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AG NDSU FIELD DAYS SET

The [North Dakota State University Research Extension Centers annual field days](#) are set. The events take place at the Research Extension Center sites across the state and feature speakers, presentations and tours covering a diverse array of topics. NDSU's 15th President, David Cook, will be attending this year's field day events.

The dates and locations for the field days are:

- July 11 – Central Grasslands Research Extension Center – Streeter (10 a.m.-3 p.m. CDT)
- July 12 – Hettinger Research Extension Center – Hettinger (5-7 p.m. MDT followed by supper)
- July 13 – Dickinson Research Extension Center – Dickinson (8 a.m.-Noon MDT, agronomy with lunch, 1-3 p.m. horticulture, 5 p.m. supper)
- July 13 – Williston Research Extension Center main site (4-8 p.m. CDT agronomy and horticulture)
- July 14 – Williston Research Extension Center irrigated tour – Nesson Research and Development farm, located 23 miles E of Williston on Hwy 1804 (8:30 a.m.-Noon CDT)
- July 18 – Agronomy Seed Farm – Casselton (5 p.m. CDT, agronomy tour, 7 p.m. supper)
- July 19 – Carrington Research Extension Center – Carrington (9:15 a.m.-3:30 p.m. CDT)
- July 20 – North Central Research Extension Center – Minot (8:30 a.m.-Noon CDT)
- July 21 – Langdon Research Extension Center – Langdon (8:45 a.m.-Noon CDT)
- August 4 – CREC Oakes Irrigation Research Site – Oakes (8:30 a.m.-Noon CDT)
- August 9 – NDSU Horticulture Research & Demonstration Gardens – Fargo (3-7 p.m. CDT, plants, local foods, and outdoor spaces)
- September 10 – NDSU Horticulture Research Farm near Amenia (10 a.m.-3 p.m. CDT, trees + ornamentals) Pre-registration required

entomology

GRASSHOPPER PROBLEMS CONTINUING

“Grasshopper, grasshopper, go away!” These words, uttered (in Finnish) by the fictional St. Urho, drove the grasshopper plague from Finnish vineyards, thus saving Finland’s grapes. Or so legend has it. In reality, grasshopper control isn’t so easy. Grasshopper numbers are increasing, with grasshoppers present statewide in all stages from egg to 4th instar nymphs. Grasshoppers are especially prevalent in cereal crops, along grassy road ditches, and to a lesser extent in broadleaf crops. **Diligent and frequent scouting is necessary to get a handle on population levels and distribution within a particular field.** We’ve heard again and again that grasshoppers are a problem this year where they were a problem last year, but keep in mind that grasshoppers are mobile and can travel. Expect grasshoppers to move out of alfalfa and winter cereals into adjacent crops after cutting/harvest. With grasshopper nymphs reaching economic levels this early in the growing season, season-long control becomes challenging. There are several factors to consider when choosing which insecticide to use.

- **Benzoylureas:** Diflubenzuron (Dimilin 2L) is only for use west of US Highway 281, and will only control first and second instar nymphs. Dimilin 2L has about one month of residual activity, so still might be a good option to control early instars that are present or will be soon. Dimilin 2L has a 50 day pre-harvest interval, so may or may not be an option right now for winter cereals.
- **Organophosphates:** Malathion and dimethoate are registered in several crops for grasshopper control. We’ve never tested dimethoate on grasshoppers, but we’re inclined to leave this chemistry for future spider mite problems rather than use it now on grasshoppers. Malathion is effective, but has a short residual of only a few days, and residual activity will be further reduced if applied in hot weather.
- **Pyrethroids:** There are several active ingredients and products. We’ve tested all pyrethroids labeled for use in soybeans, and we have had excellent control of grasshoppers using the high labeled rates. Typically, residual activity lasts for seven to ten days. However, pyrethroid applications made during hot weather (above 90°F) will have considerably less residual activity due to heat breaking down the active ingredient more rapidly than would occur during cooler weather. We’ve received reports in the past week of pyrethroids failing to give adequate control during the recent heat wave. Should temperatures moderate, pyrethroids would then be a good option.
- **Diamides:** Chlorantraniliprole (Vantacor) is effective at controlling grasshopper nymphs, and is registered for use in most of our crops. We tested Vantacor on adult grasshoppers (label indicates targeting 2nd and 3rd instar nymphs) in soybeans with excellent results. Chlorantraniliprole will not give a quick kill. However, grasshoppers stop feeding almost immediately after initial ingestion and die within a few days. Vantacor must be mixed with a high-quality MSO at 1% v/v to prevent evaporation, which is especially of concern if applied by air. If you intend to tank mix Vantacor with herbicides, be sure your herbicide(s) allows for the use of MSO. Otherwise, crop injury



Statue of St. Urho, patron saint of Finnish vineyards and grasshopper IPM, in Menahga, MN. (Photo by Patrick Beauzay, NDSU Extension)

may result from the herbicide(s) in the presence of MSO. Vantacor works well in heat and has at least a 14 day residual, probably longer (we hope to evaluate Vantacor on nymphs this year). It's also easier on beneficial insects compared to broad-spectrum pyrethroids and organophosphates.

Another important factor is crop growth. Currently, our spring cereals and broadleaf crops such as sunflowers and soybeans do not have much growth. Insecticide applications will protect the leaves that are present, but new growth will be unprotected. Also, insecticide that reaches the soil will not be effective, and that's a problem now in late planted row crops. Better results can be expected as canopy closure progresses.

Lastly, avoid insecticide applications unless absolutely necessary. There are several reasons why. Repeated insecticide applications will also kill beneficial insects and mites, and may lead to flare-ups of other pests, including spider mites. We don't want to have to deal with multiple pest issues at the same time. Pay attention to maximum seasonal use language on insecticide labels. Once you've reached the seasonal limit, it's not legal to apply more of the same active ingredient to the crop for any pest. Pay attention to rotational use language - it's best to rotate modes of action if repeated applications need to be made in order to prevent (or at least delay) insecticide resistance. Rotating modes of action also helps keep your options open for future pests this season.



*Sunflower seedling with minor grasshopper feeding damage from 1st instar nymphs.
(Photo by Patrick Beauzay, NDSU Extension)*

For more information, see the NDSU Extension publication the ***North Dakota Field Crop Insect Management Guide E1143-22*** for a list of insecticides registered for grasshopper control by crop.

[Patrick Beauzay](#)

