North Dakota State University
CROP & PEST REPORT
NDSU Extension Service

No. 6 June 19, 2008

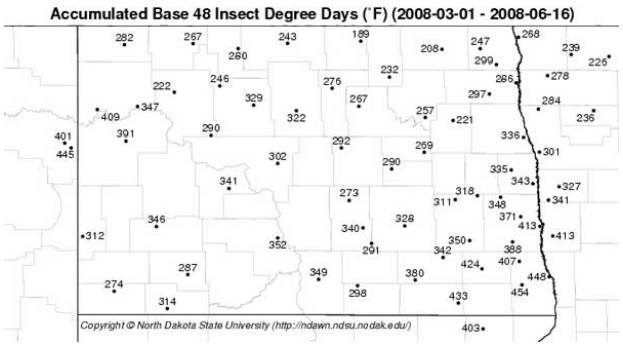
Inside this Issue...

Alfalfa Weevils Scouting and Growing Degree Day Map 1
Cutworm Activity Continues! 2
Soybean Aphid Update 2
Insect Migration Risk Forecast Low - So Far 3
Wheat Stem Maggot Update 3
Tick Problems for Livestock in Pastures 3
Sugarbeet Root Maggot: Major Fly Activity Surge Likely ... 4
Check Legumes for Nodules 5
Effect of Seed Inoculation and N Fertilization 6
Too Much Water Again 6
Stubble Height Affects Hay Drying When Soil Is Wet? 7
Alfalfa Hay Prices Increasing Rapidly 8
Wheat Leaf Rust Detected 9
Ndsu Oat Breeder Reports Oat Crown Rust on Buckthorn ... 9
Fungal Leaf Spots Most Common in NDSU IPM Survey 9
NDSU Extension Plant Pathology Web Site 9
Recent Changes in the Wheat and Barley Fungicide World .. 9
Cool Soils/Recent Rains May Encourage Root Rot 10
Miss Roundup®, Micronutrients, & Their Unhappy Marriage . 10
Impact Herbicide - Reduced Crop Rotation Restrictions 11
New Herbicide for Soybean 11
Axial XL Herbicide label Changes 11
Callisto Labeled on Flax and Pearl Millet 11
Callisto Labeled on Oats 12
Permit Herbicide Registered in Dry Beans 12
Cockle/Nightflowering Catchfly Control 12
Around the State 12
Weather & Climate 14

entomology

ALFALFA WEEVILS SCOUTING AND GROWING DEGREE DAY MAP

Field scouting for alfalfa weevil is initiated at 300 Growing Degree Days (GDD) using a base of 48 degrees F (see GDD map). Maximum feeding injury will occur from 450 to 600 GDDs (2nd - 4th instar larvae). At greater than 600 growing degree days feeding normally stops and adults emerge. This will occur usually during the second cutting unless the first is taken late. One can access the insect growing degree days on NDAWN under applications and insects, then degree days.



Scout south-facing slopes or sandy knoll areas which warm up rapidly first. These areas will have early development of alfalfa weevil larvae. Scout fields by sampling 10 plants in 5 random locations (50 total plants) and walking in an M-shaped or similar pattern throughout the field. Small alfalfa weevil larvae are slate-colored. As larvae mature, their color changes to bright green with a white line running down their back and a black head capsule. Mature larvae are about ⅜th of an inch long (see photo).

Alfalfa weevil larva *(photo courtesy Clemson Univ. - USDA Coop. Ext. Slide Series, Bugwood.org)*

Management of weevil infested alfalfa stands depends on when the infestation occurs. If the infestation occurs relatively late, when the alfalfa has reached 20 to 25 inches in height, consider taking an early harvest. Small alfalfa weevil, those less than ¼ inch in length, will drop to the soil and generally die if the soil is dry. If the infestation occurs early, when alfalfa is 10 to 15 inches in height, insecticide treatment may be necessary. Insecticide treatment is recommended if two live larvae per stem occur at this stage and/or 35-40% of the plants are showing tip feeding. In general, if alfalfa is 7-10 days out from harvest and 35-40% tip feeding is present, an insecticide treatment is recommended. If following the

first harvest, your scouting shows 8 or more larvae per square foot or larvae are suppressing regrowth, insecticide treatment is recommended. North Dakota insecticide recommendations for alfalfa are listed at the following website:
http://www.ag.ndsu.edu/pubs/plantsci/pests/e1143w1.htm

Remember to check the preharvest interval as these restrictions vary according to the insecticide used and the rate applied. Other factors to consider when selecting an insecticide is its price, potential hazards to honey bees and whether or not it is a restricted use insecticide.

CUTWORM ACTIVITY CONTINUES!

Field reports indicate that cutworms are still a problem in many agricultural crops, especially in north central and northwestern regions of North Dakota (see sunflower damaged field photograph). Early season cutworms, like dingy cutworms, should be completing their life cycle and starting to pupate (non-feeding, resting stage). Check the size of the cutworm larvae to see if it is mature (about >1 inch). If young cutworm larvae (<½ inch) and newly injured plants are not present, there would be no economic benefit to treating the field with an insecticide. Some of the late-season cutworms that may be active now include red-backed cutworm (see photograph), darksided cutworm and variegated cutworm. These late season cutworms overwinter as eggs where as the early season cutworms overwinter as partially mature larvae, which resume feeding in spring. This year scouting is a must until early July with the late season.

Sunflower field damaged by cutworms (in front half of photo)

Red-backed cutworms (left to right - adult moth, 2 pupae, and 2 larvae)

SOYBEAN APHID UPDATE

In the Red River Valley, many ladybird beetles, namely the Asian multicolored lady beetle, *Harmonia axyridis* (see photograph of adult and larva), have been observed in tree rows with buckthorn, the overwintering host of soybean aphids. These predators devour aphid eggs, nymphs and adults. They play an important role in reducing local populations of soybean aphids, especially early in the growing season. *Harmonia axyridis* is easy to identify from its false "eyes"-- two white-shaped markings and a distinctive black 'M' behind the head. In color, the insects range from black to mustard to red, with zero to many spots. A common color is red with 16 or more black spots.

***Harmonia axyridis* adult** *(photo courtesy Scott Bauer, USDA Ag. Res. Service, Bugwood.org)*

***Harmonia axyridis* larva** *(photo courtesy D. Cappaert, Michigan State Univ., Bugwood.org)*

With the cool weather conditions, soybean emergence has been delayed in North Dakota and Minnesota this year. Research from the University of Minnesota indicates the soybean aphid has the ability to "recolonize" buckthorn if soybean is not available (source: D. Ragsdale). Additional soybean aphid information will be posted in upcoming Crop & Pest Reports.

INSECT MIGRATION RISK FORECAST LOW - SO FAR

The Insect Migration Risk Forecast (IMRF) from Northern Illinois University by M. Sandstrom and D. Changnon has predicted LOW risk of insect migration into the northern areas of the U.S. The reason is the recent northerly and northwesterly wind flows, which has slowed the "insect pump" from the southern states into North Dakota. The major insect pests that migrate into North Dakota include: cereal aphids, diamondback moth, potato leafhopper and aster leafhopper. The IMRF is available at the following website:

http://www.agweather.niu.edu/IMRFForecast.html

WHEAT STEM MAGGOT UPDATE

The first adult wheat stem maggot flies have been collected using sweep nets in the Fargo, Page, Regent, New Leipzig, Hettinger, Makoti and Roseglen areas this week. Very few flies (<10 flies per 100 sweeps) have been captured, so we assume that this is the beginning of its emergence period. Future field observations will be posted in upcoming Crop & Pest Reports.

