North Dakota State University
CROP & PEST REPORT
NDSU Extension Service

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FIELD TOUR FOR RAGWEED

Glyphosate-resistant common ragweed may have been discovered in North Dakota. A field tour will be held August 5, 2008 near Mayville, North Dakota to demonstrate the possibility of glyphosate-resistant common ragweed and to gain a better understanding of glyphosate-resistance. Additional studies will show how to control the potential glyphosate-resistant common ragweed in sugarbeets, soybeans, and dry beans.

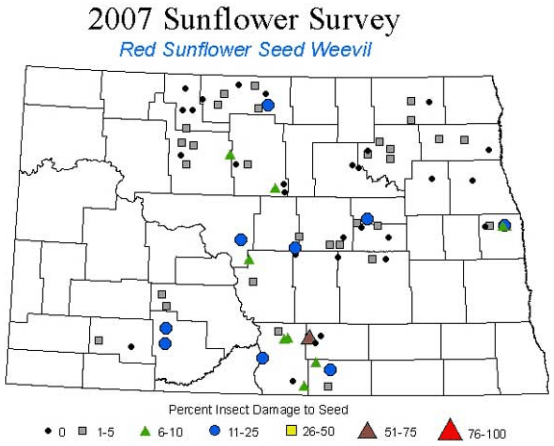
The tour of the research studies will begin at 9:30 a.m. and last approximately two hours. To get to the field, take exit 111 off Interstate 29. Go four miles west on North Dakota Highway 200. Turn north and go 2.5 miles on County Road 10 (158th Avenue). The research plot is in a wheat field on the east side of the road. Parking is available only along the side of the road.

In case of inclement weather, the tour will be canceled or postponed. If inclement weather does occur, contact Jeff Stachler at (701) 231-8131, Mohamed Khan at (701) 231-8596 or Kendall Nichols at (701) 636-5665.

Entomology

TIME TO SCOUT FOR RED SUNFLOWER SEED WEEVIL

Red sunflower seed weevil are emerging and can be found in R4 and early blooming sunflower fields in the major sunflower producing areas. The map below illustrates the "hot spots" of the red sunflower seed weevils from the 2007 Sunflower Survey in North Dakota (sponsored by the National Sunflower Association). Last year, populations were lower than 2006 and sunflower fields in the south central, central, east central and north central regions had high levels.



Identification: Adults are small, about ⅛ inch and reddish-brown in color. Newly emerged adults feed on the bracts, sunflower buds, and pollen. Peak emergence is usually in late July and early August. The female seed weevil must feed on pollen for fertile egg development.

Adult red sunflower seed weevil

Scouting: Sunflower normally reaches the bud stage in late July at which time only about 30 percent of the weevils in the soil have pupated and emerged. Most weevils emerge from the soil by the first week of August. Field scouting for adults should begin when plants are showing yellow ray petals (R5.0) to 30% of the head shedding pollen (R5.3), and should continue until most of the plants have reached 70% pollen shed (R5.7). A plant that has reached R5.7 has few seeds still suitable for red seed weevil egg laying and should no longer be susceptible to further significant damage.

Seed Weevil Damage: Research reveals that most seeds are only partially consumed or destroyed by the seed weevil larvae (see photograph) and that damaged seeds have lower oil content than undamaged seeds. The economic loss caused by larval feeding includes the loss of both seed weight and oil content.

Damaged seed from larval feeding of red sunflower seed weevil.

Economic Threshold:

Oilseed Sunflower . . . The threshold can be calculated using the following formula:

$$\text{Threshold (Weevils per head)} = \frac{\text{Cost of Insecticide Treatment}}{(\text{Market Price} \times 21.5)\,(0.000022 \times \text{Plant Population} + 0.18)}$$

The table below lists the economic threshold values based on 0.26 cent per pound for oilseed sunflowers. The current high prices for oilseed sunflowers has lowered thresholds for red sunflower seed weevil! Typically, we are at 6-8 weevils per head for the economic threshold; however, thresholds are only at **2-3 weevils per head** this year!

