Northern corn rootworm (NCR) resistance to Bt corn hybrids expressing the Cry3Bb1 (Yieldgard Rootworm) and Cry34/35Ab1 (Herculex CRW) proteins was documented for the first time in the U.S. from populations collected in southeastern North Dakota. Adults of NCR were collected from five locations (Arthur, two fields at Page, Sargent county, and Ransom county). Populations of NCRs from Arthur, Page, Ransom, and Sargent were found to have resistance to Bt corn hybrids expressing the Cry34/35Ab1 protein. The NCR population of Arthur was also resistant to Bt corn hybrids expressing the Cry3Bb1 protein. No cross-resistance was evident between the Cry3Bb1 and Cry34/35Ab1 proteins for any NCR populations tested.

In addition, western corn rootworm (WCR) adults collected from Ransom county showed resistance to Bt corn hybrids expressing the Cry3Bb1 protein. No WCR populations were observed at the other locations. The low density of WCR is probably due to the cold winter of 2013-2014 that may have caused significant egg mortality (overwintering life stage).

Increased survival of NCR and WCR to Bt pyramided (Cry3Bb1 + Cry34/35Ab1 or SmartStax) corn was also observed in some populations. The reduced susceptibility of both corn rootworm species to the Bt pyramid corn could be attributed to increased tolerance of these populations to Cry3Bb1 and/or Cry34/35Ab1 proteins. However, not all corn rootworm populations tested were resistant and some were still susceptible to Bt corn expressing either or both Cry34/35Ab1 and Cry3Bb1 proteins in ND.

This research was recently published in the 2019 *Journal of Economic Entomology*. The abstract is available at https://academic.oup.com/jee/advance-article-abstract/doi/10.1093/jee/toz111/5494710

The following are some guidelines for growers to help reduce the risk of corn rootworm populations developing resistance to Bt corn hybrids in North Dakota.

- Rotate fields (crop rotation) annually between corn and non-host crops such as soybean, flax, sunflowers, or wheat.
- Control volunteer corn that could serve as hosts for local Bt-resistant rootworm populations.

(Continued on next page)
• Plant non-Bt corn hybrids with a soil insecticide instead, especially when low rootworm pressure is expected.
• Plant the structured refuge corn (non-Bt corn) according to guidelines of the chosen Bt corn.
• Rotate fields with Bt corn hybrids that have different modes of action each year.
• Plant Bt pyramided corn hybrids. These hybrids have two or multiple Cry proteins with different modes of action for control of corn rootworms.
• Scout your field for corn rootworm adults, and assess larval root-feeding injury during late summer.
• If you experience higher pressure of corn rootworms in your field, contact and report to your local seed company representative and your local county extension agent / extension entomologist.

For more information, consult the NDSU Extension publication E1852 Integrated Pest Management of Corn Rootworms in North Dakota at:

Thanks to the North Dakota Corn Utilization Council for supporting this research on corn rootworms in ND.

EUROPEAN CORN BORER (ECB) resistance to a Bt corn hybrid expressing the Cry1F (Herculex 1) protein was confirmed for the first time for multiple populations of ECB in Nova Scotia, Canada in 2018 (Source: J. Smith and A. Schaafsma, University of Guelph). In order to reduce the risk of geographic expansion of field-evolved resistance of ECB to Bt corn hybrids, growers should avoid planting Bt corn hybrids expressing the single protein Cry1F or Cry1Ab, and pyramid corn hybrids in which one of the proteins is Cry1F. Resistance of ECB to Cry has not been observed in North Dakota or in nearby states. Always be vigilant in planting the refuge requirement that accompanies the chosen Bt corn hybrid. If you experience unexpected damage or heavy infestation of ECB adults or/and larvae in your corn fields, then immediately contact your local seed company representative and your local county extension agent / extension entomologist.