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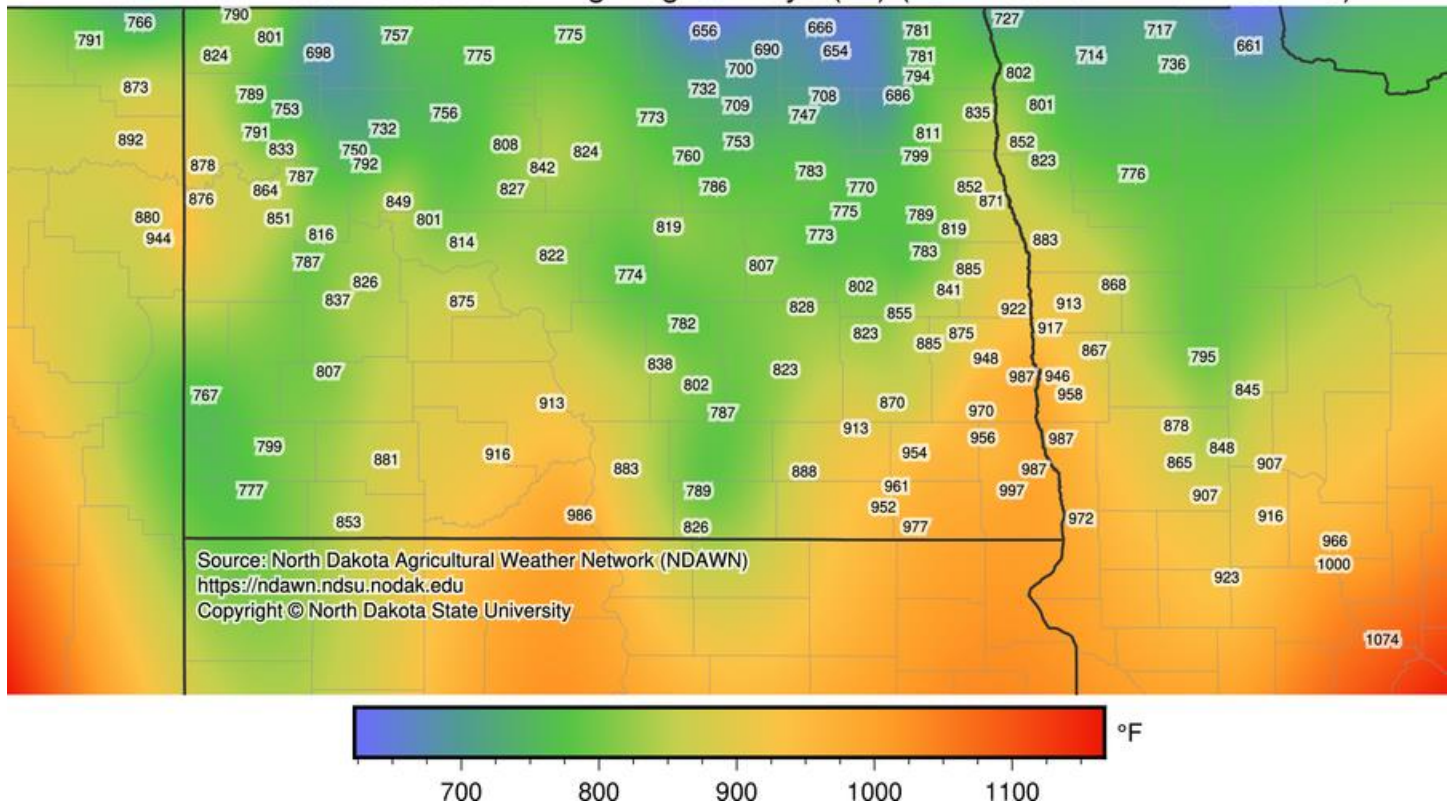
Extension Entomologist

EMERGENCE OF LEAFY SPURGE FLEA BEETLES IN 2022 BEHIND NORMAL EMERGENCE TIMING

Leafy spurge is flowering and land managers are interested in obtaining leafy spurge flea beetles (*Aphthona* species) for biocontrol of this noxious weed. Leafy spurge flea beetles are an effective means of controlling leafy spurge in North Dakota. This group of flea beetles is host-specific to the leafy spurge plant, which makes them an ideal biological control choice.

The accumulated growing degree days (AGDD) for sunflower (base of 44 F) can be used as a guide to determine when to begin scouting for adult flea beetles. Begin scouting for adult flea beetles when the AGDD approaches 1,000. **Flea beetles should be collected between 1,200 and 1,600 AGDD using the sunflower GDD model from NDAWN.** Adult flea beetles can be easily collected with a 15-inch sweep net. Due to the cooler than normal spring, emergence of leafy spurge flea beetles will be later this year. **No areas of North Dakota have yet accumulated enough growing degree days (GDD) for collecting for adult leafy spurge flea beetles.** However, the southeast area can start scouting or sweeping for flea beetles to assess collecting sites. Use the [sunflower degree days/growth stage application](#) on NDAWN website. Enter "2022-03-01" for the planting date and select "degree day" for map type.

Sunflower Accumulated Growing Degree Days (°F) (2022-03-02 – 2022-06-20)



After late July (or 1,600 AGDD), flea beetles begin to lay eggs and should not be moved or collected. Leafy spurge flea beetles typically take three to five years to establish and impact leafy spurge infestations.

To find collecting sites for leafy spurge flea beetle, contact your local county weed office (number listed in local phone book). Leafy spurge flea beetles also are available commercially for purchase at [WeedBusters BioControl](#) in Montana.

For more information, see the NDSU Extension publication on [Leafy Spurge Control Using Flea Beetles \(*Aphthona* spp.\)](#) (W1183 (Revised)).

SCOUT ALFALFA REGROWTH FOR ALFALFA WEEVILS

Cutting and haying of alfalfa and alfalfa-grass hay fields have begun in ND. Early cutting of first haying is the best strategy for reducing economic alfalfa weevil populations. Early cutting is recommended when alfalfa has reached 50 percent budding and alfalfa weevil larvae have reached the economic threshold. Early cutting will cause the larvae to desiccate and eventually die. However, some larvae will crawl and hide underneath the windrow to survive. Bale windrowed alfalfa as soon as possible to expose larvae that are sheltering under the windrows.



Alfalfa weevil larval feeding injury underneath the windrows (brown defoliated strips)

Scout the alfalfa regrowth for larval feeding to prevent further crop damage. Crop damage by alfalfa weevils reduces nutritional quality and digestibility, and causes significant yield loss, 100% loss in severe defoliation.

If eight or more larvae per square foot are found under windrow or regrowth is delayed due to feeding, insecticide treatment is recommended.

For more information, see the NDSU Extension publications *Integrated Pest Management of Alfalfa Weevil in North Dakota* [E1676](#) and the *North Dakota Field Crop Insect Management Guide* [E1143-22](#) for a list of insecticides registered for alfalfa weevil control.

FIRST DETECTION OF SOYBEAN APHIDS IN ND

The first soybean aphid nymphs were detected on June 20th by Tommy Crompton, Fargo NDSU Extension IPM scout, in soybean in Sargent County (SE area). It is very early for soybean aphid infestations and this population is far from being economic. So, relax it was probably washed off and killed with the severe thunderstorm on Monday night! Crop stages of scouted soybeans ranged from seedling through vegetative stages (V2). A total of 30 soybean fields were scouted during June 6-17 with zero soybean aphids.

Soybean aphid is light yellowish-green with black cornicles ("tail-pipes"). As with other aphids, the soybean aphid is small, about the size of a pinhead. Nymphs are smaller.



Soybean aphids on growing tips of vegetative soybean. (Photo by Tommy Crompton, NDSU Extension IPM Scout, Fargo)

I would start scouting in earnest in another week in 'hot' spots like river bottoms with the overwintering host (buckthorn) in southern ND and maybe in two weeks in northern ND. Begin scouting soybean fields at the V3 to V4 stage to determine if soybean aphids are present in fields. Be sure to look in the tender terminal leaf growth at the top where soybean aphids like to concentrate early in the season. **No treatment is recommended at this time and is discouraged so insecticides do not reduce the presence of predators and parasites or flare secondary insect pests like spider mites.** The critical growth stages for making most soybean aphid treatment decisions is the late vegetative to early reproductive stages (R3). Assessing aphid populations at this time is critical. Typically, aphid treatments occur from mid-July to mid-August in North Dakota. Stay tuned for more updates.

[Janet J. Knodel](#)

Extension Entomologist

CHLORPYRIFOS UPDATE

In August of 2021, EPA announced they were revoking all food tolerances for chlorpyrifos insecticide as of February 28, 2022. Applications made to any food crop or forage after that date that could make its way into the food chain (including hay, grazing lands, or other livestock feeds) would be considered adulterated and subject to condemnation, fines, and other penalties.

Unfortunately, the revocation does not allow for using existing stocks of chlorpyrifos. This resulted in many farmers and dealers with inventories that cannot be used as originally intended. Not surprisingly, agricultural interests sued EPA over this decision. While a court agreed to hear the case, a stay was not forthcoming and the ban remains in effect. You can read more about this here: <https://www.dtnpf.com/agriculture/web/ag/crops/article/2022/03/17/chlorpyrifos-ban-will-remain-effect>

The problem is, what to do with existing inventories? The products remain registered, so it may be used in non-crop situations. But labeling on agricultural use chlorpyrifos is extremely limited for non-crop sites. Users need to carefully read each label in their inventory to determine if a legal application can be made. If it can be applied to a site near food crops, care should be taken to avoid drift as that drift could potentially contaminate a crop. Also, care should be exercised in making sure the site is NOT hayed or grazed. Bottom line, in many situations, there are no practical legal uses for chlorpyrifos.