Economic Threshold Values for Red Sunflower Seed Weevil in Oilseed Sunflower

Price for Oilseed Sunflowers = 26 cents per pound						
Plant population plant/acre	Treatment Costs ($/acre)					
	$6.00	**$7.00**	**$8.00**	**$9.00**	**$10.00**	**$11.00**
17,000	1.9	2.2	2.6	2.9	3.2	3.6
18,000	1.9	2.1	2.5	2.8	3.1	3.4
19,000	1.8	2.0	2.4	2.7	3.0	3.3
20,000	1.7	2.0	2.3	2.6	2.9	3.2
21,000	1.7	1.9	2.2	2.5	2.8	3.1
22,000	1.6	1.8	2.2	2.4	2.7	3.0
23,000	1.6	1.8	2.1	2.3	2.6	2.9
24,000	1.5	1.7	2.0	2.3	2.5	2.8
25,000	1.5	7.0	2.0	2.2	2.5	2.7

CONFECTION sunflowers: The economic threshold is only ONE WEEVIL PER HEAD.

Insecticide Spray Timing: Insecticide spraying is targeted at the adult weevil to prevent egg laying. The best time to treat is when more than half of the plants in a field are beginning to show yellow ray petals (R5.0) to 30% of the head shedding pollen (R5.3) and the rest of the plants in the field are still in the late bud stage. Although insecticides applied to sunflower at the bud stage will kill weevils, treatments at that stage are not economical or effective because (1) seeds have not developed to a stage suitable for oviposition, (2) eggs within the weevil are not mature, and (3) adult weevil emergence is still continuing. Considering treatment at the early bloom stage is the optimal insecticide timing for efficacy and should allow growers a sufficient time to have their fields treated. Growers must be aware, however, that if weevil populations are high and/or spraying is done too early, a re-infestation may occur and a second insecticide application may be necessary. Banded sunflower moth and red sunflower seed weevil can both be controlled with one well-timed spray, usually near 10% of the head shedding pollen or R5.1 (see photograph). Fields should always be scouted for both insect pests.

Sunflower in R5.1 stage.

AVOID SPRAYING TOO EARLY FOR BANDED SUNFLOWER MOTH

Although sampling is conducted for eggs or adult moths, insecticide treatment is directed primarily at egg hatch (eggs turn yellow-orange prior to hatching) and the larval stage of the banded sunflower moth. Eggs (see photograph) are present through early August and hatch about five to eight days after being deposited. Females preferentially deposit more eggs on midsized buds (R3) than smaller or larger buds. Very few eggs are laid on plants at pollen shed (R5.1) and later. Most eggs are laid singly or in small clusters, and are deposited on the outer whorl of bracts.

Close-up of banded sunflower moth eggs.

After hatching, larvae feed on florets preventing pollination and reducing the number of seeds the sunflower head produces. Once the larvae reach the third instar, they feed on seeds, usually consuming the entire kernel. The larva typically enters near the top of the seed and leaves by way of the same puncture after eating the kernel. Each larva typically consumes the kernels of six to seven seeds in addition to the early feeding that reduces seed number.

Typically, the best sunflower plant stage to treat is the 5.1 growth stage (see photograph in previous article), or when pollen shed is just beginning. This is the time when most banded sunflower moth eggs have hatched and larvae are present, but before the head has seeds forming. At this time, the larvae are beginning to feed on the disk flowers, are exposed on the head and are susceptible to the insecticide treatment. Application at an earlier growth stage may be warranted if monitoring reveals earlier than normal egg-laying activity. On older plants where the seeds have started maturing, most larvae will be feeding in the seeds or underneath the florets, and will be protected from the insecticide. By then, much of the feeding damage already has occurred.

