North Dakota State University
CROP & PEST REPORT
NDSU Extension Service

No. 2 May 22, 2008

Inside this Issue...

NDSU Crop Management Field School 1
Remember to Plant the Non-Bt Corn Refuge Requirement for Bt Corn 1
Cold Temperatures Delay Alfalfa Weevil Emergence 2
Spring Tick Talk 3
Don't Forget Phosphorus for Alfalfa Production 3
Soybean Replanting Issues 4
Early Crop Development Is Slowed by Cool Weather in 2008 5
Soybean Rust Summary for 2007 6
Soybean Rust Active in Texas 6
NDSU Disease Forecasting Web Sites 6
Update from Southern Plains States 7
Tillage and Wind Erosion 8
How Deep Did You Plant Your Small Grains? 8
New Extension Sugarbeet Weed Scientist Joins NDSU 9
Upbeet plus Glyphosate Mixture Approved 9
Control of Dandelion in No-tillage Broadleaf Crops 10
Cankerworms 10
Update from the NDSU Plant Diagnostic Lab 11
Fairy Ring in Turfgrass and Pastures 11
Fairy Ring Fungi 11
Around the State 13
Weather & Climate 14

NDSU CROP MANAGEMENT FIELD SCHOOL SCHEDULED FOR JUNE 19 AT CARRINGTON

A crop management field school will be offered Thursday, June 19, from 9 a.m. to 4:30 p.m. at the NDSU Carrington Research Extension Center. The school is for crop advisers, but the program also will be beneficial for farmers. The school will provide hands-on training on crop, pest and soil management using field research and demonstration plots.

Specific field sessions include:

* Weed identification - identify more than 60 living weed exhibits and review biology and control
* Herbicide mode of action - identify herbicide classes by examining crop and weed injury symptoms
* Wheat disease management - review disease forecasting and fungicide use strategies
* Insect management - review current insect concerns in grass and oilseed crops
* Corn and soybean – learn about plant nutrition
* Soil - explore below-ground factors affecting crop growth using a soil pit

For further details and preregistration information, contact the Carrington center at (701) 652-2951 or go to http://www.ag.ndsu.nodak.edu/carringt/. A completed preregistration form and $50 fee is requested by June 16 ($75 after June 16). A total of 50 participants will be accepted on a first-come/first-served basis. An application has been submitted to the certified crop adviser program to provide participants with 4.5 integrated pest management, 0.5 soil and water management and 0.5 nutrient management continuing education units.

entomology

REMEMBER TO PLANT THE NON-BT CORN REFUGE REQUIREMENT FOR BT CORN

As part of your farm's Insect Resistance Management (IRM) Plan for growing Bt corn, a non-Bt corn refuge is required by the U.S. Environmental Protection Agency. Refuge corn acres are hybrids that do not contain the Bt insect trait. The purpose for planting a corn refuge is to prevent or delay the development of resistance to Bt traits. In return, the sustainability of Bt corn should be improved, so Bt corn is around as a pest management tool against corn insect pests for a long time**. Twenty percent of the corn acreage must be planted as a Bt corn refuge on each farm where Bt corn is planted.** Remember, it's the law! There are different configurations and distance requirements for planting the refuge depending on the traits. (See following references.)

A new University of Wisconsin Extension publication, *Insect Resistance Management and Refuge Requirements for Bt Corn* - A3857 (authors Cullen, Proost and Volenberg) answers frequent questions about IRM and the refuge requirements and configurations.

Examples of questions answered by this bulletin include:

What is insect resistance management (IRM)?
Why is IRM important?
What happens if I don't plant a refuge?
Who checks for IRM compliance?
What are the refuge requirements for single Bt trait hybrids with Lepidoptera ("caterpillar") protection?
What are the refuge requirements for single Bt trait hybrids with corn rootworm protection?

What are the refuge requirements for stacked Bt trait hybrids with both Lepidoptera and corn rootworm protection?
How do you select the best Bt insect trait package?
How long will Bt insect traits work?
Where are Bt traits expressed in the corn plant?
What if the Bt corn hybrid is not controlling the targeted insect?

Copies can be ordered from the UW Ext. Learning Store:
http://learningstore.uwex.edu/Insect-Resistance-Management-and-Refuge-Requirements-for-Bt-Corn-P1269C252.aspx

Another educational website is the National Corn Growers Association website with their online course on Insect Resistance Management Learning Center:
http://www.ncga.com/biotechnology/insectMgmtPlan/index.asp

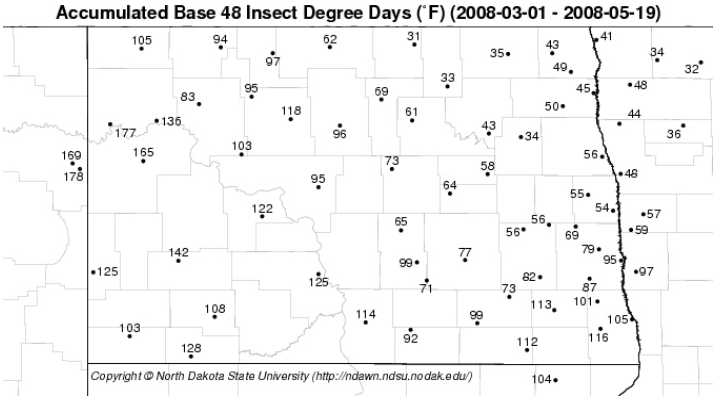
DTN and the National Corn Growers Association also hosted a free web seminar on Bt corn insect resistance and refuges. The session was designed for corn producers, Extension specialist, county agricultural agents, crop consultants and other educators. The link to see/hear the webinar is:
http://www.dtnag.com/promo/resistance

COLD TEMPERATURES DELAY ALFALFA WEEVIL EMERGENCE

Last year, the southern half of North Dakota had accumulated enough degree day (DD) units, 300 weevil DDs (base 48 F), to start field scouting for alfalfa weevil activity by May 22, 2007. In contrast, this year the DD accumulations are much lower and range between 100-142 weevil DDs in the southern half (see DD map). Alfalfa weevil infestations have been increasing in incidence and severity over the last several years. However, it is difficult to predict if weevil populations will be higher again this year. Alfalfa weevils overwinter as adults (see photo) in plant debris, woodlots, and ditches. As temperatures warms up adults migrate to alfalfa field to lay eggs.

By using degree days with a base of 48F, the life stages and development of alfalfa weevil can be predicted (see degree day table). Go to the insect section in the NDAWN website:
http://ndawn.ndsu.nodak.edu/insectdd-form.html
and select the degree day base of 48F to determine the accumulated degree days for your location. Updates on the weevil DD accumulations will be posted in the next issues of the Crop & Pest Report.