Janet Knodel
Extension Entomologist
janet.knodel@ndsu.edu

TICK PROBLEMS FOR LIVESTOCK IN PASTURES

Tick Biology: The most common ticks affecting livestock in our area are ticks in the genus *Dermacentor*. Three species are found in North Dakota: American dog tick (*D. variabilis*), Rocky Mountain wood tick (*D. andersoni*), and winter tick (*D. albipictus*). Of these, American dog tick is the most common species.

Dermacentor ticks are blood-feeding external parasites of several mammal species, including humans, dogs, cattle, and horses. They have piercing-sucking mouthparts that are inserted through the skin of their host and into vascular tissue. Once engorged with a blood meal, a tick will drop off its host to mate, lay eggs, or continue development. The life cycle of ticks is comprised of four distinct developmental stages: eggs, larvae, nymphs, and adults. Adult males and females require several days of feeding after which the male copulates with one or several females and dies. Adult females drop to the ground after mating and begin laying eggs. Females die after laying eggs. Eggs are laid on the ground in masses of over 1,000 eggs and require several days to develop depending on environmental conditions. Emerging larvae have six legs and may crawl up on vegetation and wait for a suitable host to pass by (see photograph). Larvae attach to a host, and after a blood meal drop to the ground to molt into eight-legged nymphs. Again, nymphs crawl up on vegetation and wait for a host. Engorged nymphs may rest for long periods of time before molting into the adult stage. There is probably one generation per year for American dog tick and winter tick in North Dakota. Rocky Mountain tick has a two to three year life cycle. These ticks probably overwinter as larvae or nymphs.

American dog tick questing *(photo courtesy Jim Occi, BugPics, Bugwood.org)*

Adult male *Dermecentor* ticks are recognized by a shiny brown dorsal surface with white mottling. Females are recognized by having a white thorax dorsally. Typically, males do not engorge themselves to the degree that females do. Engorged ticks may loose their basic coloration and appear gray.

Ticks are attracted to the scent of animals and are most commonly found along game trails, livestock paths, and fence rows and roadways. This is important for tick control as range or pasture treatments should be focused on these areas.

Tick Control: Control of ticks and tick-borne diseases has been accomplished primarily with pesticides called acaricides to kill ticks. Pesticides can be applied to the pasture and/or directly to the animals, depending on the chemical.

Pasture treatments: Carbaryl (Sevin) may be used to treat open areas and the perimeter. Pasture may be harvested or grazed the same day as treatment. Some of the pyrethroids registered for tick control include: Cyfluthrin (Tempo 20WP or 2L), bifenthrin (Talstar) and esfenvalerate (Asana XL), and may be used only as a perimeter spray in noncropland areas where livestock do not graze. Treat in spring when temperatures begin to exceed 60 degrees F. Treatment may need to be repeated in the fall. Adhere to grazing and preharvest restrictions as stated on the label.

Direct treatment to livestock: Permethrin is one of the common pesticides registered for direct treatment to the animals. There are a variety of procedures for treating animals with acaricides including dipping cattle, dusts, systemic injection systems and plastic collars. Regardless of the treatment method used, producers need to know and follow proper application procedures to derive maximum benefit. The development of tick resistance to acaricides is a major concern and research on new products is needed to overcome resistance to compounds already in use.

Alternative pest management methods: Tick survival requires humid microhabitats covered by vegetation, leaf litter, soil and other natural materials, or in the nests, burrows, and other cavities used by their hosts. As a result, ticks often do not come into direct contact with these toxicants. For an acaricide to be effective in killing ticks, it must reach the tick as vapors or by contact when the ticks move about while seeking hosts. Alternative pest management methods include habitat modification - burning or clearing of vegetation, or host removal (e.g. removal of deer by hunting or deer exclusion fences). Burning or clearing vegetation removes the dense cover under which ticks shelter, and reduces ground-level humidity making the habitat unsuitable for tick survival. Effective tick control should include an integrated pasture management approach – rotational grazing, selected use of acaricides and alternative methods.

Patrick Beauzay
Extension Entomology Research Specialist
patrick.beauzay@ndsu.edu

Janet Knodel
Extension Entomologist
janet.knodel@ndsu.edu

SUGARBEET ROOT MAGGOT: MAJOR FLY ACTIVITY SURGE LIKELY OVER WEEKEND

Sugarbeet root maggot (SBRM) fly counts from sticky stakes have remained low throughout the Red River Valley (RRV) during the past several days, but this week's more "normal" June weather should quickly change that scenario. Significant increases in degree-day (DD) accumulations have occurred during the past few days, so a dramatic, sharp increase in root maggot fly activity is expexted.

Peak fly activity usually occurs shortly after the accumulation of 600 DD. As indicated in Table 1, much of the RRV reached that level as of June 18. The northern Valley is likely to reach 600 units by June 21. Typically, the actual peak usually lags 1-3 days after reaching 600. Fly activity is expected to peak around June 20 or 21 in central and southern portions of the RRV, whereas the high-risk areas of northeastern ND are likely to see peak fly around June 23. Warm (around 80° F), dry weather and calm to low-wind conditions are most conducive to fly activity, so rainy or windy weather could cause slight delays the actual peak date.

Table 1. Degree-day (DD) accumulations and predicted peak activity dates for sugarbeet root maggot flies in Red River Valley

Site	Degree Day units (as of June 18)	Peak fly activity forecast*
Baker, MN	608	June 21
Ada, MN	610	June 21
Grand Forks, ND	621	June 20
St. Thomas, ND	561	June 23

*Peak fly activity in beets is most likely on the first calm or light-wind and 80°F day, after the required 600 air DD are accumulated.

Fields in high-risk areas may require the application of a postemergence rescue insecticide, especially if a low or moderate rate of a planting-time insecticide was used on the crop. Rescue insecticide applications are also recommended if a hotspot of SBRM fly activity erupts in a given field. Liquid insecticides are going to be the best option at this time because most infestations are so close to peaking. Postemergence liquid insecticides should be applied within 3 days of the expected peak, and applications made before peak work best. This will provide control of both adults and larvae.

WHAT ABOUT TANKMIXING MY INSECTICIDE WITH AN HERBICIDE? This approach certainly has practical value, because it can save the producer input costs by combining two applications into one pass across the field. NDSU research indicates that crop safety and effective weed and insect control can be achieved by tankmixing a microrate herbicide combination with an insecticide for SBRM control. Insecticides tested in this scenario have included Lorsban 4E and Mustang Max. FMC Corporation has endorsed the use of Mustang Max/glyphosate mixtures with a 2(ee) recommendation. Limited testing has also been done on tankmixing glyphosate with Lorsban 4E, and no crop injury or loss in insect control has been observed. However, it must be noted that glyphosate labels do NOT endorse glyphosate/insecticide combinations for use in sugarbeet. Therefore, growers choosing to mix their preferred SBRM foliar insecticide with glyphosate for use in sugarbeet assume all liability for any potential control failures or crop losses associated with such applications.