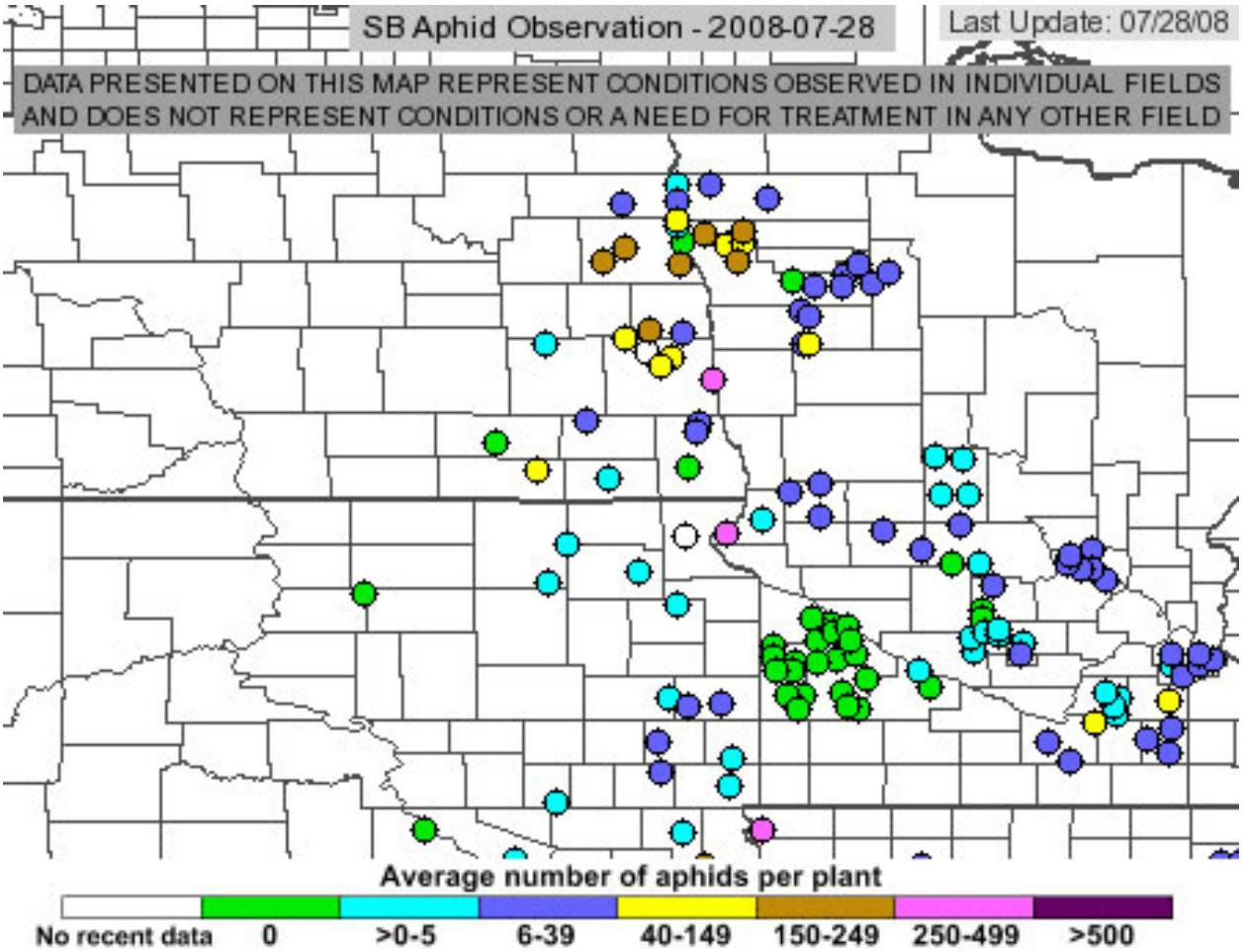
Remember to apply insecticides early in the morning or late in the day to minimize the adverse effect of the chemical on bees and other pollinators.

SECTION 24C FOR MUSTANG MAX AND GRASSHOPPER CONTROL IN FLAX

A Special Local Need (Section 24c) was registered for Mustang Max EC Insecticide® from FMC Corporation for control of grasshoppers and other insects in flax. Active dates are July 24, 2008 through September 1, 2009. The recommended use rate is 4 fl. oz. per acre. Do not apply within 7 days of flax harvest.

SOYBEAN APHIDS CONTINUE TO INCREASE

Soybean aphid numbers are increasing in the Red River Valley area and other eastern counties of North Dakota (see map). Most fields have higher counts than the previous week. Some fields are approaching or at the economic threshold level, and soybean fields in critical reproductive stages (R1-R3) will need to be treated. If weather conditions continue to be favorable (low to mid-80s F) for aphid reproduction, populations will continue to increase and scouting is crucial.



Soybean aphid map from USDA Public PIPE website: (http://sbr.ipmpipe.org/cgi-bin/sbr/public.cgi)

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plant science

FIELD PEA HARVEST

Pea fields may have some weeds or later maturing plants and a decision needs to be made about swathing the crop prior to harvest. Start swathing when the vines are yellow colored and the seeds should be firm, but not hard. Pickup guards and or pickup reels with sharp sickles should be used.