Adult alfalfa weevil *(Photo by Clemson Univ. - USDA Coop. Ext. Slide Series, Bugwood.org)*

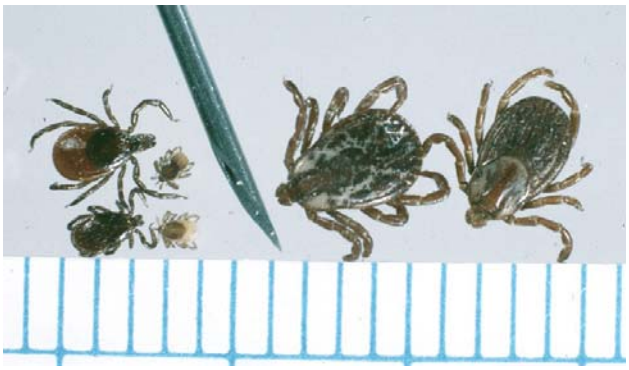


Stage of Development	Degree Days Required to Complete Indicate Life Stage	Accumulated Degree Days (base 48)	Days	General Activity
egg	300	300	7 to 14	
1st instar	71	371	21 to 28	Light leaf feeding
2nd instar	67	438		Light leaf feeding
3rd instar	66	504		Major leaf feeding
4th instar	91	595		Major leaf feeding
pupae-adult	219	814	10	Mating & egg laying

SPRING TICK TALK

Lurking in the tall grasses are thousands of ticks waiting for the unsuspecting scout, hiker, gardener, camper, ...! Ticks do not fly or jump, but find their hosts by detecting carbon dioxide and/or vibrations from walking animals. The black-legged tick (deer tick), *Ixodes scapularis*, is the primary vector of the bacterium *Borrelia* that is responsible for Lyme disease. Lyme disease occurs in three major regions of the U.S.: Wisconsin to Minnesota, Maryland north to Maine, and California and Oregon. Although it has not been officially recorded in North Dakota, people traveling from nearby infected areas can easily pick up the diseased ticks. Symptoms of Lyme disease are a bull's-eye rash, fever, headaches, and other flu-like symptoms. Only 60% of the people infected actually exhibit a bull's eye rash within two day to four weeks, so do not rely on the presence or absence of such a rash to determine the likelihood of infection. A blood test by your doctor can usually tell if a person is infected. Early treatment is essential to prevent severe and long-lasting symptoms, like arthritis, swelling and pain in joints. Lyme disease also has been diagnosed in pets, especially dogs, and in horses and dairy cattle.

Remove the tick properly. Use a sharp pointed tweezers and grasp the tick close to your skin where the mouthparts are embedded. Pull straight out with a slow, steady motion. The tick should be removed in about 30 seconds of gentle pulling. Do not twist or turn the tick, which may force more of its saliva and guts into your body. Disinfect the general area of bite with antiseptic. Do not apply any substances to the tick before removing it, such as alcohol or nail polish, petroleum jelly or other ointments; or try to burn it with matches. It will just continue to suck your blood and pump more dangerous microbes into your body. Save your tick specimen in a labeled glass jar for identification and testing. The tick in the genus *Ixodes* are very small about the size of a sesame seed and thus easy to overlook (see photo). It is a common misconception that ticks burrow into the skin. Ticks secrete a whitish cement-like substance around her head and jaws to hold her onto her host. This substances often causes many people to mistakenly believe that the ticks are burrowing into their skin.



Blacklegged tick *(Photo by Jim Occi, BugPics, Bugwood.org)*

Reduce your risk to tick bites and their tick-borne diseases. Apply insect repellent frequently with 30%-50% DEET or 7%-15% Picaridin, onto pants or other exposed clothing. Wear light-colored clothing, long-sleeved shirt, long pants and boots. Tuck pant cuffs into socks. And remember to check yourself and your animals frequently when walking in the woods or grasslands. If you have an unexplained illness with rash or fever, call your doctor and be sure to let him know if you've been in places where you may have picked up an infected tick.

Pesticide control. Insecticides can be applied periodically to reduce overall tick populations. Check insecticide labels for those products that will kill ticks around the yard [sevin (carbaryl), tempo (cyflutrhin)]. READ AND FOLLOW ALL PRECAUTIONS AND DIRECTIONS ON THE INSECTICIDE LABEL.

More information is available on the Center for Disease Control (CDC) website:

http://www.cdc.gov/Features/StopTicks/

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plant science

DON'T FORGET PHOSPHORUS FOR ALFALFA PRODUCTION

Phosphorus is the most limiting nutrient for alfalfa production in North Dakota. Alfalfa removes four to five times more nitrogen and potassium than phosphorus, but soils in North Dakota generally are high in potassium and legumes, like alfalfa, fix their own nitrogen. A ton of alfalfa removes about 12 lb/ton of phosphate (P_2O_5), so if your soil test indicates a low to very low phosphorus level (Table 1), consider applying phosphorus at the removal rate. Therefore, if you expect a 3 ton/acre alfalfa yield, apply 36 lb/acre of phosphate or if irrigating and you expect a 6 ton/acre yield, apply 72 lb/acre of phosphate.

Table 1. Nutrient recommendations for alfalfa

		Soil Test phosphorus, ppm				
		VL	L	M	H	VW
Yield	Bray-l	0-5	6-10	11-15	16-20	21+
Goal	Olsen	0-3		8-11	12-15	16+
ton/a		----------lb P_2O_5/acre----------				
2		35	25	15	10	0
4		65	50	30	10	0
5		85	60	40	15	0
6		100	70	45	15	0

Bray-I P recommendation = (18.57-0.93 STP)YG
Olsen P recommendation = (18.57-1.16 STP) YG

Deficiency of phosphorus is common in alfalfa fields. Last fall, Brian Zimprich, Ransom County Extension Agent, and I toured several alfalfa fields in Ransom county looking for potential fertility problems. We stopped at six fields that appeared to have differences in fall growth across the field. Soil samples of the poor growth area indicated a phosphorus deficiency in all six fields visited. In addition, three of the six appeared to be deficient in sulfur also. One additional field just west of the Sheyenne National Grassland on Hwy 27 tested deficient in phosphorus, sulfur, and potassium. A similar tour in western and southern Cass County with John Kringler found only one field with deficiency symptoms. Phosphorus deficiency was also found just north of Grand Forks in 2006.

A phosphorus fertility experiment on alfalfa was conducted at Buffalo, ND, in 2006 and 2007 on a soil testing 2 ppm (4 lb/acre), a very low-testing site. Forage yields increased with increasing phosphorus rate (Table 2). Forage yield showed the typical law of diminishing returns with a doubling for 40 lb/acre fertilization and 146% increase with 80 lb/acre during 2006 to 2007. Forage yields were greater and responded to greater fertilization in 2007 than 2006 due to greater rainfall in 2007 and a dry 2006.

Table 2. Forage yield of alfalfa with phosphorus fertility at Buffalo, ND in 2006 and 2007 (2ppm soil test)

Phosphorus treatment	2006	2007	Total
lbP/acre	-tons dry matter / acre		
0	1.89	2.23	4.12
20	2.62	4.64	7.26
40	2.96	5.60	8.56
60	3.36	6.17	9.53
80	3.44	6.71	10.15
LDS 0.05	0.42	0.46	

With today's cost of phosphorus, the economics of phosphorus fertilization must be considered. Obviously, even the 1 ton/acre increase in 2006 at the Buffalo site with hay selling for $60/ton would have been economic with the 3.4 tons/acre increase in 2007 highly economic. But, what about soils testing higher in phosphorus? The experiment at Buffalo is located on a hillside with 5 to 7% slope. The forage yield of the fertilized plots appeared as good as unfertilized low areas of the field (although no yield test was performed). This suggests that a topographic or grid sampling with variable application of fertilizer would have been the most cost-efficient fertility program. If nothing else, apply about 50 to 60% of normal removal rate to the whole field and double the application on the highly deficient areas.