Veronica Calles-Torrez
Post-Doctoral Scientist

Janet J. Knodel
Extension Entomologist

HANDY BT TRAITS TABLE UPDATED
The Handy Bt Traits Table for U.S. Corn Production was updated by Dr. C. DiFonzo at Michigan State University to include the ‘breaking news’ about Bt resistance in European corn borers and northern corn rootworms. A new column called “Resistance confirmed to the combination of Bts” was added to the table to indicate field failures, confirmed resistance or cross resistance for each insect pest. This table serves as a general guide to which Bt traits may have potential resistant problems to certain insect pests. Growers, seed dealers and ag consultants can then select the best Bt trait for pest management in their local area. To download The Handy Bt Traits Table, see the website below:
https://www.texasinsects.org/bt-corn-trait-table.html

Citations of the Bt resistance research on the corn insect pests is also available at:
https://agrilife.org/lubbock/files/2019/05/BtTraitTable-Citations.pdf

ALFALFA WEEVIL DEGREE DAY UPDATE
The degree day map (next page) shows that alfalfa weevil adults (200 Accumulated Degree Days, ADD) are emerged, and egg hatch (300 ADD) is occurring in southeastern and northwestern ND. Use a 15-inch sweep net to see if adults or larvae are present in alfalfa fields. The warmer weather this week should increase the rate of insect development. Scouting should begin immediately after egg hatch, and fields should be scouted weekly up through the first cutting. For information on scouting and thresholds, consult the NDSU Extension publication:
Integrated Pest Management of Alfalfa Weevil in North Dakota E1676
DRY BEAN PLANT TYPES, DEVELOPMENT AND MATURITY
Dry edible bean has two basic plant types, determinate (bush) or indeterminate (vining or trailing). Within the vining types, there are upright vine and upright short vine varieties (see bean descriptions Table 24-27 in the North Dakota Dry Bean variety results publication A654-18). Varieties may be classified according to plant types. As an example, navy beans can be determinate or indeterminate. One of the defining characteristics of determinate types is that stem elongation stops when the terminal flower racemes of the main stem or lateral branches are developed. In North Dakota in indeterminate types, flowering and pod filling may continue as long as temperature and moisture are favorable for plant growth.

(Continued on next page)
Dry bean growth stage, at any point in the vegetative stage, can be observed, by counting the number of nodes on the main stem. Reproductive stage classification begins when the first flower opens (R1) and is described and characterized by observing pod development and seed filling within the developed pod.

**Bean Growth stages**

<table>
<thead>
<tr>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germination and stand establishment (V1 to V2)</td>
</tr>
<tr>
<td>Rapid vegetative growth (V3 to V8)</td>
</tr>
<tr>
<td>Flowering and pod development (R1 to R4)</td>
</tr>
<tr>
<td>Pod fill and maturation (R5 to R9)</td>
</tr>
</tbody>
</table>

In the North Dakota variety trial publication, the total number of days from planting to physiological maturity are provided for most of the test locations. These are good estimates to differentiate maturity between varieties, and they vary among market classes. When planting late, an earlier maturing variety should be selected to account for the reduced growing season.

Dry bean maturity date and development in a season depends greatly on planting date and maturity of a selected variety. Factors affecting development include planting in cool and/or wet soils, planting in dry soils, insufficient or excessive soil moisture, high temperatures during flowering delaying pod set, or low temperatures during maturation. Varietal maturity length also may be extended by preplant herbicide injury, excess of or lack of certain plant nutrients, low plant stands, or hail damage. Some of these factors can be controlled, others cannot.

**Resources for dry bean management**

- Dry edible bean production crops team website
- Fertilizing Pinto, Navy and other Dry Bean (SF720)
- Pinto Bean Response to Phosphorus Starter Fertilizer in East-central North Dakota (A1883)
- Black and Navy Bean: Response to Row Spacing and Plant Population in Eastern North Dakota (A1921)

**REALLY LATE PLANTED CORN**

With more than a third of the corn acres yet to be planted and the final planting date for full crop insurance past (May 25th for most of the state) or fast approaching (May 31st for several counties in the southeastern corner of the state), some growers may be wondering if they should continue with their plan to plant corn, switch to another crop or take prevent plant. This decision is further complicated by the fact that a crop must be planted in order to qualify for payments from the new round of the trade mitigation program.