If peas will be directly combined, set the pickup for aggressive picking. The coulters should be sharp and the chains tight. Combine the dry field peas at 16 to 20% moisture in order to reduce splitting of the seed or cracking of the seed coat. The cylinder speed should be from 350 to 500 RPM's using the lowest speed that circumstances allow. The concave should be opened as wide as possible while still removing all the seeds from the pods. The cleaning fans should be set high with sieves open so pods will not end up in the grain tank. If the combine has a chopper, set it in such a way that it will cut aggressively and spread the cut pea vines and chaff as evenly as possible. Field peas should be handled as gently as possible especially if the peas will be used for seed next year. Run the unloading auger on the combine full and slowly to avoid seed damage. In further handling use conveyers to fill the bins or if an auger is used make sure the auger is full and runs slowly. Provide aeration to dry the field peas down to 14% moisture in order to avoid spoilage of the valuable crop.

After harvesting the crop, the field could be worked lightly to stimulate the germination of un-harvested pea seeds and create a volunteer "green manure." The volunteer field pea can make use of the sunlight and fix some atmospheric nitrogen. The green manure crop can be mechanically terminated at the end of the growing season or can be left and it will be killed by the frost.

LENTIL HARVEST

Lentils can be swathed when one-third to two-thirds of the field is golden in color. The lower pods on the plants should be fully mature and drying. Use a pickup reel and pickup guards. The best time to swath is in the early morning or late evening when the relative humidity is higher than during the hottest part of the day. The higher humidity may help in reducing shattering. As lentils are a relatively short crop there will be little stubble left after cutting and the swath may be susceptible to blowing. The use of a swath roller may cause excessive shattering and its use is not advised. It is important to harvest the lentils as soon as possible after swathing, but to allow time for the pods to dry until the seed moisture has reached the 16 to 20% moisture level. Adjust the pickup speed to match the combine groundspeed. The cylinder speed should be adjusted according to the conditions during thrashing and should be between 250 to 650 RPM's. Use a cylinder speed to just break open the pods without splitting or damaging the lentil seed. The concave setting should be similar to harvesting wheat and barley and should be adjusted according to the harvest conditions. Adjust the cleaning fan similar to that of wheat or barley harvest settings. Lentils are a little more forgiving during handling than field peas, but still split lentils or damaged seed coats are unwanted. Augers should be full and run at reduced speeds. The lentils should be dried down for storage to 14% moisture, be careful however to prevent over drying which will increase the chance of splits and broken seeds when unloading the bin at the time of sale.

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CORN GROWING DEGREES STILL LAGGING FAR BEHIND NORMAL

As we approach August and the prospects of shorting days and fewer growing degree days per day, it is now prudent to take of stock of where we are at with regards to corn development. It is obvious as you travel around the state, that corn development is far behind where it was last year. In fact, corn is just now beginning to tassel which compares with most fields tasseling in mid-July last year. A quick look at map of corn growing degree days (GDDs) on NDAWN shows that depending on the location in the state, GDDs are currently running about 100 to 150 behind the long term average when a May 1st planting date is assumed. In this article GDDs from Jamestown and Oakes will be used to illustrate the impact of the cool weather this year on corn development and the risks of insufficient GDDs on the corn crop this fall. As of yesterday (July 27th) Jamestown and Oakes were 211 and 112 GDDs behind the long term average, respectively (see Table 1). Generally, yield is not impacted by slow corn development. In fact, the lack of extremely hot days this summer has probably been beneficial to the crop as far as yield is concern. The problem with cool weather and slow corn development is that the crop may not reach physiological maturity before the first killing frost, but perhaps more importantly the grain will be so wet at harvest it will be difficult to handle and expensive to dry.

So how do GDDs translate in terms of calendar days and how far behind normal are we? During late July, daily GDD accumulations run about 20 per day, which means that we would need an extra five to ten "July days" (for Oakes and Jamestown, respectively) to catch up to the long-term average. To look at it another way, since a corn hybrid with a relative maturity of 85 requires about 1150 GDDs to silk and 2100 GDDs to reach physiological maturity (PM) (see Table 2) we have accumulated slightly

over half the required GDDs to reach PM. Since in a normal year GDD accumulations from now to October 1 are just under 1000 (see Table 1) an 85 RM hybrid would probably reach PM if the first killing frost is delayed until then. A 95 RM hybrid, on the other hand would not reach PM if normal accumulations are assumed. Grain dry-down is another issue. From research funded by the Corn Council that was conducted last year, we found that about 150 to 200 GDDs are required to dry corn in the field from 35% to 20% moisture. Using normal GDD accumulations for October (Table 1), and assuming a crop reaches PM on October 1st, corn will not reach 20% moisture by November 1st, except perhaps at Oakes.