Some consideration should be given to adjusting the fertilization rate based on seasonal rainfall. For example, the greater forage yield in 2007 due to higher rainfall justified a greater fertilization rate than that of 2006. Therefore, consider a second application in above-normal rainfall years since the increased productivity would more than justify the additional fertility and application costs.

The cheapest phosphorus fertilizer generally is MAP or DAP, both of which have nitrogen in addition to the phosphorus. Application of nitrogen to alfalfa does not increase or decrease alfalfa yield so based the cost of the fertilizer on the phosphorus component only. If the "alfalfa" field has a significant component of grass, the nitrogen may increase yield slightly.

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SOYBEAN REPLANTING ISSUES

If a soybean crop has poor emergence, which can be caused by various reasons, producers often are faced with the decision of whether or not to replant the field. There are a number of factors to consider when replanting is being contemplated. Replanting will be expensive as there are costs for preparing the seed bed, new seed, planting the seed, potential extra herbicides and don't forget the extra labor. Replanted soybeans normally have a lower yield potential as the length of the growing season is reduced. A two to three week delay in re-seeding usually leads to a substantial yield reduction. There is also additional risk in replanting because there is no guarantee that the seeding and emergence conditions will be better than during the first planting. However the soil temperatures may be higher when re-seeding, which may reduce the time till the plants emerge.

The soybean plant has an amazing capability to compensate for low plant populations. Most of the soybeans grown in this region are indeterminate, which means they keep on growing and flowering till late in the season. Beans can fill in gaps by branching out and producing more pods per plant. The number of seeds and weight of seed can adjust to good growing conditions. Low populations and even irregular or uneven stands can still provide acceptable yields.

The most important aspect of evaluating if a field needs to be replanted is the plant distribution throughout the field. If soybeans are planted in 30 inch rows and there are large gaps between the plants within the row, there may not be enough plants nearby to compensate for the reduced stand. With narrow row spacing it is more likely that plants are more evenly distributed in the field. Even with some gaps within the row, the remaining plants may be able to fill in and close the canopy.

If the conditions have been dry and the stands are irregular, the cause may be limited water availability for the seed to germinate. You need to evaluate the field to

see if there is un-germinated seed that may still germinate if conditions improve.

In conventional soybeans, weed control may be an issue to consider when making re-planting decisions. If the gaps are large between the remaining plants, you can expect weeds to take over these areas. With Roundup ready soybeans, an extra herbicide application may be needed to control the weeds.

Some producers replant certain areas within the field where there are inadequate stands. If the soybean is seeded in rows, you could consider planting another row in- between the poorly germinated rows. The planter will need to be shifted a few inches from its original site, otherwise the wheels of the tractor will drive over existing rows. Any potential mechanical weed control would not be possible using this system. The soybeans which were planted first will have a head start and there will be a difference in maturity of the two planting dates. Throughout the season the original planted soybeans will shade the later seeded plants, resulting in weaker plants and potential lodging. The yield advantage of this system is generally smaller than growers anticipate.

In general terms, the additional costs of re-planting are often higher than the yield loss of a soybean field with irregular stands.

Table. Percent yield loss of soybean affected by stand reduction (all stand figures in 1,000 plants/acre)

Original	**Remaining stand**						
Expected	120	110	100	90	80	70	50
Stand	% yield reduction						
125	1	3	6	10	14	18	30
110		0	3	7	11	15	27

Source: Adapted from page 99 Soybean Production Field Guide for ND and NW MN, 2002.

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EARLY CROP DEVELOPMENT IS SLOWED BY COOL WEATHER IN 2008

This spring, conditions have generally been favorable for planting crops except where extremely dry conditions currently prevail. Drought is becoming a concern in a growing area of the state . Additionally, cool temperatures are slowing development of emerged crops and/or delaying emergence. So how do temperatures this spring compare with previous seasons?

Assuming a planting date of April 15th, wheat growing degree days accumulations (GDDs) this season are 210 to 340 GDDs behind 2007 and 25 to 160 GDDs behind the long-term average, depending on the location in the state (see following table). Typically, we can expect to accumulate 20 to 25 wheat GDDs during this time of the year, so in terms of calendar days the small grain crops are running about seven to ten days behind last year and one to six days behind the long term average. Though the cooler weather we are experiencing this season slows development (probably at least one leaf stage behind the long-term average), it is also means that we are losing less water to evapo-transpiration which is good news given the dry conditions we are experiencing. Furthermore, yield potential development in small grains is favored by cool temperatures during vegetative growth, particularly if other factors are not limiting.

Corn GDD accumulations this season (assuming a 1 May planting date) also significantly lag behind those for the same period in 2007 and for the long-term average. Corn GDDs are calculated using a 50 degree base (compared to 32 degrees for small grains), so they accumulate more slowly than wheat GDDs. Since corn GDDs typically accumulate during mid-May at the rate of about 9 to 10 per day, corn development is running about a week behind last year in terms of calendar days but only two or three days behind the long-term average. It usually takes about 125 corn GDDs before corn emerges, so we should start to see some of the early planted corn beginning to emerge soon. Corn emergence is favored by relatively warmer temperatures and the colder temperature we have experience is not only delaying emergence, but it will likely decrease the uniformity in the timing of corn emergence. Uniformity of emergence in corn is a basic component of a high yielding crop.

Wheat and corn growing degree days (GDD) for 2008 compared to 2007 and normals (30 year average) for selected locations in ND (data obtained from NDAWN).

Location	Wheat GDDs 2008*	Wheat GDDs 2007	Normal Wheat GDDs	Corn GDDs 2008**	Corn GDDs 2007	Normal Corn GDDs
Carrington	467	791	627	114	185	165
Dickinson	536	746	561	120	177	138
Fargo	525	865	651	130	209	152
Minot	523	789	573	115	187	135

* Accumulated wheat GDDs were calculated assuming a 15 April planting date.
** Accumulated corn GDDS were calculated assuming a 1 May planting date.

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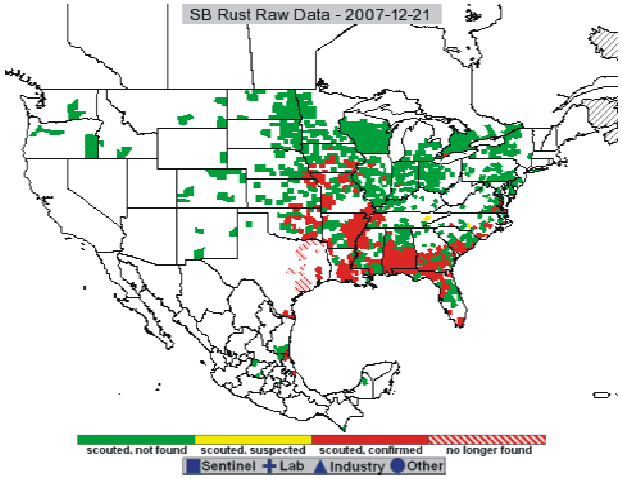
plant pathology

SOYBEAN RUST SUMMARY FOR 2007

Soybean rust was detected in 19 states and 1 Canadian province (Ontario) in 2007. The disease was reported in more states and spread further north (Northern Iowa) than any other year since it was introduced to the United States in 2004.

Despite the occurrence of the disease in many states, the spread of rust in 2007 will have no impact on soybean rust spread in 2008. Soybean rust can't survive the winter, so with the exception of a few locations along the gulf coast, all disease in the United States had died by spring. Therefore, for rust to cause problems, it must spread north again from one these overwintering sites.