As I understand it, crop insurance coverage is reduced by 1% per day after the final planting date up to 20 days. Yield is also negatively impacted by late planting. However, there is limited recent data on the effect of planting very late on corn yield in North Dakota. Therefore, I rely on data developed for the more northern region of Wisconsin (http://corn.agronomy.wisc.edu/Pubs/UWEX/A3353.pdf) to get an estimate of the kind of losses we might experience in North Dakota. These data show a 35% reduction in yield when planting is delayed to June 1st (slightly more loss than 1% per day from the recommended planting date of May 1st). Moreover, when planting is delayed to June 10th yield is reduced by 54%. This suggests that the potential for yield loss accelerates when planting is delay beyond June 1st. With current hybrids, these scenarios may be somewhat pessimistic. Certainly, there are some higher yielding earlier maturing hybrids currently available that were not available when this chart was developed. In addition to yield, excessive grain moisture at harvest is a concern when planting is delayed. Wet corn is more difficult to handle at harvest and expensive to dry.

(Continued on next page)
When recommending a relative maturity of a hybrid, I like to have the hybrid mature prior to or during the last week of September so that there is adequate warm weather (relatively speaking) to dry down the crop to a reasonable moisture level before temperatures get too cold in November. To look at the effect of planting date and the relative maturity of the hybrid planted on when the crop will reach physiological maturity (around 32% moisture), I ran simulations using the U2U Corn GGD tool (https://hprcc.unl.edu/gdd.php#) for locations near Fargo and Carrington (Table 1). Based on these simulations, farmers around Fargo would need to switch to an 80 RM hybrid if planting is delayed until June 10th in order to have it reach PM prior to the first of October. Growers around Carrington would need to switch to a 75 RM hybrid to achieve the same level of maturity. These simulations assume that we will have normal weather this season. Currently we are running 100 GDD behind normal from May 1st, but hopefully we will catch up soon. This week looks promising!

Table 1. Effect of planting date and hybrid relative maturity on the predicted date that a corn crop will reach physiological maturity, at Fargo and Carrington. Date to reach physiological maturity is simulated using the U2U Decision Support Tool - Corn GGD using average weather data.

<table>
<thead>
<tr>
<th>Planting date</th>
<th>Relative maturity of the hybrid planted -- Fargo</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>95</td>
</tr>
<tr>
<td>1-May</td>
<td>19-Sep</td>
</tr>
<tr>
<td>20-May</td>
<td>7-Oct</td>
</tr>
<tr>
<td>1-Jun</td>
<td>NBL§</td>
</tr>
<tr>
<td>10-Jun</td>
<td>NBL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planting date</th>
<th>Relative maturity of the hybrid planted -- Carrington</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90</td>
</tr>
<tr>
<td>1-May</td>
<td>30-Sep</td>
</tr>
<tr>
<td>20-May</td>
<td>8-Oct</td>
</tr>
<tr>
<td>1-Jun</td>
<td>NBL</td>
</tr>
<tr>
<td>10-Jun</td>
<td>NBL</td>
</tr>
</tbody>
</table>

§NBL – No black layer, meaning that the corn crop will not reach black layer before the first killing frost.

Joel Ransom
Extension Agronomist, Small Grains and Corn

ROOT ROTTS, SEEDLING BLIGHTS, AND SEED DECAY OF CORN

Corn seed that has been in the soil for a couple weeks without emerging may be impacted by soil-borne and/or residue-borne pathogens. Although the saturated soils can cause abiotic disorders in plants, the conditions can increase the risk for root rot, seedling blight and seed decay issues. The two most common pathogens associated with these corn diseases in North Dakota are *Pythium* and *Fusarium*. *Pythium*-associated problems are favored by cold, wet soils and will be more problematic in the wettest areas of a field (low spots). *Fusarium* has a wider range of favorable temperatures and moisture conditions and is common in corn plants that have been stressed by cold temperatures, compactions, and saturated soils. (Continued on next page)
Distinguishing between the two pathogens based on plant symptoms is very difficult and laboratory methods are often needed. To determine if a pathogen is causing stunting or wilting, dig up the entire corn plant (don’t pull on above ground tissue) and check to see if the mesocotyl region is discolored or if the seed is rotted (Figure 1).