For more guidance on the sugarbeet root maggot forecast or insect control strategies, consult the "Insect Control" section of the ***2008 Sugarbeet Production Guide*** or the "Sugarbeet Insects" section of ***2008 Field Crop Insect Management Recommendations***. Online versions of these publications are located at:

www.sbreb.org/Production/production.htm and *www.ext.nodak.edu/extpubs/plantsci/pests/e1143w1.htm*

Mark Boetel
Research & Extension Entomologist
mark.boetel@ndsu.edu

plant science

CHECK LEGUMES FOR NODULES

Soybean, dry bean, field pea, lentil, and alfalfa are important legume crops grown in North Dakota. Specific bacteria live in symbioses with legume roots and nodules are formed where atmospheric nitrogen is transformed in plant usable nitrogen. Nodulation is a good diagnostic tool to evaluate the relative crop condition. Stressed legumes will have limited nodule numbers. Severe stress after the nodules are formed may cause nodule sloughing and decrease the active number of nodules. There are several stress factors that can occur during the growing season. Excess moisture, drought, and unbalanced plant nutrition are the most common stress factors. As the legumes depend on the nodule growth for their nitrogen supply, stressed and reduced nodulation may lead to nitrogen shortages for the growing legume plant. Drought and nutrient stress may lead to low yields and early maturing of the crop.

Nodules develop on the tender root hair tissues rather than the older tissue of the root. Nodules can be already found a few weeks after the plant emerged. Nitrogen fixation kicks in, normally at about the 2nd trifoliolate stage. Active nodules, those producing nitrogen for the crop will have a nice pink or reddish color when the nodules are cut open.

Nodulation on soybean roots

Nodulation problems

If the legume seed was inoculated with an old source of inoculum (>2 yr. old) the bacteria count could be low, and therefore nodulation is lower than with new and healthy inoculants. If the inoculant (live bacteria) was exposed to heat or long periods of direct sun the bacteria count could be reduced, it only takes an hour to kill the bacteria if left in the sun. Also, if the seed was not properly and uniformly treated nodule numbers may be low. Some of the seed treatments (fungicide, insecticide or combination) may be antagonistic with inoculants (check the label.) Manufactures of products and seed suppliers can provide product compatibility information. Other stress factors that may cause low nodulation are root rot problems, wet and saturated soils, high pH and or high salt concentrations, and cold or dry soil conditions. It is important to diagnose why nodulation is low, so preventative measures can be taken next season to avoid similar problems.

Effect of Nitrogen on early growth and nodulation

Soil Science students researched the effect of nitrogen on early growth and nodulation of soybeans. Four plants were grown per 2 kg pot of soil, amended with all nutrients except Nitrogen. The treatments were four N rates of 0, 50, 100 and 200 mg/pot by two inoculation levels; soil not inoculated and soil inoculated with a small amount of commercial inoculant. The soil was a Renshaw soil from Streeter, ND, with no history of soybeans. The data were averaged across four replicates. In Figure 1, the number of nodules was substantially higher when the seed was inoculated in soil with no history of previous soybean production. The soil was not sterilized, and a few scattered nodules were obtained per pot in the absence of inoculation.

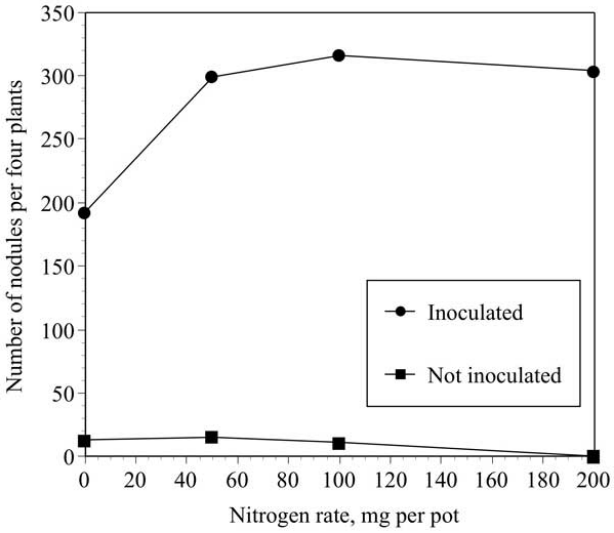


Figure 1. Effect of Nitrogen treatment on the number of nodules per pot (four plants).

In Figure 2, the weight of the inoculated plants was higher than of the non inoculated plants. If nitrogen is available, the plant will use the nitrogen for plant growth. When plants can fix their own nitrogen in the presence of the right bacteria, NDSU does not recommend a N application for soybean.

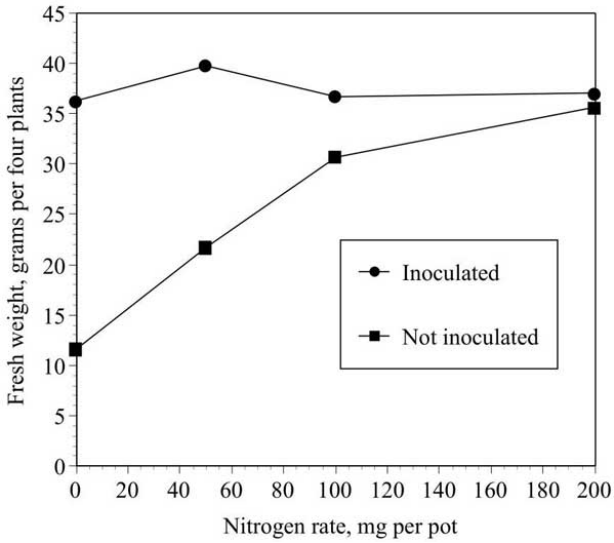


Figure 2. Effect of Nitrogen treatment on the fresh weight of the above – ground plant parts.

EFFECT OF SEED INOCULATION AND N FERTILIZATION ON SOYBEAN YIELD AND PROTEIN

Too much nitrogen can injure the Nitrogen (N) fixation and normal soybean development, leading to inadequate nitrogen being available later in the season. A study conducted by R. Jay Goos, NDSU Soil Scientist, and the Carrington Research Extension Center in 2007, demonstrated how too much available N in the soil can injure the nitrogen fixation mechanism for the entire season. A field with no history of soybeans was grown to two varieties of soybeans. Among the treatments, there was a combination of no inoculation or inoculation with or without 100 lb N/A before planting. The soil was not absolutely devoid of rhizobia bacteria, and some fixation did occur in the absence of inoculation.

Early in the growing season, the N-fertilized soybeans were much greener and more vigorous than those depending on fixation. It seemed at the time, that the N fertilizer was doing some good.

Fertilized beans early in the season (on the left) have dark green color.

By flowering, however, that difference in color had disappeared, and all plots were dark green. The export compound of fixation (the compound going from the nodules to the tops), the ureide-N, was greatly increased by inoculation, and severely suppressed by N fixation. By harvest, the best yield, protein, and protein yield was given by the plants receiving seed inoculation only.

So, given the high price of nitrogen fertilizer, and the tendency of excess N fertilizer to induce iron chlorosis on poorly-drained soils, it is hard to recommend N fertilizer for properly inoculated soybeans.

Effect of seed inoculation and N fertilization on soybeans, Carrington, ND, 2007.

		-- Flowering --		------- Harvest -------		
Seed inoc.	N fert.*	Plant growth g/plant	Ureides in stems ppm N	Yield bu/A	Seed protein %	Protein Yield lb/A
No	No	8.4	383	43.1	29.7	768
Yes	No	11.6	1064	47.2	34.6	980
No	Yes	9.1	128	43.3	29.0	753
Yes	Yes	10.0	363	46.8	32.7	918

* 100 lb N/A, tilled in before planting.