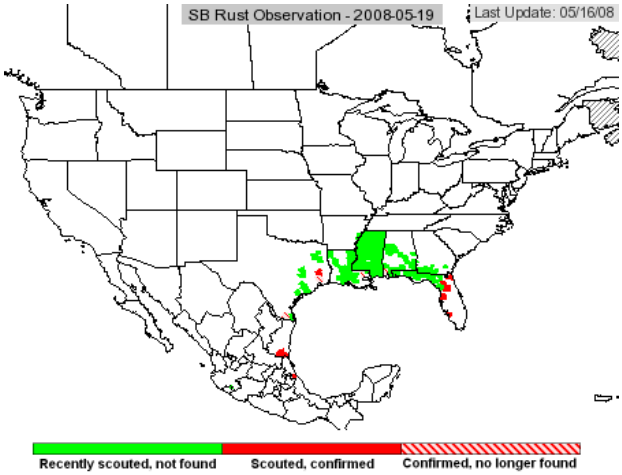
Map of soybean rust spread in United States and Canada in 2007, available at www.sbrusa.net. Counties with green are counties in which soybean rust was scouted for and not found, counties with red are counties in which soybean rust was scouted for and found, counties with red hashes are counties in which soybean rust was scouted for and found, but has since died.

SOYBEAN RUST ACTIVE IN TEXAS

Monitoring for soybean rust in 2008 has been underway in the United States and Mexico since January. As expected, most of the soybean rust was killed by the winter temperatures. However, a few pockets of the disease are still active, including a small area in east central Texas. To put this in perspective, soybean rust was not found in Texas until mid-June last year, so the disease is about one month ahead of where it was last year.

The good news is that soybean rust in Texas is struggling. Texas has been very dry, not quite as dry as western North Dakota perhaps, but dry nonetheless. The soybean rust pathogen needs ample rain or dew to spread to other plants, and in dry conditions, spread is severely hampered. Even if the disease was spreading actively, Texas is a *long* way from North Dakota, so there is nothing to worry about at this point.

Soybean rust will be monitored throughout the United States again this summer. All information is fed into a website, available at www.sbrusa.net. I encourage those of you interested to visit the site. Soybean rust information and monitoring updates are included weekly. We won't begin our scouting efforts in North Dakota for another 3-4 weeks, but will soon be locating fields to monitor as 'sentinel' plots. Sentinel plots are simply small areas in a field that are intensively sampled each week throughout the growing season. If we find something interesting (rust or otherwise), we will let you know.



Map of soybean rust in the United States as of May 19, 2008, available at **www.sbrusa.net.** Note: although soybean rust is prevalent in Florida, the spreading patterns make Florida rust irrelevant to North Dakota and other states in Midwest.

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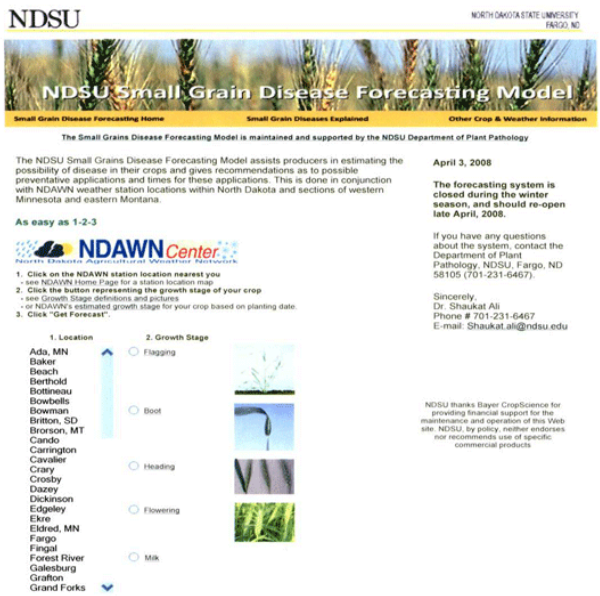
NDSU DISEASE FORECASTING WEB SITES

NDSU's crop disease forecasting web sites have a new portal this year. Links to small grain disease forecasting, Sclerotinia disease forecasting, and potato disease forecasting are available at one web address:

http://www.ndsu.edu/diseaseforecast

A person seeking information specifically on **wheat** disease risk, including fungal leaf diseases and Fusarium head blight (scab) may go directly to the following web address:

http://www.ndsu.edu/scabforecast



Opening page of http://www.ndsu.edu/scabforecast

This scabforecast web site has been reformatted for easier use. It provides information on the risk of Fusarium head blight (scab), as well as risk of the wheat leaf diseases, tan spot, Septoria blotch, and leaf rust. The risk of these four diseases is based on environmental conditions as recorded by the North Dakota Agricultural Weather Network (NDAWN) stations. This network consists of 67 stations distributed across North Dakota, the Red River Valley, and border regions of surrounding states.

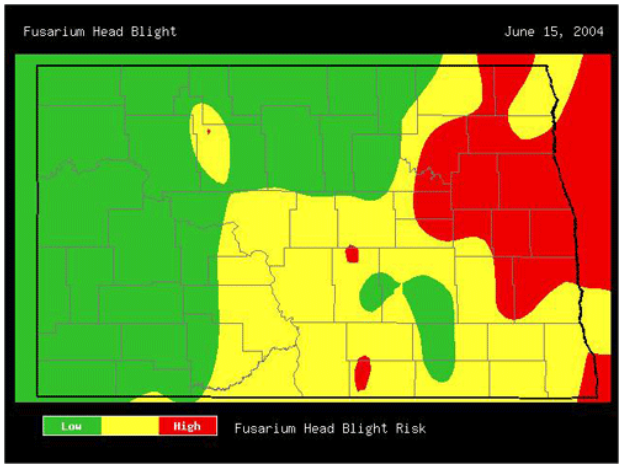
The information in the models for the leaf diseases was developed at ND, and provides information in a chart format indicating risk of the three leaf diseases over the past 12 days. Such information is another tool that producers may use to determine the need for fungicide application at critical growth stages to control leaf and head diseases in wheat. The following graph was taken from the model in June 2005, as an example:

Disease risk at Mott	6/14	6/13	6/12	6/11	6/10	6/9	6/8	6/7	6/6	6/5	6/4
Tan spot	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
S. Blotch	No	No	No	No	Yes	No	Yes	Yes	No	No	No
Leaf rust	No	Yes	No	No	No	No	No	No	No	No	No

Example of leaf disease risk predictions, from June 2005

The risk map for Fusarium head blight is based on a model developed by plant pathologists at Penn State University, a model which incorporated considerable ND disease and weather data for verification of the model. The scab model also provides the opportunity for the producer to look at risk based on the susceptibility of the cultivar to Fusarium head blight.

At the NDSU web forecasting site, a click on the flowering growth stage provides risk information in a chart format and state map format for Fusarium head blight.



Example of map of Fusarium head blight risk, 2004

A 1-888 toll free telephone service also will be activated for the current regional disease forecast information on May 30.

Direct access to the Penn State scab forecast site, which tracks risk in multiple states, may be found at: http://www.wheatscab.psu.edu/

UPDATE FROM SOUTHERN PLAINS STATES

Wheat leaf rust was found in Nebraska in counties adjacent to Kansas, as of May 14th. Oklahoma wheat has rapidly matured with recent hot temperatures in that region. The newest Cereal Rust Bulletin, with more recent rust observations, had not yet been posted, as of May 21.