Fungicide Seed Treatments

Seed treatment fungicides containing metalaxyl, mefenoxam or ethaboxam will have the best activity on *Pythium*. For *Fusarium*, several fungicide groups have activity including demethylation inhibitors (DMIs/FRAC 3), Quinone outside inhibitors (Strobilurins/FRAC 11) and Succinate dehydrogenase inhibitors (SDHIs/FRAC 7). The effective residual from any of these fungicides is around two to three weeks (depending on soil conditions).

For more information on seed decay, seedling blights and root rots of corn please use the North Dakota Plant Disease Management Guide (HYPERLINK) and the Crop Protection Network website.

Andrew Friskop
Extension Plant Pathology, Cereal Crops
IS A "BAD CHLOROSIS YEAR" IN STORE?

Things are shaping up for 2019 to be a "bad chlorosis year". The greatest factor in the severity of iron deficiency chlorosis, or IDC, in soybeans is the amount of bicarbonate ions in the soil water. Bicarbonate, or HCO$_3^-$, is the same ion that is found in sodium bicarbonate, or common baking soda. Bicarbonate accumulates in the water in the topsoil when the following three things occur:

1- there needs to be lime, or calcium carbonate in the topsoil,
2- the soil needs to be wet,
3- there needs to be biological activity to generate carbon dioxide, which generates more bicarbonate.

Bicarbonate interferes with a soybean plant's ability to take up iron and the plant's ability to move the iron around in the plant. So, with wet conditions, and late planting, 2019 could be a very bad chlorosis year.

The most effective control measure for IDC is planting a resistant variety. This is not a good year to experiment with a brand-new variety without a local track record on IDC-prone land. It might be a wiser choice to stick with a variety with a good record of IDC resistance. Nothing can substitute for a resistant variety. There is no fertilizer, no foliar spray, nor any other cultural practice that can turn a weak variety into performing like a resistant variety on IDC-prone land. No variety is immune to IDC. Even a resistant variety can turn yellow if conditions are bad enough. So, other cultural practices, like an iron fertilizer, need to be added to a resistant variety, not used instead of a resistant variety. A fertilizer supplier may imply that using a certain fertilizer or amendment will allow a soybean farmer to plant whatever variety they want on IDC-prone land. According to my research, that is not true.

Regarding iron fertilizers, there are three compounds that my research has shown to give at least an early-season reduction in chlorosis. The three "red" chelates, FeEDDHA, FeEDDHSA, and FeHBED, can all reduce chlorosis early in the season. Typically, 2-3 pounds per acre of a 6% a.i. product in-furrow is needed for an early-season response. Commercial iron products vary in quality though. The higher the quality, the longer-lasting the response will be. Products with a lower percentage of the effective isomers need to be applied at higher rates than higher-quality products.

Another cultural practice that is helpful, is increased row spacing and seeding rate. Going to 22 or 30 inch rows will result in less IDC than planting with narrower rows, in general. However, increasing row width will probably increase weed pressure and will decrease yield in non-IDC areas. Sometimes more than one cultural practice is needed when IDC is severe. I work with a group of farmers in the Colfax, ND, area, and the best results on IDC-prone land are obtained when three cultural practices are combined: a resistant variety, 22 or 30" rows, and an in-furrow application of 3 lb/A of an effective FeEDDHA product.

R. Jay Goos
Soil Science Professor
EARLY SEASON WEED CONTROL: TIMING IS EVERYTHING

With several rounds of rainfall this past week, many people pushed hard to wrap up planting season where the ground was fit. In years with these compacted planting seasons, it is often difficult for sprayers to keep up with planters in order to get preemergence herbicides applied on all fields. Most corn herbicides can be forgiving and allow applications preemergence through an early vegetative growth stage. Herbicides used for soybean weed control tend to have stricter labels. Four popular herbicides that only allow application only prior to crop emergence are sulfentrazone (Authority/Spartan, generics), flumioxazin (Valor/Fierce, generics), saflufenacil (Sharpen-based products), and metribuzin (Sencor, generics). Examining these labels reveals that there is typical label language that says applications “must” or “can be” applied from planting up to three days after planting soybean. This three day-window is typically written into labels because under ideal soil conditions, soybeans will emerge within three days after planting. The reality we are facing in 2019 is that cold soils will delay emergence of soybean. There are many reports of soybean planted two weeks ago that have yet to emerge. The language on each individual label will decide how long we can legally apply each of these products after planting. Some of the products simply say to apply after planting, but prior to crop emergence. Our interpretation is: labels that state “must apply within three days” means you have a three-day window. Applications made after that three-day window may not cause crop injury if the soybeans have not yet emerged, but any liability for crop injury would be on the applicator, not the chemical manufacturer. Remember, as always, the label is the law.