Hans Kandel
NDSU Extension Agronomist
hans.kandel@ndsu.edu

R. Jay Goos
NDSU Soil Scientist
RJ.Goos@ndsu.edu

TOO MUCH WATER AGAIN

After a very dry start this season, rainfall has been so abundant these past two weeks in parts of the state that we are now dealing with problems of excessive moisture. Water logging in eastern ND was also a problem last year, though temperatures tended to be much warmer in 2007. The small grain crops that have not been affected by water logging, are developing nicely. On the other hand, the warm season crops are yellow and struggling to developed due to the double whammy of low temperatures and saturated soils. Perhaps the warmer weather predicted for this week will give a big boost to these crops and hasten soil drying that is so urgently needed. Water logging (ponding, saturated soils) affects a number of biological process in plants and soils, and is damaging to crop growth. Many factors, however, influence the extent of yield loss caused by excessive moisture. The following notes on water logging are drawn from an article I wrote last year on the same topic, that appear to relevant again this year.

Effect of water-logging on the developing plant

Crop injury from water-logging is primarily caused by the lack of oxygen. All plants need oxygen for cell division, growth and the uptake and transport of nutrients. When soils become saturated, the amount of oxygen available to plant tissues below the surface of the soil (or water level if ponding occurs) decreases rapidly as plants and microorganisms use up what is available. The movement of oxygen from the air into water/saturated soil is much slower than in a well aerated soil and much less than needed by the various organisms in the soil. The rate of depletion of oxygen in a saturated soil is dependant on a number of factors, but temperature is the most important and predictable factor; the higher the temperature the faster the rate of oxygen depletion. In that regard, the cooler temperatures this year have slowed damaged caused by water logging. Generally, the oxygen level in a saturated soil reaches the point that is harmful to plant growth after about 48-96 hours.

In cereals, the growing point is below or near the soil's surface during early vegetative growth (5-6 leaf stage in corn and small grains). While the growing point is below the soil's surface, cereals are quite sensitive to waterlogged conditions. In fields with timely planting, corn is now in the 3-4-leaf stage, spring wheat is starting to joint and winter wheat is beginning to flower, so much of the spring sown cereals are quite sensitive to water logging at this time. Young plants can be killed if soils are saturated beyond 48 hours, particularly when soil temperatures are high (i.e. above 65 F) Water-logged conditions also reduce root growth and can predispose the plant to root rots later in the season, so the ultimate effect of excess moisture may not be known until late in the season. It is common to observe plants that have experienced waterlogging to be especially sensitive to hot temperatures and to display nitrogen and phosphorus deficiencies later in the season due to restricted root development. Leaf yellowing is the most common symptom of waterlogging in plants not killed by excessive soil moisture. Yield losses can occur, however, even if these visible symptoms are not observed.

Effect of water logging on the soil

Water-logging can also indirectly impact cereal growth by affecting the availability of nitrogen in the soil. Excessive water can cause leaching of nitrate nitrogen beyond the rooting zone of the developing plant, particularly in lighter textured soils. Furthermore, when oxygen levels become depleted, soil microbes extract oxygen from the nitrate molecule, causing nitrogen to be converted to a gaseous form that is lost to the air (denitrification). The amount of N loss through denitrification depends on the amount of nitrate in the soil (the ammonium form of nitrogen is not lost through denitrification), soil temperature, and the length of time that the soil is saturated. Research conducted in other states has found losses between 1 and 5% of the nitrate N lost for each day that the soil remains saturated.

Can anything be done to improve crop recovery after water logging?

Plants subjected to saturated soils most urgently need oxygen. Oxygen will move into the soil as water drains from or is extracted from the rooting zone. In a corn crop, tillage may seem to be a way to introduce oxygen into the soil, but is not recommended due to the potential for compaction, the high cost of diesel fuel and limited impact of this practice. With the promise of warmer and dry weather, soils will dry out about as quickly on their own.

Adding additional nitrogen to fields that have had significant N losses, once they have dried, can remedy these losses, particularly for corn, which can effectively utilize N applied much later in the season than small grains. In small grains, in order to impact yield, additional N should be applied prior to the 6-leaf stage. Additional N, after this stage, however, does have the potential to increase protein levels. Before adding extra nitrogen to fields that experienced water logging, you should first consider the likely yield potential of the crop that has probably already been damaged. Nitrogen losses are not likely to be uniform throughout the field and additional N may only be needed in low spots where losses were the highest. If you do decide to apply some additional N, you should consider varying the rate to target those areas in the field where N is likely to be the most limiting.

Is replanting a viable option for corn given the late date? We have limited data on the effect of planting corn in late June. Nevertheless, even with the earliest available hybrids, it is suffice to say that planting this late would be a high risk proposition unless the corn crop is intended for silage. With a fourth of the growing season behind us, there is not likely to be enough growing degree days to make a crop even in southeastern ND.

Joel Ransom
Extension Agronomist - Cereal Crops
Joel.Ransom@ndsu.edu

STUBBLE HEIGHT AFFECTS HAY DRYING WHEN SOIL IS WET?

Hay harvest in the eastern part of North Dakota and western Minnesota has been delayed by the cool wet spring. Producers are just now starting to harvest their hay because the soils have been too wet to carry the harvesters and many have yet to begin. Those that have started are laying the hay on very wet soils, which will delay the drying of the hay. The soil water keeps the humidity high within the hay decreasing the drying rate.

Leaving 3 to 5 inches of stubble standing in the field when cutting alfalfa tends to keep the hay off the ground allowing breezes to circulate around the windrow speeding the drying rate. Many producers typically cut at 3- to 4-inch stubble heights because it is difficult to get their harvesting equipment to harvest at lower stubble heights and some producers believe regrowth will be faster if harvested at a higher stubble height. If this is the case, do not increase the stubble height, 3 to 4 inches of stubble is adequate to decrease the drying rate.

Stubble height has a major impact on forage yield of alfalfa. We harvested alfalfa at 1, 3, and 5 inches in height at Fargo (dryland) and Carrington (irrigated), ND, in 1999 to 2001. Forage yield for a 3-cut system average 6.3, 5.1, and 4.3 tons/acre each year over the 3-year period, respectively. That's 2 tons/acre difference between the 1 and 5-inch stubble heights left standing in the field over the season! Granted, the quality of the lower stem is relatively poor, but to give up the yield with the current high hay prices is really questionable. Many alfalfa fields in eastern ND and western Minnesota have lodged from the pounding rainfall and high winds. In this case, it will be impossible to get even a 3-inch cutting height with a swather and yield loss will be inevitable.

Forage quality can be improved by leaving some stubble in the field. For example, relative feed value increased with each increase in stubble height for all three years due to decreasing acid and neutral detergent fibers while crude protein increased with increasing stubble height. If forage quality pays, i.e., cash hay or dairy producers, some of the lost yield potential with increasing stubble height is off set with the value of increased quality.

Leaving additional stubble height in the first harvest had absolutely no effect on the regrowth rate since all the regrowth occurred from the crown in these experiments. Regrowth for the third or fourth harvests occurred much more from remaining stubble; however, canopy height was not affected by stubble height. As a result, forage yield still decreased with increasing stubble height in the third and fourth harvests.

Drying rate in the field probably can be increased more by windrow width than stubble height. Many experiments have shown that wide windrows or unwindrowed hay dries faster than relatively narrow windrows (2 to 3 feet wide) due to the depth of the windrow. The faster drying reduces plant respiration maintaining a higher level of soluble carbohydrates within the forage. Yes, raking is recommended to improve drying rate, but be sure to rake when the moisture content of the hay is about 50%, so leaf loss is minimal. Raking hay that has been placed on wet soil greatly aids drying because frequently the soil dries between the windrows before raking. Therefore, the window can be place on relatively dry soil and the windrow inverted to expose the wettest hay. Conditioning the hay when cutting improves drying rate also, especially in the first harvest. Conditioning may not help in latter harvests since the stem size generally is much smaller with less lignification and cutinization than what occurs in the first harvest.