If you are in possession of chlorpyrifos that you cannot use, the first call you should make is to your distributor. They may be willing to take your inventories or they may have suggestions on disposal. Distributors are NOT under obligation to buy back chlorpyrifos, but may be willing to accept the product and repurpose or dispose of it.

State waste pesticide collection programs have been suggested as a potential means of disposing of chlorpyrifos. However, on March 1, 2022, the North Dakota Department of Agriculture announced that they would not accept chlorpyrifos during the 2022 Project Safe Send (PSS) collection. You can read more about this decision here: <https://www.nd.gov/ndda/news/goehring-epa-north-dakota-unable-dispose-chlorpyrifos>. In summary, the NDDA's concern was that these inventories could overwhelm the PSS budget, which was set during the 2021 legislative session.

There are pesticide disposal firms that can accept chlorpyrifos, but they would do so for a fee. Two firms that I am aware of are Veolia and Clean Harbors. Their websites are listed here: <https://www.veolianorthamerica.com> and <https://www.cleanharbors.com>

Finally, people who have significant quantities of chlorpyrifos are between a rock and an even harder place. Holding the inventories in hopes of PSS accepting them in 2023 and beyond would be highly speculative. Plus, EPA has also announced that they are re-evaluating the chlorpyrifos registration. It is likely that in another year or two, they will do away with the registration, even for the limited uses still allowed on the label. Thus, it is likely that significant quantities of chlorpyrifos will simply continue to take up space in shops or warehouses for some time to come.

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Pesticide Program Specialist



SCOUT AND RECORD SUGARBEET FIELDS WITH FUSARIUM YELLOWS IN SUGARBEET

Sugarbeet plants with Fusarium yellows were identified in the Moorhead Factory district last week. Sugarbeet are infected with several *Fusarium* species including *equiseti*, *oxysporum*, and *secorum*. *Fusarium equiseti* typically infects sugarbeet and cause death at the seedling stage (Figure 1). *Fusarium oxysporum* and *secorum* infections result in symptoms when plants are at the 4- to 6-leaf stage and older. Yellowing, leaf wrinkling, and necrosis starting on the oldest leaves (Figure 2) are common symptoms caused by *F. oxysporum* and *secorum*. Outer surface of roots are healthy but the vascular system of the root is blocked and discolored (Figure 3).



Figure 2. Typical symptoms of Fusarium yellows on an older sugarbeet plant with yellowing and necrosis starting on oldest leaves followed by similar symptoms on younger inner leaves



Figure 1. Picture of seedlings infected with *F. equiseti*.



Figure 3. Cross section of older sugarbeet root showing vascular discoloration and 'woodiness'

HEAT, WIND AND WIND BLOWN SOIL DAMAGE SUGARBEET

Temperatures of over 100° F coupled with heavy wind and wind-blown soil caused severe leaf damage to sugarbeet plants over the last weekend. Late planting because of wet conditions in April and into May meant that most plants were in the 4- to 6-leaf stage. In areas where the fully developed leaves were killed but the growing points were still intact (as in Figure 1), regrowth will take place especially after a rain. Figure 2 shows a wind damaged plant with a healthy and deep penetrating root that is into moisture. There is no need to spray or treat wind damaged plants.



Figure 1. Picture of plant with severe damage to the leaves by wind and blowing soil.



Figure 2. Picture of wind damaged plant with a well-developed root reaching into moisture. Pictures were provided by a sugarbeet producer.

[Mohamed Khan](#)

Extension Sugarbeet Specialist

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ESTIMATE PLANT POPULATION

Most crops have emerged. Some fields have variable plant stands due to a number of possible reasons, such as planting when it was too wet, poor seed bed preparation, planting equipment issues, soil crusting, and water and wind damage to seedlings.

The second half of June is typically too late to replant the crop, but it is still important to know the plant population and identify what may have caused the lower stand in order to avoid the same planting issue in the future. Another reason to do a stand count is to estimate yield potential, and to help with determining additional inputs during the balance of the season. In addition, weed competition may become increasingly challenging with reduced stands. Also, plant growth stages may be more variable, increasing the challenge of timely inputs and harvest. Table 1 provides some guidance on what levels of minimum established plants are acceptable.

Table 1. Minimum stand levels of several crops that should be considered acceptable.

Crop	% of Normal Stand	Minimum Stand	Units
Canola	25-50	4	plants/ft ²
Corn: Irrigated	50-60	17,000-20,000	plants/A
Corn: Dryland	40-50	13,000-16,000	plants/A
Dry Bean: Navy and Black	40-50	36,000-60,000	plants/A
Dry Bean: Pinto	40-50	28,000-40,000	plants/A
Field pea	40-70	3-5	plants/ft ²
Flax	20-40	20-35	plants/ft ²
Safflower	40-50	2-2.5	plants/ft ²
Small Grain	30-40	8-14	plants/ft ²
Soybean	50	75,000	plants/A
Sunflower	50-60	8,000-11,000	plants/A

Source: [Replanting or Late Planting Crops, Pub. A934](#).

An easy method to determine the stand count in drilled (row spacings of less than 10 inches) or solid seeded crops is using the "hula hoop" method. Randomly toss the hula hoop in 10 different areas of the field and make counts within the hoop.

Using Table 2, multiply your average counts by the multiplication factor which corresponds to the size of the hoop being used. The product answer equals the plant population per acre.

Table 2. Hoop Diameter Multiplication Factor.

30 inches	8,900
32 inches	7,800
34 inches	6,900
36 inches	6,200
38 inches	5,500

Example: 36 canola plants in a 32 inch diameter hoop equals: $36 \times 7800 = 280,800$ plants per acre or 6.4 plants per square foot.

[Hans Kandel](#)

Extension Agronomist Broadleaf Crops

[Greg Endres](#)

Extension Cropping Systems Specialist
NDSU Carrington Research Extension Center

HEAT CRINKLE IS BACK IN EMERGING POTATO PLANTS

There have been several inquiries about potential herbicide injury to emerging potato plants. The symptoms of leaves becoming chlorotic or mosaic, not fully expanding, and having wavy leaflet margins at a glance may look like herbicide injury, however usually this is a result of heat damage to developing and emerging potato shoots. Potato hill shape, bare soil, long day lengths, and warm temperatures allow the top few inches of soils to heat up. As the potato shoot starts growth in cooler soil and grows towards the soil surface, the rapid change from cool soil to hot soil can cause injury to the developing and emerging shoots. For example, I've measured a differential of 60 °F soil at a 6-inch depth to 110 °F at a 3-inch. If irrigation is available, water can help cool the soil. The plants typically produce new leaves without the crinkled leaves within a week or two after heat crinkle is noticed. Some varieties (i.e. Russet Burbank) are more sensitive to heat crinkle than others.



Image 1. Heat crinkle of Russet Burbank potato leaves affected by high temperatures.

[Andy Robinson](#)

NDSU/U of M Extension Potato Agronomist



TOPDRESS AND SIDE-DRESS N TIMING

There is a wide range of spring wheat and durum stages presently in North Dakota. In-season N application for yield increase in spring wheat/durum should be applied by early jointing. Later application will diminish any yield benefit. In-season applications can be made using urea treated with an NBPT urease inhibitor, or using stream bars with UAN or any other liquid N product. If using stream bars, use only when wind does not break up the stream into tiny droplets which would result in a broadcast application that may severely burn the plants.

In corn it is important in North Dakota to apply a sidedress when needed the at the end of the V8 stage. Application later than V8 will result in diminished yield in these northern latitudes because our corn hybrids will have already made most of their yield component decisions. In regions south of here, the sidedress window extends a couple leaves, but not in North Dakota.