These label languages may beg the question, what does happen if I apply these products on emerging soybean? We applied these products at the Carrington REC last year to use as a teachable moment. Attached are pictures of sulfentrazone (Image 1) and flumioxazin (Image 2) applied to VE, or cotyledon soybean. The bottom line is that severe injury, and possible plant death and stand reduction can be expected if these Group 14 products are applied to emerged soybean. These products are important in our ever-lasting fight against herbicide-resistant and other difficult-to-control weeds. If we do not apply these products prior to crop emergence, several of our best herbicides must go back in the toolbox and we have fewer options remaining for weed control. This is not ideal for weed control, but hardly anything has been ideal in 2019. So what is Plan B if we do not get a preemergence herbicide on our soybean acres?
Plan B for soybean weed control will greatly depend on which soybean technology has been planted. Roundup Ready Xtend, Roundup Ready, Enlist, and Liberty-Link soybean all allow approved herbicides to be applied over-the-top of emerged soybean. These products will control emerged weeds that are not resistant to their active ingredients. There are also herbicides that can be applied on any-traited soybean for control of emerged weeds. These mainly fall into three modes of action: Group 2 (Firstrate, Pursuit, Raptor, generics), Group 14 (Blazer, Cobra, Flexstar, generics), and Group 6 (Basagran, generics). For early vegetative herbicide applications, a herbicide with residual activity should be tank-mixed with the first application. In emerged soybean, this limits us to Group 15 herbicides (Dual, Outlook, Warrant, Zidua, generics) and fomesafen (Flexstar, generics). For the benefits of applying residual herbicides, please see Dr. Tom Peter’s article from last week’s Crop & Pest Report.

Joe Ikley
Extension Weed Specialist

Greg Endres
Extension Cropping Systems Specialist
NDSU Carrington Research Extension Center

HERBICIDE APPLICATION LAYBY; WHAT DOES LAYBY MEAN? HOW DOES IT WORK?

I am writing about waterhemp control in sugarbeet today although we will attempt to expand the concept into soybean, too. In sugarbeet, the idea is to use SOA 15 herbicides (chloroacetamide, S-metolachlor, Outlook and Warrant) postemergence to sugarbeet and preemergence to waterhemp. In the beginning, the concept was a single application of one of the three chloroacetamide herbicides applied between V2-V8. However, the concept has evolved into split applications, the first application usually timed to the V2 stage and the second application at V6-V8 stage. We call the concept layby. The term is not original, and it might be technically incorrect, but that what we call it in sugarbeet.

Let’s take a step back. What does the term ‘layby’ mean and how is the concept used in other parts of the country? I believe the term ‘layby’ originates from cotton country and refers to herbicides applied to maintain weed control until the cotton canopy is sufficiently developed to shade the furrow and bed top, thereby suppressing small weeds. The herbicides commonly used at layby have both preemergence and postemergence activity to control emerged weeds and to provide residual control for an extended duration of time. Layby herbicides complement weed control provided by other integrated weed management practices including cultural and mechanical weed control and use of other herbicides including preplant-preemergence and early season postemergence herbicides. Layby herbicides are primarily used to control broadleaf weeds in cotton.

Now back to sugarbeet. Layby application are usually timed to waterhemp emergence. In the southern part of the RRV and west central Minnesota, that means herbicide applied and activated by May 20th (note, 2019 is a unique season and application is later than normal since sugarbeet plant was later than normal).