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soils

TILLAGE AND WIND EROSION

On Saturday, May 17, the Red River Valley experienced a mini dust bowl, as winds clocked at 40-mph to near 60-mph whipped up soil from recently seeded fields. Driving speeds were reduced to 25 mph due to visibility problems in some parts of Pembina County, according to Leslie Lubenow, Pembina County Extension agent. About 17,000 acres of sugarbeets need to be replanted as a result and many more acres lost soil that will take decades to replenish.

The first figure shows a ditch filled with soil from surface creep wind erosion in the adjacent field. Many more tons of topsoil were lost into the air. The second figure shows a newly seeded sugarbeet field on the right, and a wheat field on the left. The soil saltation from the sugarbeet field was so bad that the grower was forced to field cultivate the wheat field to slow the soil loss in it.

Figure 1. Soil from adjacent field fills in a ditch as a result of the May 17 wind storm. *(Image courtesy of T. Grove, American Crystal Sugar Co. agriculturalist.)*

Conservation tillage practices for the Valley have been studied for thirty years at NDSU. Although no-till is not practical, there are some measures that can be taken to reduce the impact of wind. Growers that used a cover crop were better off than those that did not. Cover crops are especially practical now with glyphosate resistant crops. Research continues into the use of strip-till in sugarbeets and other row-crops. Although there are challenges with using this tillage system in this area, the results so far make us hopeful that this might soon make dust storms in the region much more rare.

Figure 2. Soil from sugarbeet field (right) moved into the wheat field (left), causing saltation and soil loss. The grower field cultivated the emerged wheat field to stop the erosion. *(Image courtesy of Tyler Grove, American Crystal Sugar Co. agriculturalist.)*

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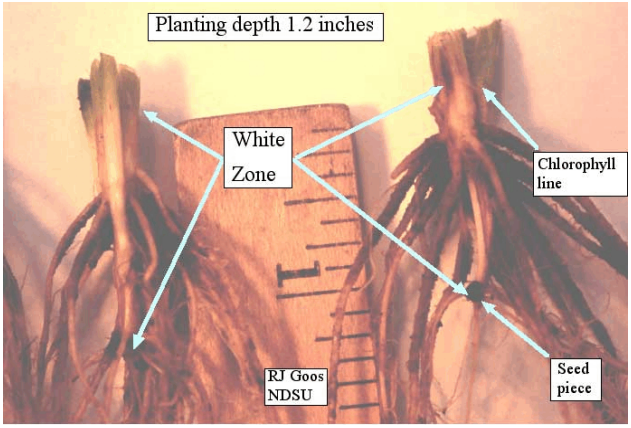
HOW DEEP DID YOU PLANT YOUR SMALL GRAINS?

Now that the wheat and barley crop has emerged in most of North Dakota, it is a good time to confirm how deep the crop was actually planted, according to Jay Goos, Professor of Soil Science at NDSU. "A farmer can confirm the effective seeding depth of small grains by measuring the length of the 'white zone'," says Goos. The "white zone" is a term coined by Goos to describe the length between the seed piece, and an imaginary line on the stem, where the stem turns from white to green. "Going to a field, digging up random plants, and measuring the length of the white zone can give a farmer an accurate measure of the effective seeding depth, after the soil has settled around the seed," he says. "There are a lot of patchy and streaky stands of wheat in eastern North Dakota this spring. This technique might prove helpful in the next week or so, to help figure out why some rows emerged more slowly than others. Was the seeding depth too deep or too shallow? Examining the white zone length might be useful in helping farmers figure out why certain rows emerged well, while others didn't."

In most cases, measuring the length of the white zone is simple, as there is not much of a "bend" in the shoot. "If there is a bend in the shoot, as when a shoot curved around a clod to emerge, it is more accurate to measure length of the white zone without unbending the shoot. The vertical distance between the seed piece and where the stem turns green is the important measurement," according to Goos.



This picture shows the length of the white zone for wheat plants planted 1.2 inches deep

If pressed to give an "ideal" length of the white zone in wheat, Goos would say that it would be about one inch for a typical year. "Farmers sometimes need to seed more deeply than that, especially in dry years, in order to 'hit moisture,' but deep seeding is not without risk. Tiller production and crown root production generally go down as seeding depth is increased, and if seeding is too deep, the stand will suffer. Seeding too shallow has risk as well, involving the seed being stranded in dry soil, or in a crust. The worst-case scenario with shallow seeding is when seed begins to grow, and then dries out and dies. Seeding too shallow also can lead to some heat stress on the crown if the weather turns very warm early in the season. We observed this in 1988, with many hot days in May and June. So, there is no ideal seeding depth for all conditions. But, it is important that farmers get into their fields and learn to correlate the length of the white zone to what produces good stands and vigorous tillering."
In general, Goos says, farmers don't plant as deeply as they used to. "No-till and one-pass seeding systems generally lead to shallower planting than systems used years ago, when the standard practice was to till the land and then plant a week or so later in much looser and drier soil."

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weeds

NEW EXTENSION SUGARBEET WEED SCIENTIST JOINS NDSU

Hello! My name is Jeff Stachler. On May 6, 2008, I joined the Plant Sciences Department at NDSU as the Extension Sugarbeet Weed Scientist. I will be attempting to fill the "large shoes" of Dr. Alan Dexter. I will be responsible for extension and research activities pertaining to weed control in sugarbeets in Minnesota and North Dakota. This position continues to be funded as a joint position between North Dakota State University and the University of Minnesota.

I was raised on a diversified crops and livestock farm from West Central Ohio, near the Indiana border. I received an Agronomy B.S. degree from The Ohio State University and an M.S. degree from Michigan State University in Weed Science in 1995. My Master's research focused on controlling wild carrot in no-tillage corn and soybeans and the discovery of resistance to 2,4-D in wild carrot in the Great Lakes Region. After completing my M.S., I accepted a position with The Ohio State University as Weed Science Extension Program Specialist for agronomic crops in September 1995. My responsibilities there included extension programming, research of problem weeds, and teaching. This position allowed me to work toward my Ph.D. while working as an Extension Weed Specialist. My Ph.D. research was on the discovery of resistance to glyphosate and ALS-inhibiting herbicides in marestail/horseweed in Ohio and glyphosate-resistant giant ragweed in Ohio and Indiana.

I look forward to working with everyone in North Dakota and Minnesota in the coming years! If you have any questions or comments, I can be reached at jeff.stachler@ndsu.edu or 701-231-8131.

UPBEET PLUS GLYPHOSATE MIXTURE APPROVED

DuPont Chemical Company recently received approval of a 2(ee) label for the mixture of Upbeet with glyphosate applied to glyphosate-resistant sugarbeets. Upbeet may be applied at 0.25 to 1.0 ounce per acre in combination with glyphosate. The label suggests adding a nonionic surfactant (NIS) at 0.25 %v/v plus ammonium sulfate (AMS). This herbicide combination should improve the control of velvetleaf compared to glyphosate alone and may improve the control of additional weed species. The mixture of Upbeet plus glyphosate is the only mixture currently labeled for glyphosate-resistant sugarbeet. This mixture can ONLY be applied to glyphosate-resistant sugarbeets.