If equipment, labor, and fertilizer sources are available, the fertilizers available for sidedress between the rows include anhydrous ammonia, coulter-applied UAN, UAN dribbled between the rows, UAN using y-drops, or urea applied between the rows. Urea broadcast over the whorl should be limited to 60 pounds N/acre (about 130 lb urea/acre) to avoid burning new leaves. Coulter UAN is preferred over anhydrous ammonia in high clay soils with a 'mucky' subsurface consistency.

Rain after surface application of any N fertilizer increases the efficiency of the application. If it does not rain following surface application, N fertilizer efficiency can be greatly reduced. The y-drops are helpful if there is dew to 'self-irrigate' the UAN into the soil. Otherwise, dribbling between the rows is equally effective. With the recent rains, dew is more likely than it was in June 2021.

[Dave Franzen](#)

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HERBICIDES AND HOT WEATHER

Spring planting in many areas of Minnesota and North Dakota was delayed due to unseasonably cool and wet conditions which have resulted in delayed crop emergence and crop growth. However, crop and weed growth has greatly accelerated with the recent above average air temperatures. This has resulted in postemergence herbicide applications applied in less than desirable hot temperatures and windy conditions, thus limiting the desired application window for area row crops.

Some areas have received rainfall this month and that's a brief relief from the above average temperatures, but the weather forecasts still predict some hot (90 – 100 degree) weather as we continue the postemergence spray season. There are several details one needs to consider when making postemergence applications in these conditions.

Weeds

Depending on local rainfall patterns (or the lack of rainfall) or supplemental irrigation, weed height may be highly variable across North Dakota and Minnesota fields. For example, there are already reports of large kochia, waterhemp, ragweed and lambsquarters in many fields. Crops planted in minimal tillage situations may have allowed weeds a head start in germination and emergence, especially in fields where no burndown application was applied. Thus, strict adherence to labeled weed sizes on many postemergence herbicides is strongly encouraged.

In 2021, we often discussed how weeds will be tougher to control if they are not actively growing due to drought stress. Herbicide performance is optimized when weeds are actively growing. Weeds that have endured hot, droughty conditions may have already developed a thicker cuticle than normal in an attempt to slow their rate of transpiration or water loss. Even after a field receives rainfall, the weed's cuticle will not "shrink" back down immediately. This means any herbicide-containing droplet will have a tougher pathway to enter the plant. Last year, we spent a lot of time discussing the control of drought stressed weeds during our hottest days.

The contrast this year is that most folks have adequate moisture, and we are dealing with weeds that are growing fast but will likely shut down growth in the peak heat of the day. We also tend to have a southeast wind that is pumping in humid air from the Gulf of Mexico; contrast that to last year's southwest winds bringing in more arid air masses over dry soils. So a general rule of thumb is to expect better weed control due to adequate moisture (and yes, also expect more crop injury for the same reasons). The use of oil adjuvants, and specifically MSO along with nitrogen fertilizers (AMS or UAN), can improve the herbicide uptake if one needs to spray during the hottest parts of the day. Some may be wary of using oil adjuvants due to increased crop response, but many of our broadleaf crops, and specifically soybean, can recover from this type of injury. In most cases, the yield loss due to weed competition would be worse than any crop response from the adjuvant.

Herbicides that will have the largest drop in performance during hot conditions are usually systemic herbicides like Group 1 (ACCase inhibitor – e.g., Select Max, Assure II, and Puma, etc.) and Group 2 (ALS inhibitor – e.g., Raptor, and Pursuit, etc.) herbicides. Glyphosate and Group 4 (auxin mimics – e.g. dicamba and 2,4-D) will also have reduced efficacy in these conditions. On the other hand, contact herbicides, such as Group 14 (PPO inhibitors – e.g., Flexstar, and Cobra, etc.) and Group 10 (glutamine synthetase inhibitor - Liberty) herbicides become more active under higher temperature. Contact herbicides, including Cobra, Liberty, Reflex applied in hot, humid conditions will likely result in greater foliar injury to crops, but also greater weed control.

Finally, consider the leaf angle of weeds throughout the day. Like our grass crops, grass weeds will roll their leaves during the peak heat of the day to conserve moisture. Broadleaf weeds will usually be droopy. Both scenarios will lead to decreased spray coverage simply due to leaf architecture. Thus, spraying in the morning or evening will also help with coverage on weeds in hot conditions. In general, applying systemic herbicides early in the morning, after plants have had a chance to recover from heat stress, will give the best chance for the herbicide to reach the active site and effectively kill weeds.

Fate of spray droplets

In 2021, we experienced hot, dry weather during spray season. Herbicide performance may have been related to small spray droplets evaporating before reaching their intended target. The current forecast keeps our humidity levels higher in comparison. This means that overall, we can expect less loss due to droplet evaporation. We can of course still get the occasional day with hot, dry air masses, and Delta T (ΔT = indicative of evaporation rate and droplet lifetime) will be

very important to pay attention to during those days. NDAWN reports Delta T values and has a nice graphic presentation with green (ideal for spraying), yellow (caution for spraying), and red (not recommended to spray) color representation. Last year we had a lot of locations in yellow and red categories during June, indicating high likelihood of droplet evaporation and/or off target movement (i.e. droplets not reaching their desired target). This year we have had a lot more green coloration on the chart, or ideal spraying conditions with minimal risk of droplet evaporation. To summarize, expect less droplet evaporation, leading to better weed control, and potentially more crop injury compared to 2021.

Current Weather

[Show information](#)

Table

Map

☐ Show data from additional heights

Station ⬇	Ag District ⬇	Last Updated ⬇	Current													
			Air Temp ⬇	Wind Dir ⬇	Wind Speed ⬇	Peak Gust ⬇	Rel Hum ⬇	Dew Point Temp ⬇	Est. Wet-bulb Temp ⬇	Est. ΔT ⬇	Inversion 9/1.5 m ⬇	Inversion 3/1 m ⬇	Bare Soil Temp ⬇	Turf Soil Temp ⬇	Solar Rad ⬇	Sea-level Baro Press ⬇
Hastings 4S	MN-SE	● 21 Jun 18:50 CDT	83°	W ↘	8 mph	12 mph	31 %	49°	63°	20°	---	0°	89°	81°	140 W/m²	---
Becker 1W	MN-C	● 21 Jun 18:50 CDT	79°	W ↘	11 mph	17 mph	41 %	53°	63°	16°	---	0°	85°	81°	344 W/m²	---
Clarissa 1SE	MN-C	● 21 Jun 18:50 CDT	76°	WNW ↙	13 mph	20 mph	44 %	52°	62°	15°	---	0°	82°	81°	368 W/m²	---
Mooreton 3SW	ND-SE	● 21 Jun 18:50 CDT	79°	WNW ↙	21 mph	29 mph	44 %	55°	64°	15°	0°	0°	65°	78°	321 W/m²	1015.9 mb
Westport	MN-WC	● 21 Jun 18:50 CDT	76°	W ↘	16 mph	25 mph	43 %	52°	62°	15°	---	0°	79°	76°	446 W/m²	---
Campbell 3SE	MN-WC	● 21 Jun 18:50 CDT	78°	W ↘	17 mph	26 mph	45 %	55°	64°	14°	---	0°	82°	69°	355 W/m²	---
Froid 5S	MT-NE	● 21 Jun 18:50 CDT	74°	W ↘	11 mph	16 mph	45 %	51°	60°	14°	---	-1°	70°	63°	490 W/m²	---
Staples 2N	MN-C	● 21 Jun 18:50 CDT	76°	W ↘	16 mph	20 mph	44 %	53°	62°	14°	---	0°	80°	74°	325 W/m²	---
Fort Yates 2W	ND-SC	● 21 Jun 18:50 CDT	75°	NW ↙	6 mph	14 mph	49 %	54°	62°	13°	---	-1°	72°	69°	411 W/m²	1019.8 mb
Hubbard 1SE	MN-NC	● 21 Jun 18:50 CDT	74°	W ↘	16 mph	25 mph	49 %	54°	62°	13°	---	0°	85°	76°	347 W/m²	---
Lisbon 2W	ND-SE	● 21 Jun 18:50 CDT	76°	NW ↙	22 mph	28 mph	48 %	55°	62°	13°	---	-1°	84°	80°	344 W/m²	---
Little Falls 6SE	MN-C	● 21 Jun 18:50 CDT	75°	W ↘	10 mph	16 mph	48 %	54°	62°	13°	---	0°	80°	75°	414 W/m²	---

Screenshot of current conditions as reported by NDAWN on June 21, 2022. The "EST ΔT" column is color coordinated for ease of interpretation.