(Continued on next page)
Application is with a tank-mix of glyphosate plus ethofumesate and either S-metolachlor, Outlook or Warrant, with ammonium sulfate and an HSMOC class adjuvant. Water volume is a compromise between volume to provide good coverage for soil applied herbicides and volume to optimize glyphosate efficacy. Volume is usually 12-15 gpa. It is critical to combine herbicides with glyphosate that control emerged weeds. Ethofumesate applied at 4 fl oz/A is an effective mixture as it improves glyphosate penetration of cellular waxes, especially waxes on waterhemp. Chloroacetamide herbicide choice is at the discretion of the farmer. However, more recently, we have found split application of chloroacetamide herbicides improves sugarbeet safety and waterhemp control.

Now to soybean. We have observed the same benefit applying chloroacetamide herbicides POST to soybean to control late emerging waterhemp. In soybean, waterhemp control is better when chloroacetamide herbicides are combined with a PRE with longer residual control such as sulfentrazone (sold under several brand names) or pyroxasulfone. Cultural practices including narrow rows and bumping soybean population density, also are effective ways to close soybean rows sooner, thus assisting with waterhemp control.

Tom Peters
Extension Sugarbeet Agronomist
NDSU & U of MN

PINE NEEDLE SCALE ON CONIFERS

Pine needle scale is a widespread pest of pine and spruce trees throughout northern North America. These insects are generally pests of ornamentals rather than landscape trees. Scale insects are not the cause of tree decline or death, but they can weaken trees. Severe infestations can cause premature needle drop and kill terminal buds. However, damage from pine needle scale can be avoided through adequate spacing of trees and proper care. Feeding injury appears as yellowing or browning of needles around the scale. White waxy coatings cover the adults, which gives them the appearance of paint spatters on needles. Adult females are immobile and live on the same needle for their entire life. They have two generations per year: one in spring and another in mid-summer.

Beneficial insects such as lady beetles and parasitoid wasps naturally control pine needle scale. Proper tree care during establishment and ideal site selection provide additional elements of control. Insecticides can be ineffective unless applied when scales first hatch and are vulnerable nymphs. Eggs begin hatching when the local environment reaches 300 Degree Days at base 50ºF or when lilacs are in full bloom. If control is necessary, try using horticultural oils or insecticidal soaps that are safe for natural predators. Other insecticides labeled for the control of scales are harmful to predators and other beneficial insects.

(Continued on next page)
The window for controlling pine needle scale will soon occur throughout the region. For monitoring insect Degree Days, visit NDAWN at https://ndawn.ndsu.nodak.edu/insect-degree-days.html

For more information on scale insects:

Alexander Knudson
Entomological Diagnostician

**AROUND THE STATE**

**NORTH CENTRAL ND**

Some welcome rain arrived to the North Central region of North Dakota over the holiday weekend. Some of the reports around the area for the past week were: Minot NCREC: 0.63”; Mohall 0.45”; Rugby 0.45”; Bottineau 0.61”; Berthold 0.52”; Garrison 0.99”; Plaza 0.56”; Rolla 0.92”; Ross 0.68”. Some hit and miss areas of frost have been reported in the area, however, some warmer weather appears to be a part of the short term and extended forecast.

Do you have an interest in learning more about beneficial insects and their impact on the farm? NDSU Extension, the USDA Natural Resources Conservation Service, and other area partners are teaming up to present Good Bugs III: Farming with Beneficial Insects for Pest Control – Conservation Biocontrol on Rangeland and Cropland short course. This course will be offered on June 12th at the Hettinger Research Extension Center in Adams County and June 26th at the Burleigh County SCD Menoken Farm. Both courses will begin at 9 am local time and conclude around 4 pm. Registration is $30 until June 1st. Registration will rise to $40 after that date. Registration is available at www.ndswcs.org. If you have any question, please reach out to TJ Prochaska at travis.prochaska@ndsu.edu.