Hopefully this data has helped you visualize and quantify the delay in corn development this year. Though the data does not suggest that we will see large yield losses due to crop immaturity this year (assuming a relatively normal first frost date and that recommended hybrid maturities were grown), they do indicate that corn will probably need substantial drying after harvest before it can be safely stored. Obviously, warmer than average weather will hasten corn development and reduce the impact of our cool spring. Since we are dealing with "average" weather data, large deviations from the normal can be expected. A prolonged warm and dry fall, like we had in 2007 would be beneficial in reducing the need for drying time. On the other hand, cooler than average temperatures, during the remainder of the season, could exacerbate an already difficult situation.

Table 1. Corn growing degree day (GDD) accumulations, their deviation from normal and normal accumulations for the remainder of the growing season and for November, Jamestown and Oakes, ND.

Location	GDD accum. (5/01 to 7/27)	Deviation from normal (GDDs)	Normal accum. (7/27 to 10/01)	Normal accum. (10/01 to 11/01)
Jamestown	1102	-221	978	102
Oakes	1229	-112	973	150

Table 2. Typical GDD accumulations needed for hybrids of three differing RMs to reach silking and physiological maturity (PM).

Hybrid RM	Planting to silking	Planting to PM
85	1100	2100
90	1150	2200
95	1200	2300

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plant pathology

SUGARBEET CROP PROGRESS REPORT 2008

The sugarbeet crop is progressing rapidly with the current warm conditions. The American Crystal Sugar Company is expecting a better than average sugar beet crop – an average crop is one that will yield 20 tons per acre with an 18% sugar content. In 2006 and 2007, growers at American Crystal had record yields. If the current conditions – warm, sunny, with timely rainfall – continue, growers should have another bumper crop since the crop is good to excellent in most areas. Growers at the Minn-Dak factory district got an early start, had snow in April, but warmed up in July resulting in good crop growth. Growers in the eastern part at Southern Minnesota Cooperative were delayed at planting because of wet conditions but overall, the sugarbeet crop is also looking good. Growers need a good sugarbeet crop to make a profit using high cost agricultural inputs.

There have been few reports of Aphanomyces and Rhizoctonia root rot in the Red River Valley. However, Rhizoctonia root rot was more widely observed in Southern Minnesota. More research will be needed to address this problem, and Rhizoctonia tolerant varieties will have to be used more widely in the Southern Minnesota Factory District. At the Moorhead Factory District, Fusarium yellows is starting to rear its ugly head. Fusarium yellows is emerging as a deadly disease with no chemical control currently available. Growers must use Fusarium yellows resistant varieties in fields with a history of the disease.

About 50% of the sugarbeet acreage at American Crystal and Minn-Dak Cooperative, and 15% of the acreage at Southern Minnesota were planted to Roundup Ready sugarbeet. Weed control in the Roundup Ready sugarbeet is excellent. Growers have done a good job at weed control in the conventional sugarbeet as well. In fields where there are some late emerging weeds because of poor canopy coverage, hand-pulling or the use of a 'stalk chopper' or a 'modified sickle-bar' will make harvesting much easier.

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NDSU IPM FIELD SCOUTS RESULTS - July 25

NDSU field scouts surveyed 54 wheat fields and 28 barley fields last week. The average growth stage of the wheat fields surveyed was early soft dough, and the average growth stage of barley fields surveyed was mid-dough.

In **wheat, leaf rust** was observed in 6 of the 54 fields, with severities averaging 6%. The positive fields were in the Southeast and Central districts. Fourteen of the 54 fields surveyed show symptoms of **scab** (Fusarium head blight). The average field severity in these fields was low, at 1.4%, and these fields were observed in the southeast, east-central and central districts.

Barley net blotch continues to be the most common disease observed in barley, in 50% of the fields, and primarily in the northeast and north central regions. Average severity in symptomatic fields was 7.7%. Three barley fields showed loose smut symptoms, with an average incidence of 10% tillers infected. No scab symptoms were reported in barley.

UPDATE FROM USDA CEREAL DISEASE LAB

The USDA Cereal Disease Lab reports that during the week ending July 25th, high levels of **stem rust** were found on the susceptible spring wheat cultivar Baart at experiment stations in WI and MN. This cultivar is used as a check cultivar to detect stem rust in a region, and is not grown as a commercial cultivar.