Volatility and Dicamba Application Restrictions

The volatility of herbicides is also increased when temperatures are high. Dicamba is often the first herbicide that comes to mind when we discuss volatility due to the off-target movement concerns over the last several years. A reminder that any dicamba application in Xtend or Xtendflex soybeans requires the use of a volatility reduction agent (VRA) to help decrease the risk of volatility in those applications. However, applications of dicamba in corn are currently taking place in some areas, and those labels do not require the use of a VRA. There will be an increased risk of volatility from all dicamba applications during hot weather. There is also a risk of increased corn injury from dicamba in hot conditions. In general, it would be best to target dicamba applications in corn for more favorable weather.

The U.S. Environmental Protection Agency (EPA) approved Minnesota Department of Agriculture's (MDA) state-specific use restrictions for three dicamba herbicide products during the 2022 growing season in Minnesota. The restrictions (including temperature) are aimed at curbing off-site movement of the products.

- **DATE CUTOFF:** In Minnesota, no application shall be made south of Interstate 94 after June 12, 2022. North of Interstate 94, use is prohibited after June 30, 2022. For North Dakota dicamba product users, dicamba use is prohibited after June 30, 2022.
- **TEMPERATURE CUTOFF STATEWIDE:** In Minnesota, no application shall be made if the air temperature of the field at the time of application is over 85 degrees Fahrenheit or if the National Weather Service's forecasted high

temperature for the nearest available location for the day exceeds 85 degrees Fahrenheit. Forecasted temperature must be recorded at the start of the application. There is no temperature cutoff in North Dakota.

- In addition to the cutoff date, Xtendimax and Tavium have crop growth stage requirements. Xtendimax applications are prohibited after the R1 growth stage, and Tavium can be applied through V4.

Key points

Consider these points for improving herbicide performance in hot and dry weather:

- Use recommended adjuvants at labeled rate to help spray droplets better-absorb into leaf surfaces by dissolving cuticles and slowing the evaporation rate.
- Increase the spray volume to improve coverage.
- If appropriate, use coarser droplets to minimize evaporation.
- Make applications in the morning when plants have recovered from the heat and the leaves are oriented to intercept more droplets, but pay close attention to temperature inversions, which typically occur until just after sunrise (and set up several hours prior to sunset).
- Pay close attention to weed size. Weeds will rapidly grow in hot weather with adequate soil moisture. Target small weeds when herbicides are most effective. The target weed size for any technology in soybean should be 4 inches or shorter.
- Scout fields 7 to 10 days after postemergence applications to determine herbicide performance. If a respray is warranted, then 14 days after the first application is a good interval to target. The longer we allow weeds to regrow from a failed application, the more difficult complete control will become.

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Extension Weed Specialist

[Debalin Sarangi](#)

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GROWTH STAGE CUTOFFS FOR HERBICIDE APPLICATIONS IN CORN AND SOYBEAN

The delayed planting this season has pushed back postemergence applications in many crops by a few weeks. Since Tuesday was the summer solstice, traditionally the time we start to think about soybeans flowering, this seemed like a good time to remind folks about growth stage cutoffs in soybean. Compared to most year, many fields will likely produce their first flower (R1 growth stage) while soybeans are relatively small. That growth stage is important since some popular products restrict applications at or after R1. Here is the label language for many popular products:

Liberty (and generic glufosinate): “Emergence up to bloom or R1 growth stage.”

Enlist One and Duo: “Apply... any time after soybean emergence through the R1 growth stage”

Xtendimax: “This product may only be applied in-crop up to and including June 30. Applications occurring after R1 are prohibited as crop response may occur.” There is no growth stage cutoff for Engenia, but the June 30 calendar cutoff is in place.

Roundup (and generic glyphosate): “This product may be used in soybean with Roundup Ready Technology from emergence (cracking) through flowering (R2 stage soybean)”

Cutoff stages for other products are available in the [NDSU Weed Control guide. See “When to Apply” on pages 30-35.](#)

Please Note: The Correct language for Enlist cutoff is located above in this newsletter. New federal and state labels were issued after the Weed Guide went to print, so cutoff stages in the weed guide are not accurate for Enlist One and Enlist Duo.

In addition to considerations for soybean, many corn fields are rapidly approaching the growth stage and height-restriction cutoffs for postemergence corn herbicides. If we go off of growth stage restrictions, we start losing many popular options once we reach V5 to V6 corn (5 to 6 visible leaf collars). If we base our staging on height, then some of the earliest cutoff timings are 8-inch corn for broadcast applications of 2,4-D, and any atrazine must be applied before corn reaches 12-inches in height. If corn is 12 inches or taller, the atrazine must be left out of the tank. Many premix herbicides also have a cutoff of 11-inches which is driven by the Group 15 (acetochlor) product in the premix. Keep in mind that the cutoff for many products is based on growth stage or corn height, whichever comes first. There are plenty of options available to apply to later growth stages, but be sure to know the cutoff for your product of choice. See the “When to Apply” column on pages 22 through 26 in the 2022 NDSU Weed Control guide for height and growth stage restrictions of postemergence herbicides in corn.

[Joe Ikley](#)

Extension Weed Specialist

PROJECT SAFE SEND DATES AND LOCATIONS

Farmers, ranchers, pesticide dealers and applicators, government agencies and homeowners with unusable pesticides can bring them to any of the Project Safe Send Sites listed below.

Project Safe Send is a safe, simple and non-regulatory program that helps people safely and legally dispose of unusable pesticides free of charge. Since 1992, more than 11,000 people have brought in over 5.7 million pounds of pesticides to Project Safe Send.

The program accepts old, unusable or banned pesticides, including herbicides, insecticides, rodenticides and fungicides. The collected pesticides are shipped out of state for incineration. Project Safe Send is funded through product registration fees paid by pesticide manufacturers.

People are urged to check their storage areas for any unusable pesticides and safely set them aside for Project Safe Send. If the containers are deteriorating or leaking, pack them in larger containers with absorbent materials. Free heavy-duty plastic bags are available from the North Dakota Department of Agriculture.

If bringing more than 1,000 lbs., please contact Aubrey Sondrol at alsondrol@nd.gov or 701-425-3016 to pre-register. Each participant is limited to 5,000 total lbs. Each participant is limited to one shuttle. Chlorpyrifos will not be accepted.

Please see the following chart for the 2022 Sites.

2022 PROJECT SAFE SEND SITES

8 am - 12 pm (local time) at North Dakota Department of Transportation (NDDOT) facilities

Tuesday, July 12	Adams	804 1st Ave
Wednesday, July 13	Larimore	1524 Towner Ave
Thursday, July 14	Valley City	1524 8th Ave SW
Friday, July 15	Lisbon	12999 Hwy 27
Tuesday, July 19	Tioga	425 2nd St SE
Wednesday, July 20	Minot	1305 Hwy 2 Bypass E
Thursday, July 21	Rugby	603 1 St NE
Friday, July 22	Devils Lake	1905 Schwan Ave NW
Tuesday, July 26	Dickinson	1700 3rd Ave W Ste 101
Wednesday, July 27	Beulah	205 Hwy 49 S
Thursday, July 28	Bismarck	218 S Airport Rd
Friday, July 29	Ashley	520 7th St. SW

[Andrew A. Thostenson](#)

Pesticide Program Specialist



AROUND THE STATE

NORTH CENTRAL ND

Heat was the dominating storyline last week. More moderate temperatures and small chances of precipitation appear to be part of next week's forecast. At the NCREC, 0.70" of rain was observed since last Monday (June 13th). The following are precipitation observations across the area as noted by local NDAWN stations from June 13th through June 20th: Bottineau: 0.88"; Garrison: 2.62"; Karlsruhe: 1.13"; Mohall: 0.97"; Plaza: 1.07"; and Rugby: 1.28". As we approached submission deadline, an additional 0.12" of rain was measured at the NCREC.