The best recommendation then is lay the alfalfa in wide windows, rake at 50% moisture, invert the windrow, place on soil that has dried, and keep the stubble height as low as possible. If you're a beef cow producer, maybe consider a small increasein stubble height (no more than 3 to 4 inches) to increase quality for a cash hay or dairy producer.

ALFALFA HAY PRICES INCREASING RAPIDLY

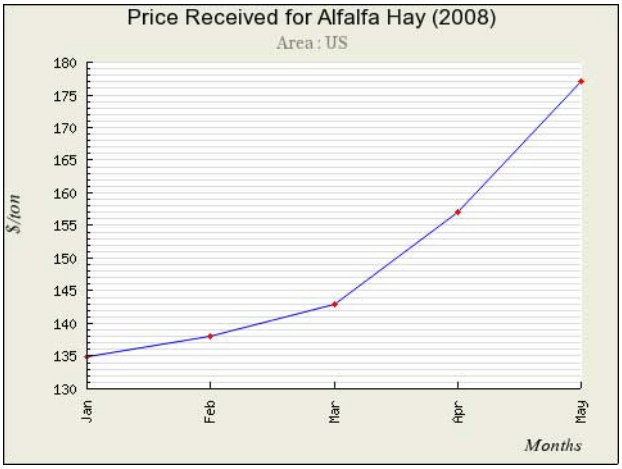
Alfalfa hay prices have increased $40/ton since February (see enclosed figure). Average hay price in the United States reached $177/ton. This includes all alfalfa hay marketed in the United States, which means high-quality hay is much higher.

Alfalfa hay sold this past month at Stearn DHIA at Sauk Centre, MN, quality-tested auction averaged $254/ton for 151 to 174 relative feed value (RFV) with two small lots at $300/ton. Lower-quality hay (101 to 125 RFV hay) sold for $150 to $190/ton.

I believe that you can expect the hay price for quality alfalfa to continue to rise in the next few months. One factor driving the price is that some of the first harvest in Nebraska, Iowa, Illinois, Wisconsin, etc. has yet to be harvested due to the heavy and frequent rainfall. Hay that has been harvested is lower in quality than usual due to delayed harvest. As a result, quality hay will be very scarce. Another factor affecting the price is that the hay price must increase to compete for acreage with $7 corn and $15 soybean price.

North Dakota hay price averaged only $72/ton last month. North Dakota has always been under the national hay price due in part to a beef-cow-based market versus a dairy-based market. However, I have heard of central North Dakota producers getting $180 to $200/ton in the quality-tested marked. It costed them $65 to $75/ton for transportation, but the price differential resulted in a much better deal for the producer.

Producers that get good quality alfalfa in the pile from the first harvest might want to consider marketing it into the high-priced dairy market. Prices will continue to climb in the short term due to poor quality, and it may increase due to aligning with other crops.

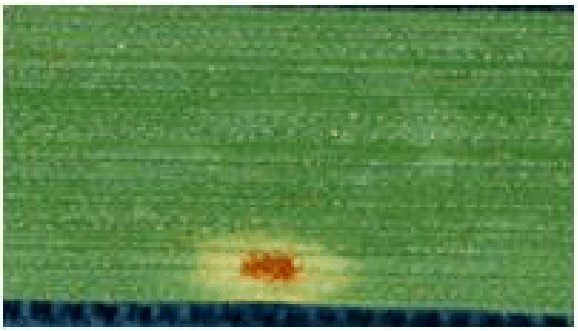


Dwain W. Meyer
Extension Forage Specialist
dwain.meyer@ndsu.edu

plant pathology

WHEAT LEAF RUST DETECTED

NDSU IPM field scout, Andrew Friskop, detected trace levels of wheat leaf rust in two spring wheat fields in Richland County, on June 16. These fields were in the jointing stage, and only one or two pustules were found. This detection is about 10 days later than when wheat leaf rust was first reported in 2007. Leaf rust levels have been reported to be high on susceptible cultivars of winter wheat in states to our south this year.



NDSU OAT BREEDER REPORTS OAT CROWN RUST ON BUCKTHORN

Mike McMullen, NDSU Oat Breeder, recently reported to the Cereal Disease Lab that oat crown rust aecia are just beginning to appear on buckthorn, as of June 15 in Fargo. This seems much later than usual, but due to cool weather, oat development also is later than normal. The bright orange aecial cups on buckthorn hold an alternate spore form of the oat crown rust fungus, and their appearance generally indicates that the urediospore stage occurring on oat leaves will be showing up fairly soon in the region.

Aecial stage of oat crown rust on buckthorn.
(Photo courtesy Carl Bradley)

FUNGAL LEAF SPOTS MOST COMMON IN LAST WEEK'S NDSU IPM SURVEY

During the week of June 9-14, the NDSU IPM field scouts surveyed 99 wheat fields and 26 barley fields across the state, with some days unsuitable for scouting, because of heavy rain. During that week, spring wheat was generally in the tillering stage, with a few fields jointing. Winter wheat was jointing to early heading, and barley was predominately tillering, but about a third also were already in the jointing stage. This week's sunnier and warmer weather should see crops rapidly developing beyond these growth stages.

Tan spot was the only wheat disease observed last week, with 1/3 of all wheat fields surveyed showing infection. The highest incidence and severity occurred in fields planted into wheat stubble. Some fungal leaf spotting also was observed in barley fields in the northwest region.

Other wheat or barley diseases were not observed last week, and neither were insects, except for a very few grasshoppers in field margins. Field scouts in the southwest did report seeing leafhoppers in the fields.

NDSU EXTENSION PLANT PATHOLOGY WEB SITE

The NDSU Extension Plant Pathology web site has recently been updated to include a link to the compilation of NDSU sponsored 2007 small grain fungicide trials. The site also has links to 3 new plant pathology publications, one on Ascochyta in chickpea, one on Black leg in canola, and one on rust diseases of wheat. The NDSU Extension Plant Pathology web site is found at: http://www.ag.ndsu.nodak.edu/extplantpath/

RECENT CHANGES IN THE WHEAT AND BARLEY FUNGICIDE WORLD - A GOOD SUMMARY

Don Hershman, Extension Plant Pathologist from the University of Kentucky, recently wrote an excellent summary of recent changes in small grain fungicide registrations. His paper, titled "Recent Changes in the Wheat and Barley Foliar Fungicide Status Quo" outlines the struggles and milestones achieved with some recent registrations for wheat and barley fungicides. His paper can be found at a link on the following US Wheat and Barley Scab Initiative web site:
http://www.scabusa.org/

This paper is a concise synopsis of the history of recent registration events. Following the May 8, 2008 posting of his paper, EPA also granted an additional registration, to Prosaro fungicide, a premix of prothioconaozle and tebuconazole, manufactured by Bayer.

Marcia McMullen
NDSU Extension Plant Pathologist
marcia.mcmullen@ndsu.edu

COOL SOILS/RECENT RAINS MAY ENCOURAGE ROOT ROT OF SOME ROW CROPS

Despite being very dry earlier this spring, we may begin seeing the effect of root rots in some row crops. Cooler than average soil temperatures often mean seeds stay in the ground longer, increasing their exposure to root rotting pathogens present in the soil. Last week's rain, although much needed in most of the state, may give some root rot pathogens a foothold on some broadleaf crops, particularly those recently planted (edible beans and soybeans for example). Although there is not much that can be done to manage root rots after planting, the observation of suspected root rot in a field (poor stand, young plants yellowing/wilting/dying) may influence management decisions for the rest of the season, as well as for future crops in the field.