CONTROL OF DANDELION IN NO-TILLAGE BROADLEAF CROPS

Several calls have been received about the control of dandelion in no-tillage broadleaf crops. The ideal time to control dandelion with herbicides is in the fall. Control of dandelions with herbicide applications in the spring is possible, but usually variable and with fewer options.

In soybeans, the most effective preplant treatment for the control of dandelions is glyphosate plus 2,4-D ester plus a cloransulam-containing herbicide (Authority First, FirstRate, Gangster, or Sonic). The user must carefully weigh the value of the cloransum (FirstRate) component as it is a long residual herbicide and rotation to barley, canola, flax, sugarbeet, and sunflower is 30 months plus a bioassay.

Mixtures of glyphosate plus 2,4-D ester can effectively control dandelion, however, control tends to be less consistent and is dependent upon the rate of each product. The minimum rate of glyphosate and 2,4-D ester in this mixture should be 0.75 pounds acid equivalent per acre (lb ae/A) and 0.5 pounds active ingredient per acre (lb ai/A), respectively. Higher rates of glyphosate and 2,4-D ester usually improves the consistency of control, especially rates of 2,4-D ester at 1.0 lb ai/A. Planting of soybeans must be delayed after preplant application of 2,4-D ester. Soybeans can be planted 7 days after application of 2,4-D ester at 0.5 lb ai/A (usually 1 pt/A, although some 2,4-D formulations are more concentrated) and usually 30 days after application of 2,4-D ester at 1.0 lb ai/A. The 2,4-D formulation, E-99, can be applied at 1.0 lb ai/A 15 days prior to planting of soybean.

Glyphosate applied alone at 1.5 to 2.25 lb ae/A can control dandelion. This is especially important if soybeans have been planted but have not emerged or growers are not willing to delay planting of soybeans. Preplant application of Valor plus glyphosate plus 2,4-D ester can provide rapid activity on dandelion, but dandelions are more likely to regrow compared to previously mentioned treatments. Ammonium sulfate must always be included with glyphosate applications.

Application of effective herbicides prior to or at the time of flowering of dandelions can provide somewhat effective control of seedling dandelions, because viable seeds have not been produced. However, if dandelion seed has been produced prior to preplant herbicide applications, the inclusion of Gangster should provide the most effective residual control of seedling dandelions. Valent claims Valor will control seedling dandelions, however limited research data is available to support their claim. Cloransulam applied alone provides only limited residual control of dandelions.

After emergence of glyphosate-resistant soybeans, only two options exist for fair to excellent control of dandelions. Those options include glyphosate applied at 1.5 lb ae/A followed by glyphosate at 0.75 lb ae/A or glyphosate applied at 1.1 to 1.5 lb ae/A plus FirstRate at a minimum of 0.3 ounce per acre.

Control of dandelions in other no-tillage broadleaf crops (sunflower, flax, etc.) hinges upon the success of preplant herbicide applications. Since 2,4-D ester is not available for use in preplant applications of these crops, the proper rate of glyphosate is key to successfully controlling dandelion. Apply glyphosate at 1.5 to 2.25 lb ae/A prior to planting of other broadleaf crops. Glyphosate may be applied after planting, but it must be applied prior to crop emergence and control of dandelion may be reduced due to plants being damaged during the planting process.

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horticulture

CANKERWORMS

During a visit to Mandan on Tuesday, May 20th, Jackie Buckley and I found our first cankerworms of the year. The spring cankerworm (*Paleacrita vernata*) and the fall cankerworm (*Alsophila pometaria*) are defoliators of several deciduous trees including various elms, boxelder, ash and linden. Over the last two to three years, a large outbreak of cankerworms has caused widespread defoliation in the Missouri River Valley. While healthy trees can withstand 1-3 years of defoliation, repeated defoliation causes a lot of stress. Defoliation, combined with the current drought conditions in the western part of the state, will likely result in increased tree mortality over the next few years.

The two individual cankerworms that Jackie and I found are still pretty small, 4-7mm in length. We also found two clusters of fall cankerworm eggs that haven't yet hatched. The eggs could be a late-hatching group or could have been killed over the winter. I'll observe them over the next two weeks to see if they hatch. The current damage on trees is minimal and not noticeable to the casual observer. But as the individual larvae continue to grow, and as more larvae hatch, damage will become evident and homeowners will likely want to pursue treatment.

Several treatment options are available and should be considered in the next one to two weeks. Several chemical pesticides are labeled for control of "caterpillars," including carbaryl, acephate, malathion, cyfluthrin, esfenvalerate, permethrin and spinosad (Zeleznik et al. 2005). Application timing is critical. Another option is the bacterial pathogen Bt. It is highly specific and has been used for many years.
The Bismarck Forestry Department is planning to spray

Bt sometime during the next week as weather conditions permit. Applying a sticky substance such as Tanglefoot ® at this point would not be helpful. That material is useful to capture the wingless female adult moths as they crawl up the trees to lay eggs. Tanglefoot ® should be placed on trees in early September to capture fall cankerworm females, and in March to capture spring cankerworm females.

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diagnostic lab

UPDATE FROM THE NDSU PLANT DIAGNOSTIC LAB

From May 14 to May 21, 2008, the NDSU Plant Diagnostic Lab has received 31 samples. The table below summarizes the types of samples processed during this period:

Sample Category	Number of Samples
Seed Health and Phytosanitary	25
Woody ornamental – Evergreen	2
Vegetable	1
Other	2
Annual	1
Total	31

FAIRY RING IN TURFGRASS AND PASTURES

Have you ever seen green rings of grass in your lawn that seem to appear out of nowhere? Have you noticed a ring of mushrooms that might show up as if overnight? If so, a type of fungus that causes a whimsically named fairy ring might be living on the organic matter in your lawn. If you submit a turf sample to the NDSU Plant Diagnostic Lab, and fairy ring is the suspected problem, a version of the following standard report is what you might receive back in the mail:

> "The turfgrass sample has been examined. The reported symptoms were turf with yellow rings, about 1" thick, in patches ranging from 1 to 2 feet in diameter. The peat-backed sod is reportedly three years old.

No foliar symptoms (other than the yellowing) were detected, so foliar diseases do not appear to be seriously impacting the sample. Although the roots were thickly formed within the peat layer, they also penetrated to the underlying clay soil surprisingly well, which is desirable and beneficial for the health of the lawn. Roots appeared healthy, with no discoloration; an occasional lesion not consistent with known root diseases was detected, but these were rare and did not seem to be associated with a pathogenic fungus. Disease does not appear to be the primary problem on the sample.

The sample had a thick thatch layer (primarily the peat backing of the sod). Thick thatch (anything over 1/2" thick) can create environments favorable for pathogenic fungi (those that can cause disease on grass) as well as saprophytic fungi (those that feed on dead organic matter within the thatch layer and don't cause disease). In the sample you submitted, I did not detect signs of fungi that cause serious root diseases. As a result, I suspect that the main problem may be due to purely saprophytic fungi in the basidiomycete group of fungi, known as **fairy ring fungi**..