For the second consecutive week, most calls into the Extension Crop Protection office were on grasshoppers and canola flea beetle. Grasshopper nymphs are growing around the field edges of numerous area farms. In some of these areas, chemical control protocols are being utilized along the field borders where populations appear to be concentrated.

Additionally, canola flea beetle continues to be a problem. Some growers may need to use a second application if economic thresholds are being met again. In some instances, a foliar insecticide application may be needed around day 7 and day 14 post emergence to help control flea beetles. As plants reach the 6th to 8th leaf stage, crops should be vigorous enough to overcome damage caused by the canola flea beetle, meaning chemical control would no longer be needed.

Weeds are still an issue in the fields across the region. Fallow fields, due to the inability of farmers to plant under the wet conditions, are often very weedy. Some fallow fields are severely impacted by erosion. Last week Dr. Bortolon and Extension Agent Sarah Bedgar visited hail damaged oats and canola in Max. Crops are generally in fair condition and the subsoil has adequate moisture for the crops.



Figure 1. From the top left, clockwise: oats affected by hail; spring wheat; canola; field pea.

[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

Planting has pretty much wrapped up in most of the region with a few producers trying to get their seed in last minute during the weekend. Considering entering into 3rd week of June and several fields being still wet, producers are going for PP claims which could be about 5-10% acres in our region. Most of the crops are emerging and look good in terms of evenness and emergence ratings. Small grains are entering into the tillering stage; dry beans, soybeans, corn, field peas, flax, sugarbeets and canola are up and growing fast (Figure 1). Weed control is in full swing. Some fields look excellent, others are behind on spraying. The NE region suffered heavy winds over the last week, especially on Saturday (peak gusts up to 47 mph), causing terrible dust clouds in many areas causing visibility issues along Hwys 1,2, 5 and I-29. The late planting season contributed to the bare fields with not enough ground cover to hold the top soil. These very high winds caused a fair amount of damage to dry bean and soybean, but also some damage to corn, wheat and sunflower (Figure 2).

Figure 1: Spring wheat and field pea fields in Cavalier County
Photos: Anitha Chirumamilla, LREC



Figure2: Wind damage to soybean seedlings and soybean field in Griggs County
Photos: Jeff Stachler, ANR Extension Agent, Griggs County

Late planted canola fields look like they escaped the flea beetle pressure (Figure 3a). However, several early planted canola fields were sprayed for flea beetles over the weekend (Figure 3b). Grasshoppers are emerging and they are being spotted all over the region. Reports of as much as 30% defoliation from grasshopper feeding was observed in wheat fields in Griggs county (Figure 4). Alfalfa stands are nearing flowering stage and the first cuttings are happening. Leafy spurge is showing up in many ditches, road sides and pastures (Figure 5).



Figure 3a: Late planted canola that is free of flea beetle damage

Photo: Anitha Chirumamilla, LREC



Figure 3b: Flea beetles on canola seedling

Photo: Anitha Chirumamilla, LREC



Figure 4: Grasshopper feeding damage in wheat in Griggs County

Photo: Jeff Stachler, ANR Extension Agent, Griggs County



Figure 5: Leafy Spurge plants in Cavalier County

Photo: Anitha Chirumamilla, LREC

[Anitha Chirumamilla](#)

Extension Cropping Systems Specialist
Langdon Research Extension Center

SOUTH-CENTRAL/SOUTHEAST ND

According to NDAWN, the region's rainfall during June 1-20 ranged from 0.8 inch (Zeeland; McIntosh County) to 3.3 inches (McHenry; Eddy County), with the Carrington REC receiving 2.2 inches. The weekend's strong winds and high temperatures caused some variable injury to row crops including corn and soybean, and most commonly dry bean.

Crop planting is essentially complete with the exception of annual warm-season forages. Winter wheat growth stages range from heading to flowering. Mid-May seeded small grain are nearing the jointing stage and corn has 6 leaves (V6 stage). Cooperative weather is needed for timely POST herbicide application in small grain and corn fields, and soon for soybean.

[Greg Endres](#)

Extension Cropping Systems Specialist
NDSU Carrington Research Extension Center

SOUTHWEST ND

A majority of the fields in the region continue to look great. The past week has brought hail to a few parts of the region, including in Dickinson. On Monday June 20th heavy winds, rain, and hail came down and made fields in the Dickinson area look like they were hit with a flail mower. The hail was so heavy that there were still piles of ice in the landscape the next afternoon. Some patience will be needed to see what remains for a viable stand. Some of the crops impacted had their growing points destroyed and some may recover. A few other areas reported light hail with little injury but may cause some bacterial issues down the road. According to NDAWN, from June 13th to June 20th, Dickinson received 2.29 inches of rain with 1.76 falling on June 20th. Over the same period (13th-20th) Beach received 2.09, Hettinger 1.33, Mott 0.47, Carson 1.64, and Mandan with 2.04 inches of rain.

While we've had some warm days reaching the 80s and 90s, night time temperatures have been relatively low, reaching down into the 40s. This has slowed the growth of some crops like soybeans.

All crops are in a wide range of growth stages with various planting dates. A good portion of canola fields in the region are beginning to bloom, but



Figure 1. Grasshopper nymphs feeding on the edge of a wheat field near Beach. (Photo credit Ashley Ueckert)

there are also canola fields that haven't bolted yet. Wheat is anywhere from just emerging to flag leaf depending on planting date.

For those that can get in the hay fields, forages are beginning to be cut. Some are cutting a little early due to alfalfa weevil pressure. Insect pressure is high in some areas. Multiple reports of high grasshopper nymph activity have resulted in insecticide applications in parts of the region. Other than tan spot in winter wheat, we haven't seen much disease in spring planted small grains yet, but conditions continue to be conducive.



Figure 2. Hail and heavy rain in demonstration plots at the NDSU Dickinson REC



Figure 3. Canola field south of Dickinson just barely beginning to bloom on June

[Ryan Buetow](#)

Extension Cropping Systems Specialist
NDSU Dickinson Research Extension Center



WEATHER FORECAST

The June 23 to June 29, 2022 Weather Summary and Outlook

Two notable weather features occurred during the past week. The first was the high temperatures over the weekend. Widespread temperatures in the 90s occurred with a few areas, especially in the Red River Valley hitting 100° or even a bit higher. Other days besides the weekend were also above average for many parts of the region, and temperatures were anywhere from 7° to 10° above average in eastern North Dakota into western Minnesota. Western North Dakota was a bit “cooler” with temperatures 3° to 5° above average (Figure 1).

