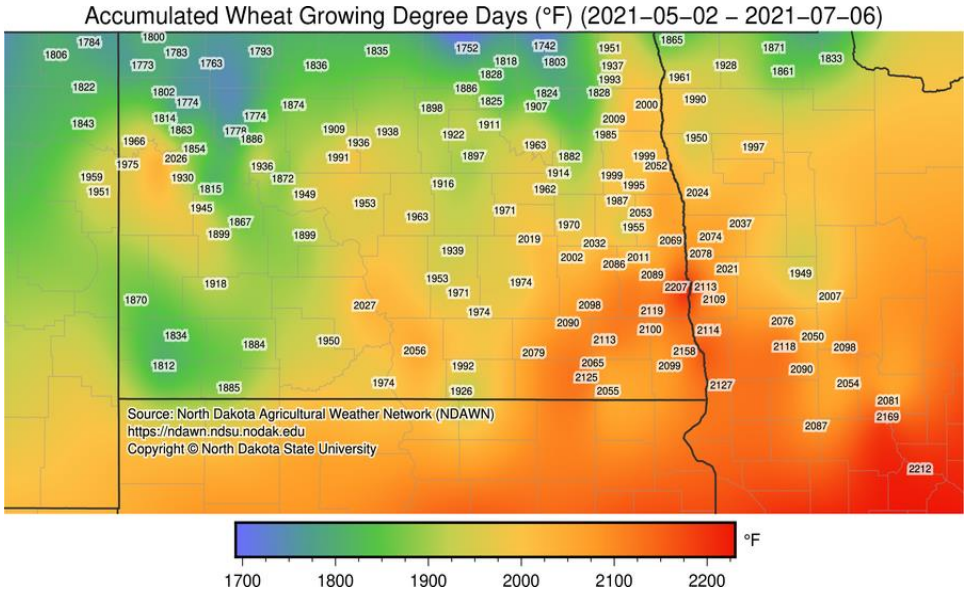

Figure 5. Accumulated Growing Degree Days for Wheat (Base 32°) since May 1, 2021

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.

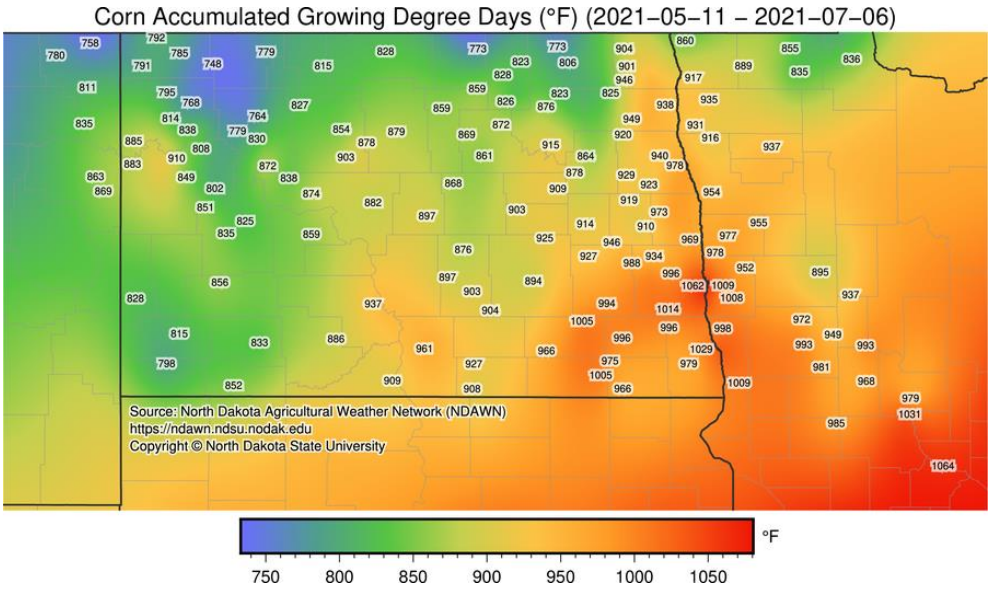

Figure 6. Accumulated Growing Degree Days for Corn (Base 50°) since May 10, 2021

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

Daryl Ritchison
Meteorologist
Director of the North Dakota Agricultural Weather Network (NDAWN)

North Dakota State University
CROP & PEST REPORT
NDSU Dept. 7660; PO Box 6050
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Janet Knodel
Co-Editor

Entomology
701-231-7915

Plant Sciences
701-231-7971

Soils
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Marcia McMullen
Co-Editors

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