If you see some suspicious patches in the field, take note for the future, it may be root rot diseases.

Sam Markell
Extension Plant Pathologist
samuel.markell@ndsu.edu

soils

MISS ROUNDUP®, MICRONUTRIENTS, AND THEIR UNHAPPY MARRIAGE

Once upon a time, there were micronutrients.

They were needed to increase the happiness and prosperity of farmers in certain parts of the world.

But in North Dakota, sometimes the micronutrients were needed ☺ and sometimes they were not ☹.

Farmers were sometimes confused about what they needed and what they didn't need.

Friendly people would give steak dinners and encourage farmers to invite micronutrients onto their farms for only a little gold per acre.

The friendly people would provide "testimonials" from other farmers who believed they had received a benefit from micronutrients. Sometimes these people came from the kingdom, but other times these people came from far away, where farm conditions and crops were different.

Farmers would try the micronutrients, and sometimes the fields would be better off- but often they were not.

The unhappy farmers would try to find the friendly people and introduce them to their lawyer, but the formerly friendly people were often hard to find and the farmers remembered that they had forgotten to leave "check strips" on their 1,500 acres of test fields.

The friendly people had often moved to exotic places like Palm Springs after the steak dinner, and besides, even if they were found, the king had outlawed public burnings of traveling friendly people years ago.

And many farmers were sad because they hadn't read the "Terms and Conditions of Sale". ☹

The farmers decided to go to an Extension meeting, where a soil fertility wizard would help them foretell what micronutrients might be important for which crops.

This is what they heard-

"Micronutrient needs in North Dakota are crop specific."

"Antagonism or non-performance is possible if metals are applied with glyphosate."

So the farmers came away from the Extension meeting knowing that only four crops in the region benefit from zinc application, only a few crops from iron (and then more from seed-placed EDDHA than a foliar spray), and there was no need at all for copper, manganese or boron in the kingdom for corn, soybeans, canola or sunflower.

But still the friendly people tell them through the magic screen and through the air waves that micronutrient mixes are important and why not mix it with their herbicides.

And it came to pass that a young maiden- Miss Roundup®, came to the kingdom. The farmers were delighted to see her, because everywhere she went, evil weeds would die and fields made pure and clean.

Farmers courted Miss Roundup® and eagerly sent gifts of Tech Fees to her guardians as thanks for her many blessings.

Miss Roundup® performed her magic with a group of approved attendants, called Adjuvants. However, friendly people, seeing an opportunity, suggested to farmers that perhaps micronutrients could accompany her when she performed her magic in the fields, and therefore accomplish a weed and feed blessing.

Farmers were excited, because they could use the friendly people's micronutrients without an extra trip into their fields. Miss Roundup® could accomplish the task with no increase in gratuity to her guardians.

However, one wise old farmer, a true Consultant in the kingdom, suggested that they go to the Extension wizard and ask him for wisdom. And it came to pass that they visited the wizard, and unable to bestow wisdom, offered to share data instead.

This is what he shared-

"In trials near Walcott, ND in 2002, application of an iron chelate increased the phytotoxicity of three postemergence broadleaf herbicides on soybeans and reduced soybean yield an average of 4 bu/acre.

In Michigan research, in micronutrient and Roundup® tankmixes, velvetleaf control was reduced 50% with iron and zinc chelate additions and lambsquarter control was reduced 50% with iron. Adding more ammonium sulfate, or increasing Roundup® rate

increased control, but reduction in efficacy was still recorded. Manganese as ligno- and sulfate fertilizers decreased glyphosate absorption by weeds, manganese-EAA chelate reduced efficacy, but the mechanism was not known, while manganese-EDTA had no effect (manganese deficiency is common in Michigan due to their inherently low soil manganese availability, but not in North Dakota)."

In Virginia, manganese tank mixes reduced control of lambsquarter, smooth pigweed and large crabgrass.

A number of studies have shown that micronutrient additions to glyphosate can reduce weed control. Even applications of micronutrients a few days before glyphosate application can reduce weed control. Reductions in weed control may not always happen, and additions of extra ammonium sulfate may help to reduce the reductions, but farmers want clean fields, so the risk of unhappiness is there."

So the farmers left the wizard and considered the wisdom of marriage between Miss Roundup® and micronutrients.

Some were still enchanted by the lure of magical riches promised by friendly people through visitations by micronutrients on their farm that could be carried by Miss Roundup®.

Some weeds were not vanished by the marriage of Miss Roundup® and micronutrients, and the farmers lost their farms and became insurance salesmen.

Others took the Extension wizards words to heart and refused to marry Miss Roundup® with micronutrients, and lived Happily Ever After.

Roundup® is a product licensed and registered by Monsanto Corporation and neither Dr. Franzen nor North Dakota State University make any promotion of its use over similar products.

Dr. Dave Franzen
NDSU Extension Soil Specialist
701-231-8884
david.franzen@ndsu.edu

weeds

IMPACT HERBICIDE - REDUCED CROP ROTATION RESTRICTIONS

The Impact herbicide label now includes the reduced use rate of 0.5 oz with a 9-month plant back to soybeans as opposed to the 3/4 fl oz rate which would require an 18 month restriction on soybeans. The new Impact label also adds four new weeds: green foxtail (in addition to yellow foxtail), dandelion, powell amaranth (similar to redroot pigweed and well established in ND), and marestail.

NEW HERBICIDE FOR SOYBEAN

Authority Assist is a premix for preemergence broadleaf weed control in soybean. The ingredients are sulfentrazone (Spartan) and imazethapyr (Pursuit). Authority Assist has rate recommendations at full rates of 6 to 12 fl oz/a depending on soil type and organic matter, and at reduced rates of 4 to 6 fl oz/a. The reduced rates are intended as a foundation treatment to suppress early-season weeds before a glyphosate application in Roundup Ready soybeans. The 6 fl oz/a rate provides the equivalent of 6 fl oz/a Spartan and 2 fl oz/a Pursuit. With this premix, control or suppression of lambsquarters, nightshade, pigweed, smartweed, velvetleaf, and waterhemp should be expected along with suppression of foxtails. Common and giant ragweed are weeds that may not be suppressed well. Because Authority Assist contains imazethapyr, certain rotational crops are limited. Rotational intervals include wheat at 4 months, barley and tobacco at 9.5 months; field corn, peas, and snap beans at 10 months; alfalfa at 12 months; oats and sweet corn at 18 months; and potatoes at 26 months.

AXIAL XL HERBICIDE LABEL CHANGES

- Do not graze livestock or harvest forage for hay from treated wheat and barley for a minimum of 30 days following application.
- Do not harvest grain for 60 days following application.
- Do not apply both Discover and Axial products to the same crop in the same season.
- Wheat and barley straw may be fed to livestock 60 days after application.

CALLISTO LABELED ON FLAX AND PEARL MILLET

Callisto is now labeled only as a soil-applied treatment on flax and pearl millet. The supplemental label contains information about crop injury if applied postemergence. The label rate is 6 fl oz/A.

CALLISTO LABELED ON OATS

A supplemental label for Callisto has been posted on CDMS that allows preemergence or postemergence applications for broadleaf weed control in oats. This label is for oats grown for seed, not for oats underseeded with alfalfa. The preemergence rate is 6 fl oz/a and the postemergence rate is 3 fl oz/a. Postemergence applications need crop oil or surfactant to control emerged broadleaf weeds. The addition of ammonium sulfate or 28% UAN will improve weed control, but may also increase the risk of injuring the oats. The preemergence application should provide greater crop safety than postemergence applications. The spectrum of weed control will be the same as when Callisto is used in corn.