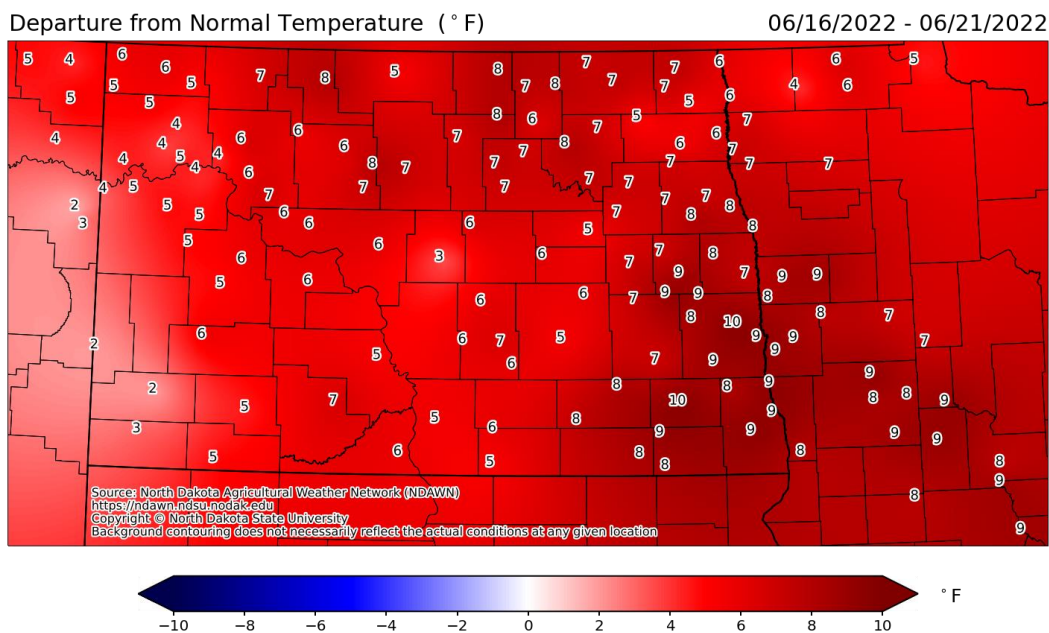


Figure 1. Departure from Normal temperature at NDAWN stations for the period of June 16 through June 21, 2022

Most of the rain in the past week occurred as we transitioned back to cooler temperatures on Monday or Monday night. The strongest thunderstorms that did develop impacted areas near or south of I94 where most of the severe weather reports occurred. All NDAWN stations recorded rainfall, but amounts varied greatly as noted in Figure 2.

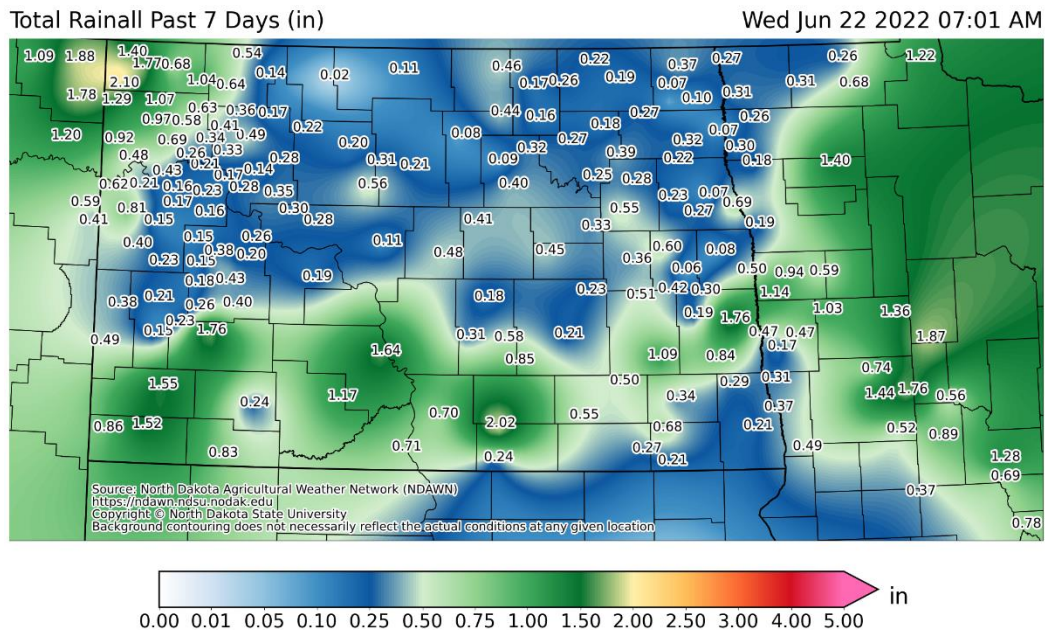


Figure 2. Total rainfall for the 168-hour period ending at 7:00 AM on June 22, 2022 at NDAWN stations

Even with the rain from earlier this week, a high percentage of areas in North Dakota into northwestern Minnesota recorded below average rainfall for the first 3 weeks of June (Figure 3). The best time period for rain during the next 7 days looks to be Friday afternoon and night. That threat of rain/thunderstorms will be associated with a cold front that will move through the region. A couple of other chances of rain are likely next week as we finish off the month of June.

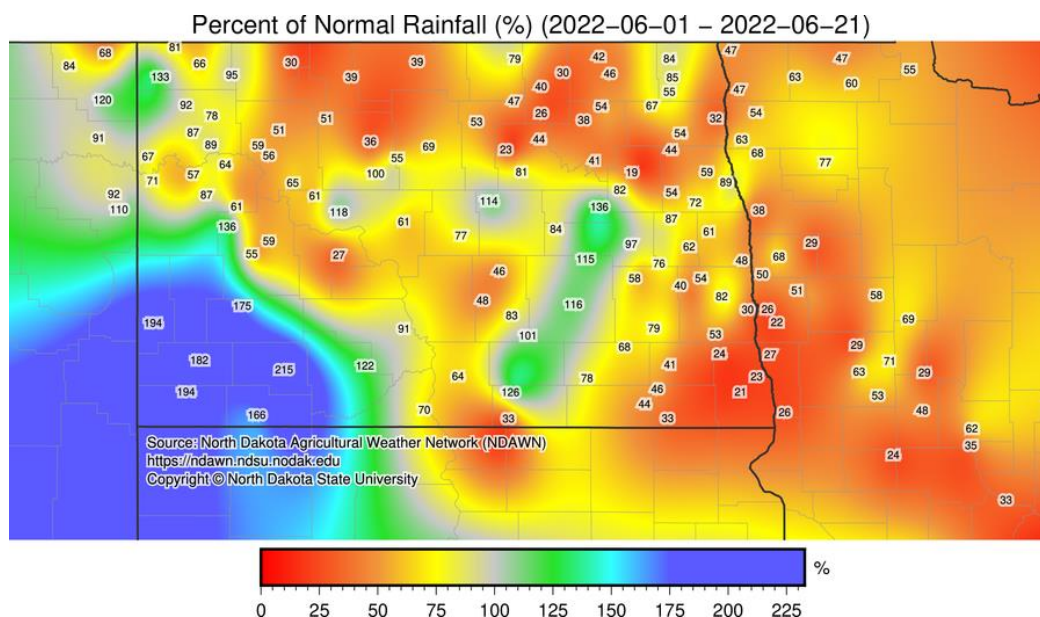


Figure 3. Percent of Average Rain for the period of June 1 through June 21 at selected NDAWN Stations.

Figures 4 and 5 below are forecasted Growing Degree Days (GDDs) base 32° (wheat and small grains) and 50° (Corn and Soybeans) for this forecast period.

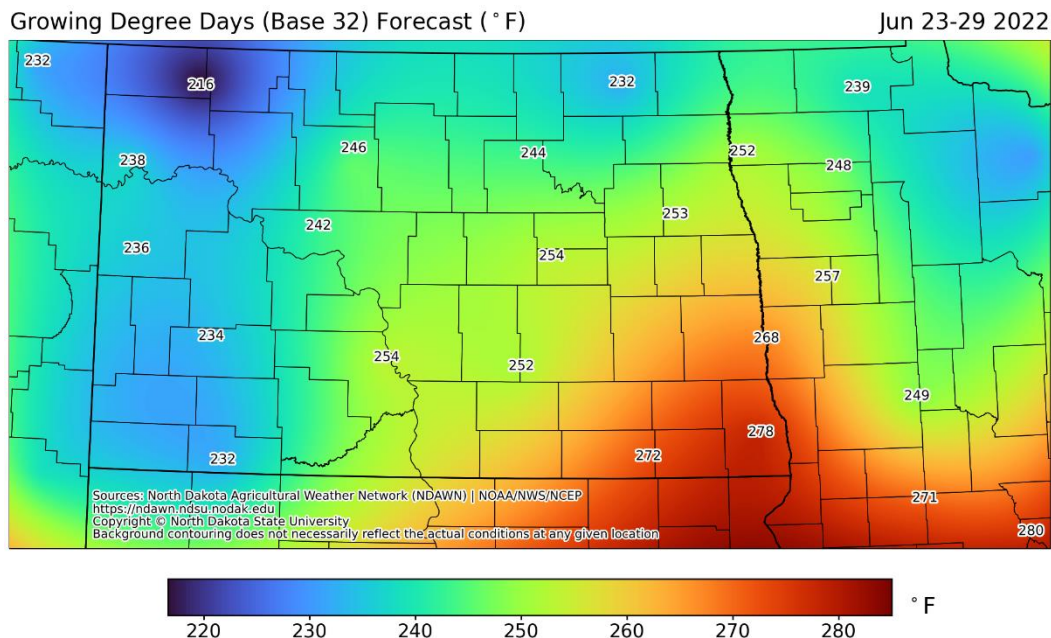


Figure 4. Estimated growing degree days base 32° for the period of June 23 to June 29, 2022.