FAIRY RING FUNGI

Many of the fairy ring fungi fall in the order Agaricales. Many (but not all) basidiomycete fungi produce mushrooms, and several of the fairy ring mushrooms are poisonous. If fairy ring is occuring, mushrooms (also known as basidiocarps) will sometimes, but not always, grow along the perimeter of the ring. The fungus is growing on dead organic matter, rather than directly infecting the grass. Symptoms vary depending on the type of fairy ring, but in general, if plant death or stress is obvious, it may be due to water stress resulting from the creation of a hydrophobic soil (due to dense mycelia, or vegetative growth, of the fungus). Other causes for the inhibited grass growth may be due to lethal concentrations of ammonia (a by-product of the fungus as it breaks down matter), nitrogen depletion, toxic levels of hydrogen cyanide or ethylene potentially released by the fungus, actual root infection by the fungus (a pathogenic process), creation of hydrophobic conditions by release (from the fungus) of a hydrophobic substance, and weakened plants killed by other stresses. It's not well-understood precisely what causes the symptoms.

Management is limited. Fungicides are generally not considered effective against fairy ring fungi. A wetting agent may be helpful if water stress is noted in the affected areas (wetting agents help break the surface tension of water so it can better overcome hydrophobic conditions and penetrate to the roots of the grass). Injecting water in the fairy ring areas can minimize water stress of the grass; the goal is to saturate the soil to prevent drought stress of the grass and to promote microbial activity that is antagonistic to the fairy ring fungus. This procedure requires repeated injection (such as with tree root watering wands, or deep holes punched

into the soil surface), and when used in conjunction with wetting agents, the soil is more uniformly saturated. It may be difficult to achieve and maintain satisfactory levels of soil saturation, though.

A less practical approach is to remove infested sod and soil and replace with clean soil (overseeding or re-sodding would be needed). If this option is chosen, sod and underlying soil must be removed from about 20 inches beyond the advancing ring, to a depth of 8-30 inches, depending on severity. Ideally, the excavated area should be re-filled with clean topsoil similar in texture to the soil removed. Seeding is preferable to sodding, since seeding poses less risk to reintroducing fairy ring fungi. Another option is to cultivate the affected area repeatedly, and allow it to sit without seed for a period of time (such as over the winter), and then seed the following spring (when conditions favor growth of the grass, typically in May for our area).

Reducing further formation of thatch and increasing rate of thatch decomposition are key management strategies that can help minimize fairy ring. Power raking and core aeration can help initiate this process. These are discussed in a little more detail under General Turf Management Tips, below.

Masking the symptoms: Since complete control of fairy rings is probably not realistic, masking symptoms may be more reasonable. Symptoms can often be disguised with deep irrigation to the grass root zone (to reduce water stress) and with moderate nitrogen applications at the appropriate times of year. Core aeration and use of wetting agents can also help with water penetration to the root zones.

General turf management tips:

Conditions that can favor fairy ring are a thick thatch layer or soils high in organic matter. A thick thatch layer should be minimized, ideally in spring when grass is actively growing (for our area, the recommended 'rule of thumb' is to power rake after the lawn has been mowed three times). In some years, it may be too late to power rake this time of year, but this spring has been cool, so it might be okay to still perform this procedure if temperatures remain cool and favor the growth of the grass. Power-raking will help reduce the thatch layer, but it is stressful to the grass. Aggressive power raking at the wrong time of year may lead to a flush of weeds that may out-compete the stressed grass, so care should be taken when performing this procedure.

Core-aeration is another technique that will also help reduce the thatch layer, but more importantly, this procedure will further encourage roots to grow more deeply into the soil profile. Both power-raking and core-aeration may be beneficial for your lawn, especially if you have a thick thatch layer and compacted soils. Both procedures can be done now as long as temperatures remain cool. Core aeration is less stressful to the grass than power raking. Core aeration may need to be performed more than once in a given year to achieve desired results over a period of several years (it may not be a quick fix; every situation is different).

The ideal mowing height for lawns is about 2-1/2 inches to 3 inches. A short mowing height is very stressful to lawns in our areas, and this practice leads to poor root development which may predispose your lawn to drought stress."

[Source: Compendium of Turfgrass Diseases, third edition, APS Press, 2005; Edited by Richard W. Smiley, Peter H. Dernoeden, Bruce B. Clarke; 167 pp.]

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Fairy ring in a sodded lawn in Fargo. A darker green ring of grass, with or without basidiocarps (mushrooms) and no ring of dead grass, is characteristic of type 2 fairy rings.

around the state

North Central ND

Lack of soil moisture remains the top concern in the north central region. The October through May precipitation in the north central region remains at or below 50% of normal. Many growers took advantage of early dry conditions and got an early start on spring seeding. However, continued dry conditions had forced them out of the fields temporarily due to poor seedbed conditions. Either topsoil was powder, or so crusty it was impossible to obtain good seed/soil contact, or seal anhydrous ammonia in the soil. In early May, rainfall ranging from 0.2 - 1.8 inches was just enough to get seeding going again. Much of the canola seeding had been delayed to this time.

Winter wheat stands throughout the region are average to poor, with some being reseeded to spring crops. The majority of the stand loss has been due to drought stress rather than winter kill. Early seeded spring cereals are 1 to 2-leaf, with some uneven stands in areas with extremely low soil moisture. There have been limited reports from northern tier counties of seeds not emerging for 2 to 3-weeks because there simply was not enough moisture for germination.

Fortunately, cool dry conditions have also delayed pest issues. There have been no reports of Wheat Streak Mosaic Virus. Spring annual weeds are just beginning to emerge. Tim Semler, Bottineau County Agent, did report some cutworm activity. He also reported on wireworm activity, luckily in most cases there was a seed treatment in place.

Denise Markle
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Minot, ND

South-Central ND

Our soils are warming but continue to be dry. High winds over the past weekend dried and eroded soils, and in scattered areas reduced crop stands. Light frosts continue to occur but are not of concern compared to our dry conditions! Rain is especially needed for adequate stand establishment of row crops and May-seeded cool-season crops.

Winter wheat is actively growing and is in the tillering stage. Stands of spring-seeded small grain generally are adequate and are in the 1- to 2-leaf stage. Corn is beginning to emerge. Soybean planting will essentially be complete by May 24. Sunflower and dry bean planting should easily be completed by the end of May if current weather conditions continue. Crop pest problems are minimal but weeds are emerging including foxtail. Pasture growth is very slow.