TJ Prochaska
Extension Cropping Systems Specialist
NDSU North Central Research Extension Center
NORTHWEST ND

Rainfall on Friday, May 24th ranged from 0.25-0.5” across most of Northwest ND. Very little to no rain fell over Memorial Day weekend, despite there being strong chances predicted earlier in the week. Temperatures over the weekend were cool with cloudy conditions in the mornings but warmed up into the 60’s and 70’s in the afternoons. The forecast for this week is much warmer and sunnier than last week with a chance of thunderstorms over the coming weekend. Highs are predicted to be in the 80’s for most of the week with a chance of upper 80’s on Thursday. Most crops planted in late April and early May have emerged, though development has been slow with the cool temperatures and cloudy days. Spring wheat, durum, pea, and lentil are all emerged at the Williston Research Extension Center, and winter wheat is jointing. I have found kochia, common lambsquarters, Russian thistle, downy brome, and wild buckwheat emerged to about 2” tall, so now is a good time for early post spraying of weeds. The top soil is starting to dry out and rain is needed to support crop emergence and establishment.

Clair Keene
Extension Cropping Systems Specialist
NDSU Williston Research Extension Center

NORTHEAST ND

This week has shaped up to be a great week for farming activities after Friday’s rain and Saturday’s showers. I’ve observed excellent wheat stands emerging in the valley. Saline ground has impacted emergence in some fields. Canola is just starting to pop out of the ground. Flea beetle activity will be strong with these warm days. Scout your fields daily. The threshold is 20% defoliation for a post-application up to 4-Lf stage (when four true leaves are present on the plant, not counting cotyledons). Fertilizer activity is still busy and spray season is approaching.

Lesley Lubenow
Area Extension Specialist/Agronomy
NDSU Langdon Research Extension Center

SOUTHWEST ND

After an extended wet period, many farmers are pushing to get back to planting. There are still a few wet spots, but most fields should be ready to go soon with the warmer temperatures forecasted. From May 20th to May 28th, according to NDAWN, Dickinson received 1.21 inch of rain. From May 1st to May 28th Dickinson received 3.21 inches.

Ryan Buetow
Extension Cropping Systems Specialist
NDSU Dickinson Research Extension Center
SOUTH-CENTRAL

According to NDAWN, the region’s total rainfall during May 1-27 ranged from 1.5 inches (Carrington, Cooperstown and Harvey) to 3.8 inches (Wishek). Generally, areas south of I-94 have adequate to excess moisture throughout the soil profile. The most recent frost occurred on May 20 (27 degrees F at Carrington)

Alfalfa regrowth has reached 12 inches in height and flower buds should soon be appearing. Winter cereals are rapidly advancing through stem elongation stages. Spring crops seeded during late April are tillering and plant stands generally look very good. Corn fields planted the first week in May have emerging plants. Corn planting likely will be completed this week, and the majority of soybean acres should be planted. This week also will include a push for planting dry bean. Pigweed species were first noticed early last week.

The Carrington REC has a living weed exhibit available for viewing. Currently, over 50 weeds are present, including most of the ND State noxious weeds (except Palmer amaranth!).

Greg Endres
Extension Cropping Systems Specialist
NDSU Carrington Research Extension Center
WEATHER FORECAST

The May 30 through June 5, 2019 Weather Summary and Outlook

Some scattered areas of rain occurred this past weekend, but, generally speaking, almost all the rain that was recorded in the past week occurred last Friday, May 24 (Figure 1). That rain was the last in a series of three storms that produced anywhere from two to four inches of rain across much of southern North Dakota, with the northern one-third of the state mostly recording under one inch. There will likely be some moisture in the next week, but the pattern that has brought widespread rain events to not only our region, but throughout the corn belt, seems to be finally breaking down.

Temperatures have finally warmed up to more seasonal levels in the past couple of days, but the past week, as a whole, finished anywhere from three to six degrees below normal. The next week should be a rare week in recent months with temperatures near or even a bit above average, bringing some much needed heat units to the region.
The upper-level wind flow has been dominantly from the southwest for the past couple of months. Storms that move in from the southwestern part of the United States to the northeast have the ability to draw in moisture form the Gulf of Mexico and in turn is the wettest pattern for areas east of the Rocky Mountains. That persistent pattern is breaking down and the mean upper-level wind flow will become more west to east and, in turn, more typical weather for June is anticipated for the next week or two.

My projected Growing Degree Days (GDDs) for the next seven days for Base 50°, 44° and 32° is presented in Figure 3.

Using May 5 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
Using May 15 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 since May 15, 2019

Daryl Ritchison
Meteorologist
Director of the North Dakota Agricultural Weather Network