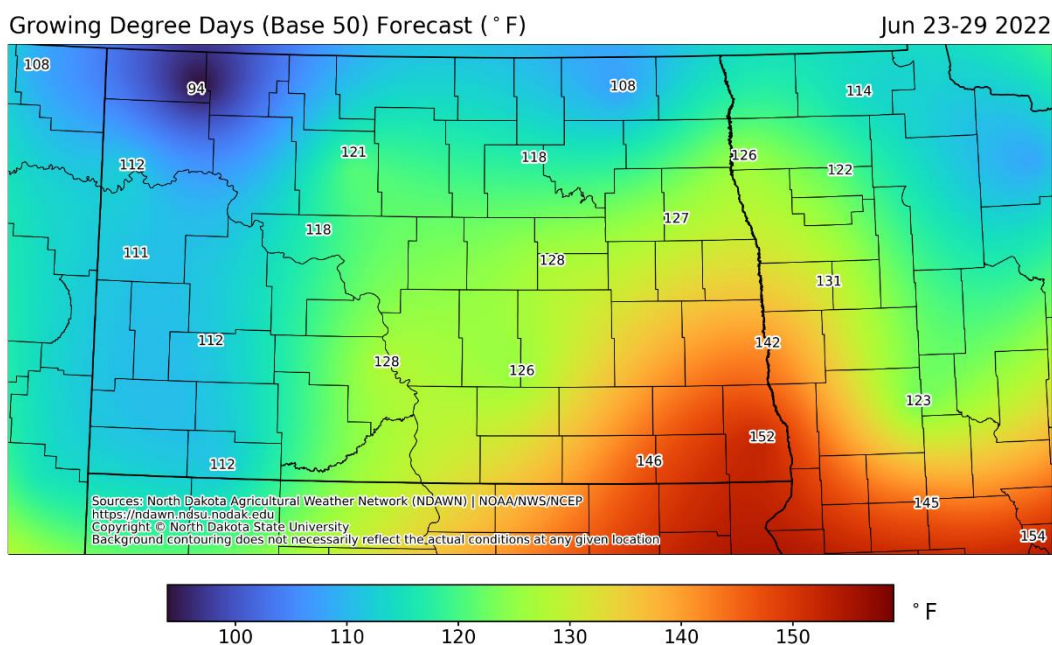


Figure 5. Estimated growing degree days base 50° for the period of June 23 to June 29, 2022.

Using May 15 as a planting date, the accumulated number of growing degree days for wheat (base temperature 32°) is given in Figure 6. You can calculate wheat growing degree days based on your exact planting date(s) here:

<https://ndawn.ndsu.nodak.edu/wheat-growing-degree-days.html>

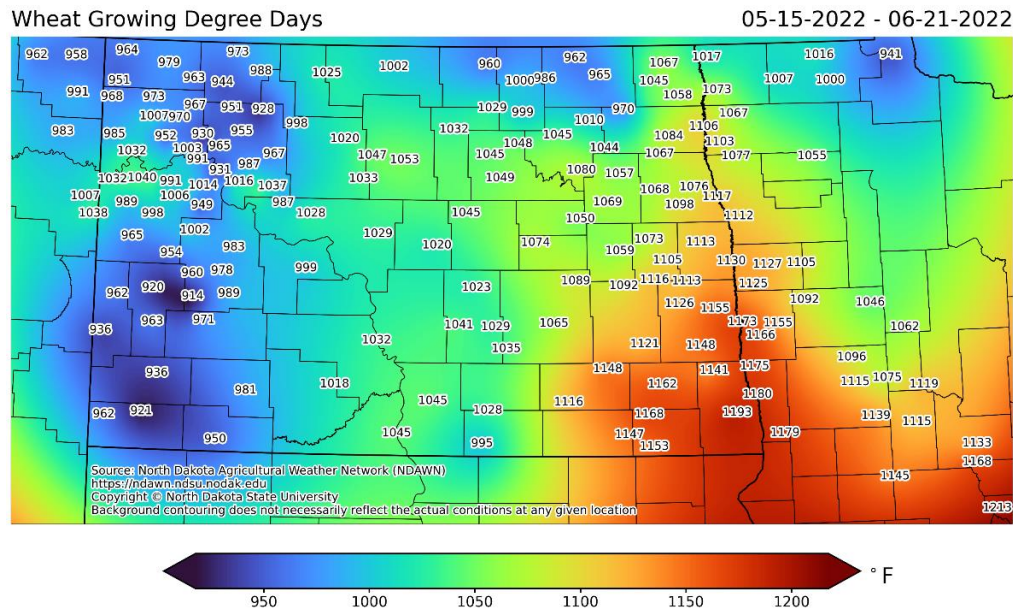


Figure 6. Wheat Growing Degree Days (Base 32°) for the period of May 15 through June 21, 2022.

Using May 20 as a planting date, the accumulated number of growing degree days for corn (base temperature 50°) is given in Figure 7. 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>.

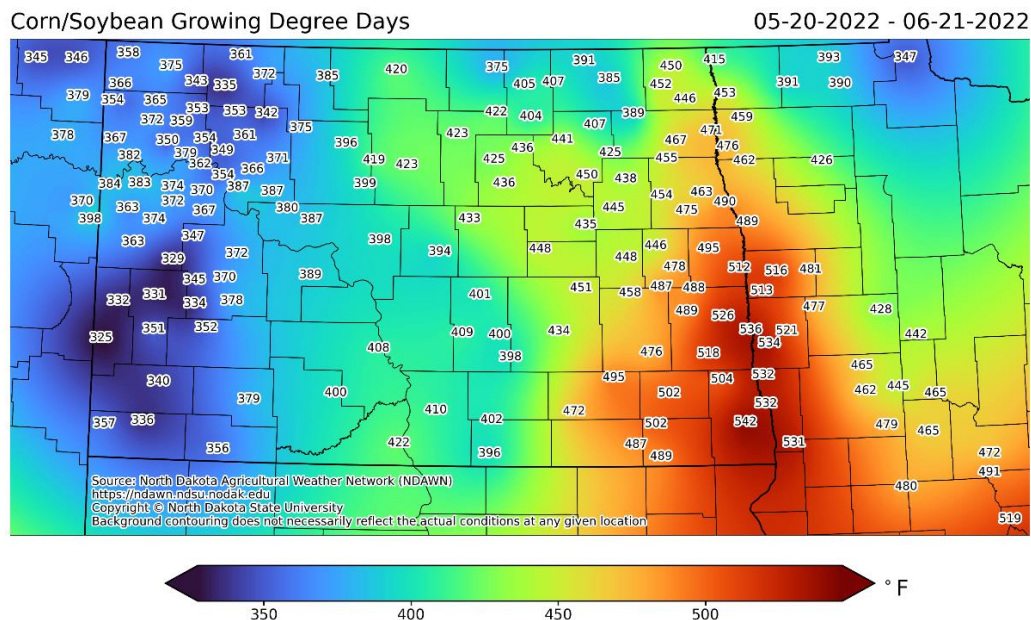


Figure 7. Corn Growing Degree Days (Base 50°) for the period of May 20 through June 21, 2022.

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>

Daryl Ritchison

Meteorologist

Director of the North Dakota Agricultural Weather Network (NDAWN)

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