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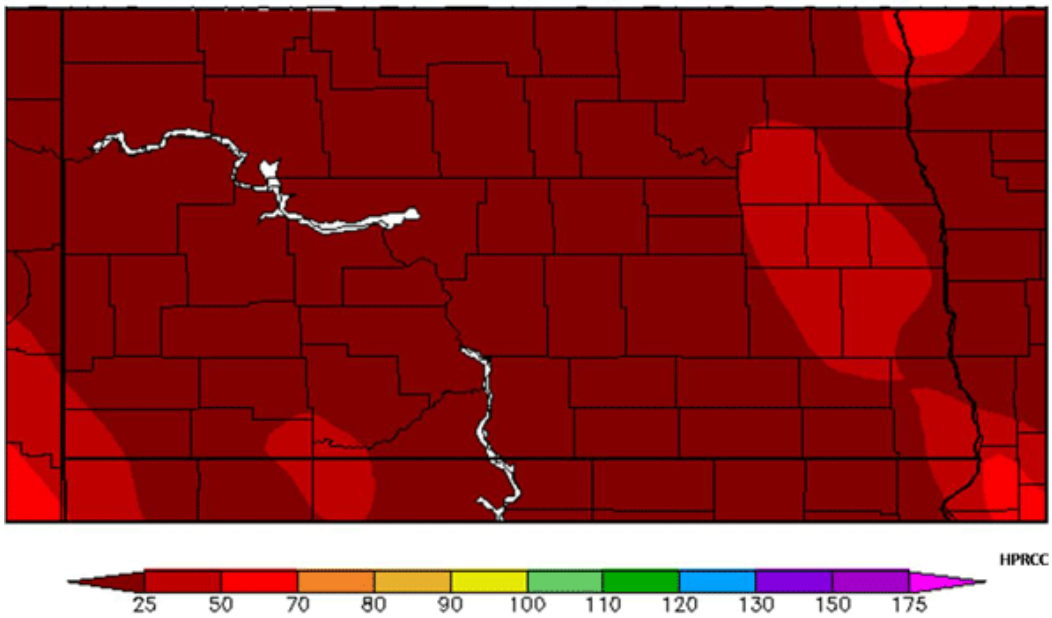
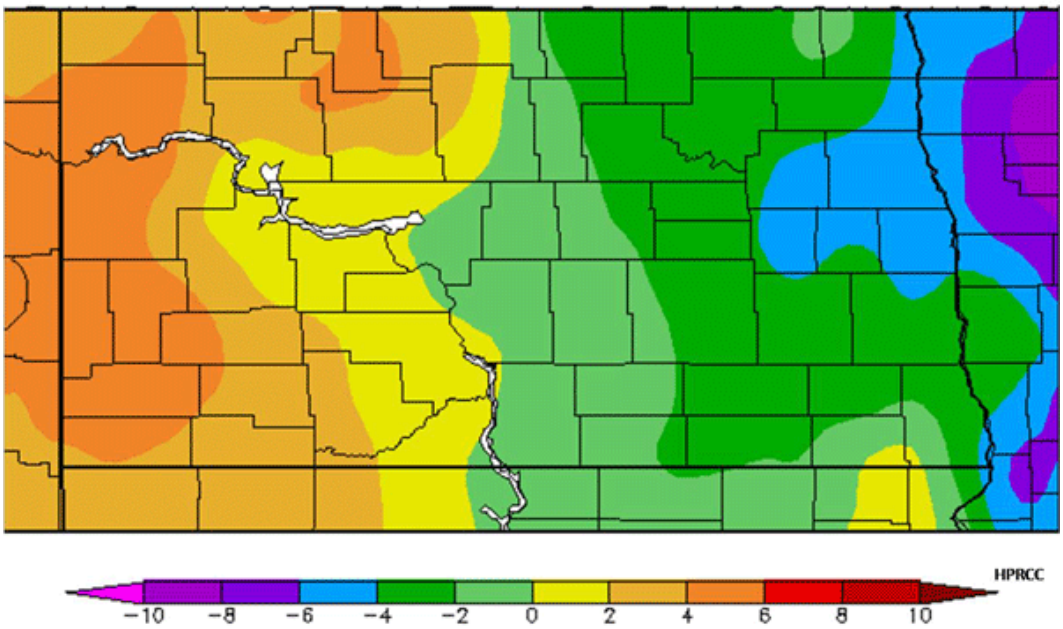
weather

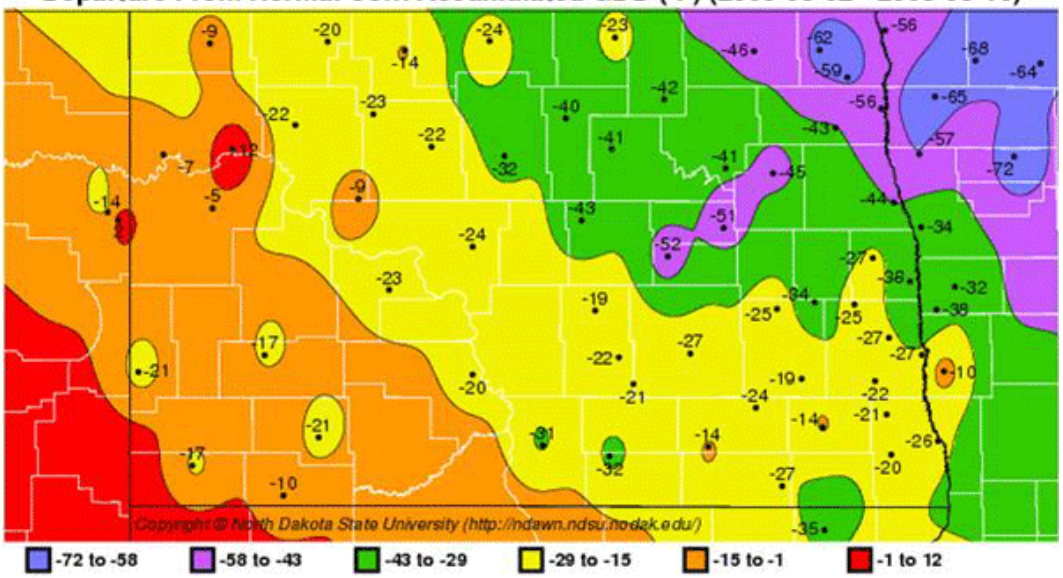
Last 7-Day Percent of Normal
Precipitation(%)
5/14/2008-5/20/2008



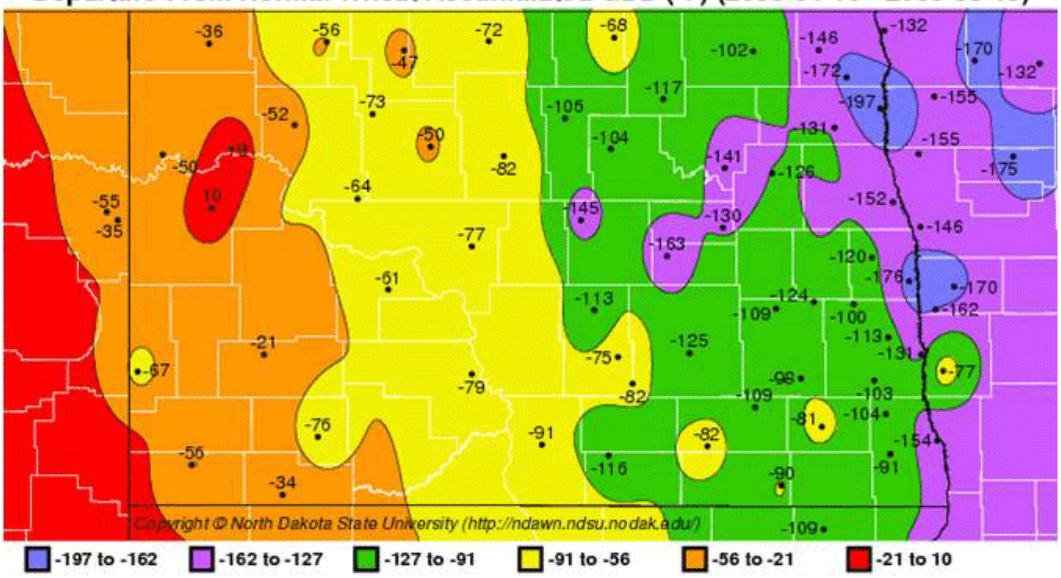
Last 7-Day Departure From Normal
Temperature(°F)
5/14/2008-5/20/2008



Departure From Normal Corn Accumulated GDD (˚F) (2008-05-02 - 2008-05-19)



Departure From Normal Wheat Accumulated GDD (˚F) (2008-04-16 - 2008-05-19)



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Permit No. 818
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