PERMIT HERBICIDE REGISTERED IN DRY BEANS

Last was a banner year for common ragweed and it was especially a problem in broadleaf row crops, including dry beans. Permit controls most large-seeded broadleaf weeds including cocklebur, marshelder, wild mustard, and ragweed species. Permit was developed as a POST corn herbicide by Monsanto and now Gowan owns the marketing right. Gowan has also expanded the label to include use on additional crops, including dry edible beans. Permit is labeled for PPI and PRE use in dry beans at up to 0.67 oz product/A. NDSU has a limited database on PRE weed control.

Permit is rated "Good" across universities for common ragweed soil-applied (PRE or PPI). Permit + Eptam is rated as (Very Good). Eptam has lost favor for weed control in ND because of the quickness of incorporation and deep incorporation required. Deep incorporation (PPI) of Permit with yellow herbicides (Treflan, Sonalan) or Eptam may dilute the product too much and lead to less efficacy. Yellow herbicides are generally rated poor on large-seeded broadleaf weeds anyway. Permit + Dual is a little more variable based on university ratings.

A logical program for common ragweed control in dry beans would be Permit PRE followed by Reflex POST if escapes occur. These programs would give different mode's of action, which is good because ragweed resistance to Permit (ALS) has been documented.

COCKLE/NIGHTFLOWERING CATCHFLY CONTROL

The Huskie label should show control of nightflowering catchfly the same as white cockle. Bayer has conducted research to confirm control of both nightflowering catchfly and white cockle. Huskie at 11 oz/A will provide 90 to 95 percent control of both of these species. The activity may be slower on white cockle than some of the other species on the label such as lambsquarters, etc. Complete control on white cockle may not be expected until 21 to 28 days after application.

Rich Zollinger
Extension Weed Specialist
r.zollinger@ndsu.edu

around the state

Southwest ND

Southwest North Dakota NDAWN locations reported having received various amounts of precipitation over the past two weeks. Past two week totals ranged from 1.24 inches at Beach to 3.07 inches at Hettinger. Producers have reported rainfall amounts greater than and less than those at the NDAWN locations. Wind and rain limited times when herbicide and fungicide applications could be applied, but recently applicators are getting into fields.

All crops are exhibiting a wide range of development in the area as well as within some fields. Germination was very uneven particularly on tilled fields and/or where high disturbance drills were used to put the crop in. Some producers with low disturbance drills had difficulty planting into last year's heavy residue but many experienced operators adjusted their planting pattern to accommodate for the residue and produced some excellent stands considering how dry it was earlier this year. Winter wheat that avoided severe winter injury has headed out in the area. However, winter wheat that was severely injured is in the boot to various stages of head emergence. Early seeded (late March to early April) spring wheat is in the boot or early stages of head emergence. Many alfalfa fields are in the bud to early bloom (less than 5%) stage and are ready for cutting. Sunflower and corn has benefitted from recent warm conditions. Sunflower seeded May 25 is in the V2 stage of development.

Several positive wheat streak mosaic virus (WSMV) and high plains virus (HPV) samples have been found in southwest North Dakota. The increase in WSMV and HPV samples indicate poor sanitation practices, early planting of winter wheat, and planting in close proximity to active "pools" (such as live field corn last fall) of mites and virus provided the green bridge needed by these pests to cause problems in this year's crop. These viruses have also spelled over into the spring wheat crop too.

Roger Ashley
Area Extension Specialist/Cropping Systems
Dickinson Research Extension Center
(701) 483-2348 ext 106

South-Central ND

During the past week (June 11 to 17), the region received rain ranging from 1.1 inches at Linton to 3 inches at Fingal, based on NDAWN (North Dakota Agricultural Weather Network). Additional rainfall will be welcome to replenish subsoil moisture. High wind, hail, and/or heavy rain injured crops in localized areas as reported from counties including Barnes, Eddy, Foster, Kidder, McIntosh, Sargent, and Stutsman.

Winter wheat is beginning to flower, and spring wheat and barley are in the jointing stages. Row crop development continues to be slow, especially corn. For example, corn planted on May 1 at Carrington and Oakes is behind about 100 growing degree day units compared to the 5-year average (as of June 17). Warm night temperatures would be useful to make-up the current deficiency in heat units.

Small grain injury due to POST application of herbicides is quite common but is expected to be temporary and not impact grain yield. Row crop POST herbicide application is in progress. Wheat tanspot levels continue to be low based on IPM crop scout reports, and leaf rust has not been found yet. Farmers should continue to monitor for cutworm presence in row crops.

Greg Endres
Area Extension Specialist/Cropping Systems
NDSU Carrington Research Extension Center
gregory.endres@ndsu.edu

Northwest ND

During the past ten days or so (June 9 – June 17), the region again received much needed rainfall ranging from 1.08 inches in Sidney, MT to 2.24 inches near Bowbells based on NDAWN sites. Cool temperatures during this time have been a benefit to producers as crops continue to grow.

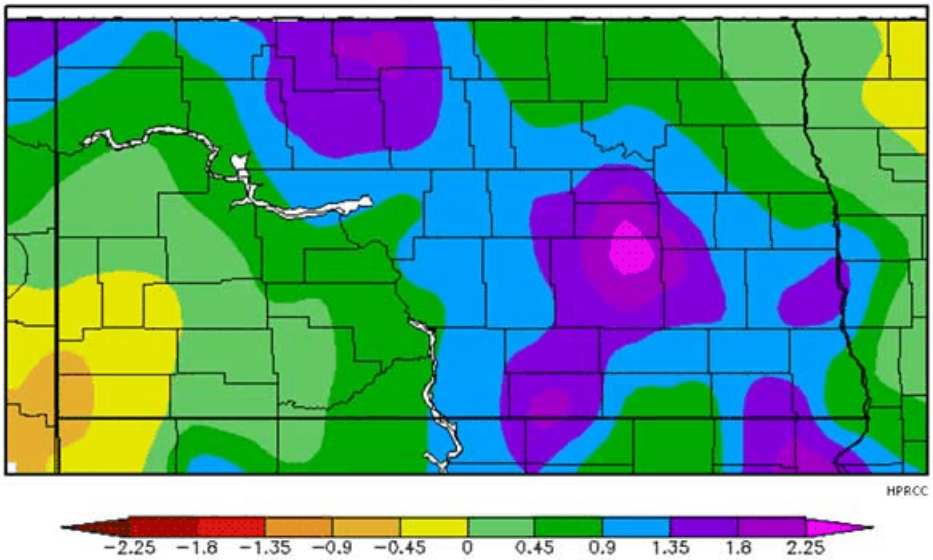
Winter wheat is heading out while many of the small grains are at the 6 leaf stage and above. Reports on stands indicate there are several different stages of that crop within a field because earlier dry conditions. Reports of tan spot and root rot diseases are starting to show up in small grain crops. Field pea leaf stages have been reported up the 7-9 node stage. Root rot diseases are also being reported for field peas. Warm season crops are getting a good start. This warmer weather will improve their conditions. Alfalfa harvest has started in the Yellowstone valley.

Cutworm infestations in small grains and legume crops have continued to be reported throughout the region. Small grain herbicide applications have been going for the past couple of weeks.

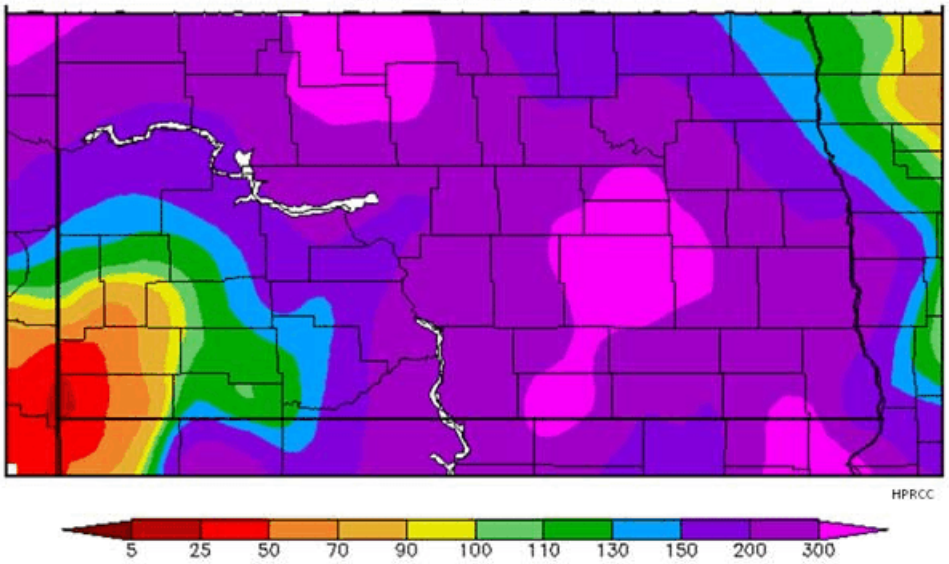
Chet Hill
Area Extension Specialist
Williston Research Extension Center
chet.hill@ndsu.edu

weather

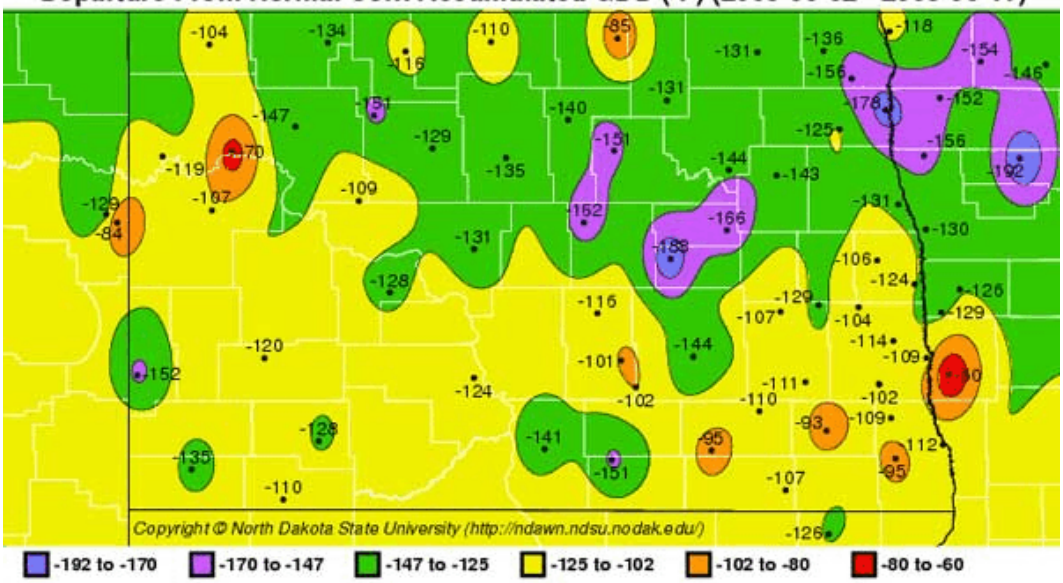
Last 7-Day Departure From Normal
Temperature(°F)
6/11/2008-6/17/2008



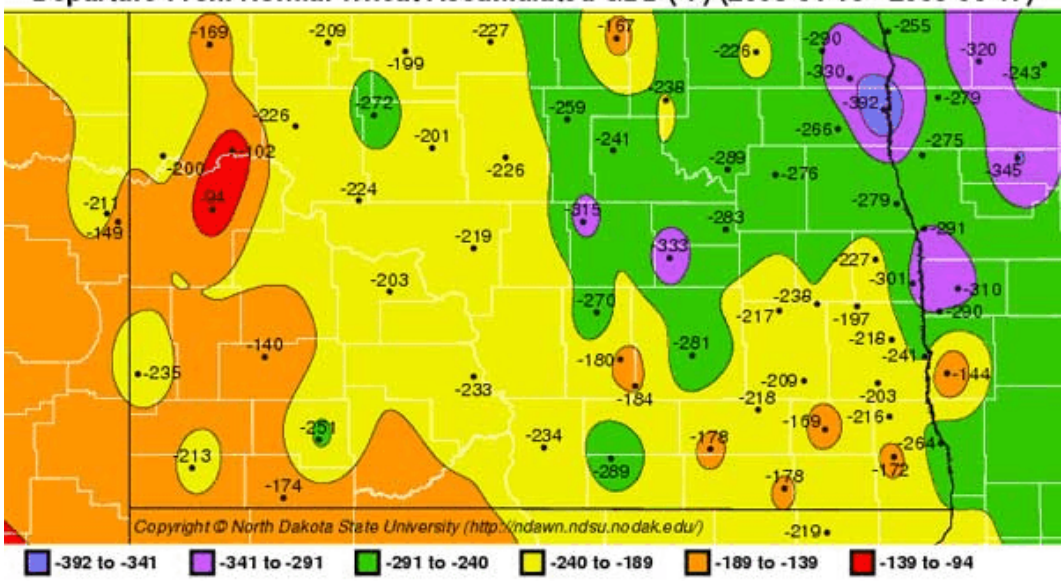
Last 7-Day Percent of Normal
Precipitation(%)
6/11/2008-6/17/2008



Departure From Normal Corn Accumulated GDD (˚F) (2008-05-02 - 2008-06-17)



Departure From Normal Wheat Accumulated GDD (˚F) (2008-04-16 - 2008-06-17)



F. Adnan Akyüz, Ph.D.
Assistant Professor of Climatology
North Dakota State Climatologist
http://www.ndsu.edu/ndsco/

North Dakota State University
CROP & PEST REPORT
Extension Entomology
Hultz Hall 202
Fargo, ND 58105-5346

Janet Knodel, *Co-Editor*
Entomology
231-7582 phone
231-8557 fax

Sam Markell, *Co-Editor*
Plant Pathology
231-8866 phone
231-7851 fax

Plant Sciences
231-7972 phone
231-8474 fax

NDSU
Extension Service

Soils
231-8881 phone
231-7861 fax

Weeds
231-7972 phone
231-8474 fax

Ag Engineering
231-7261 phone
231-1008 fax

Helping You Put Knowledge To Work

The information given herein is for educational purposes only. References to a commercial product or trade name is made with the understanding that no discrimination is intended and no endorsement by the North Dakota Extension Service is implied.

NDSU Extension Service, North Dakota State University of Agriculture and Applied Science, and the U.S. Department of Agriculture cooperating. Duane Hauck, Director, Fargo, North Dakota. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. We offer our programs and facilities to all persons regardless of race, color, national origin, sex, handicap, age, Vietnam era veterans status, or sexual orientation; and are an equal opportunity employer.
This publication will be made available in alternative formats for people with disabilities upon request (701) 231-7881.