In ND, we do not grow susceptible spring wheats or durum wheats, but a few winter wheat cultivars and barley cultivars grown generally are susceptible to stem rust. We have not detected stem rust in any of our commercial wheat or barley fields surveyed, but we did detect stem rust in a susceptible winter wheat cultivar, Radiant, in plots near Lisbon, ND. A sample of that detection was sent to the USDA lab for race confirmation. Last year, a similar detection resulted in identification of a stem rust race common in the US. The following picture of stem rust was taken on a susceptible barley line in plots at Fargo last week.

Stem rust on barley; susceptible barley line at Fargo, July 21.

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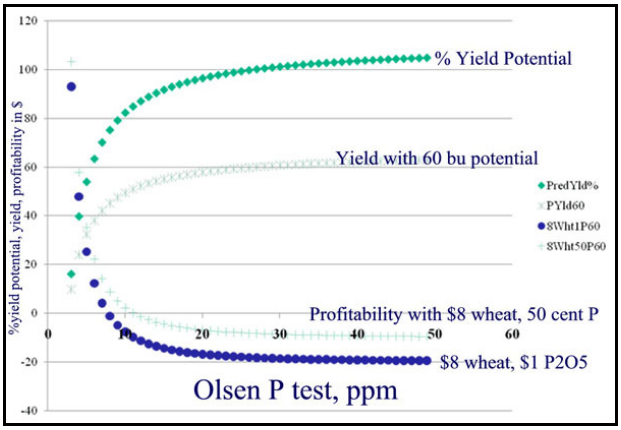
soils

PHOSPHATE - TO BUILD OR NOT TO BUILD

If Hamlet farmed today and the soil test recommended phosphate, no doubt he would ask that question. I took a break from my nitrogen calibration work last weekend to pour over reams of papers and data from NDSU, Canadian and corn-belt studies on various crops. NDSU work, along with that of the USDA in Culbertson, MT and Mandan, are quite extensive in wheat. Taking those calibration equations developed by Halvorson, Grant Jackson and Black, I inserted today's costs of phosphate of about $1/lb P2O5, and $8 wheat into them. The following graph illustrates that building P at this time is not a wise decision.



Unless the P test is less than 7 ppm, the economics do not support building P test levels even when wheat is $8/bu with P costs of $1/lb. If MAP costs drop to $600 (P cost about 50 cents/lb P2O5), then building low P tests to about 10 ppm makes "cents" again.

I also reviewed the ND and Canadian literature on broadcast vs banded P for wheat, and clearly there is at least a 2-1 advantage in efficiency, with banded having the distinct edge. If you request University recommendations from your lab *du jour* this fall, you will be presented with a recommendation for P based on broadcast rates. With P costs at current levels, my recommendation is to band, either with seed, or near seed, and reduce these rates by one-half.

For corn, there is also an efficiency to banding, but probably not one-half. The biggest mistake a grower may make is not requesting University recommendations. Differences between "industry" and "University" recommendations for corn can be huge, with little difference in resulting yield when using either one. Remember, we live in North Dakota, not the central corn-belt. Reducing these rates by one-third would be wise

with current cost/price structure. Banding for corn will require either a strip-till-style system of about 2 inches below the projected seed zone, or a 2X2 band planter set-up.

For soybeans, broadcast P with rates not cut appears profitable for $10 or higher soybeans and low P levels. Once P test hits about 10 ppm, there is no profitable response to P in soybeans.

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weeds

DON'T FERTILIZE YOUR WEEDS

The following was written by Dr. Chris Boerboom, Weed Scientist, U of WI.

Considering the cost of nitrogen, we can ill afford to allow weeds to use this expensive input. We conducted an experiment for the past 2 years that provided results that truly surprised us in regard to weeds and nitrogen. Basically, we confirmed that weeds are highly effective consumers of nitrogen. As a consequence, the potential exists for weeds to capture some of the nitrogen that the corn needs for optimum yields. We just didn't expect the effect to be so large. In term of competition, the biggest risk would seem to be when weeds are allowed to grow too large before being controlled postemergence. Therefore, our experiment was designed to determine how delayed weed control might affect optimum nitrogen rates in corn.

In the experiment, we applied increasing rates of nitrogen over the range of 0 to 200 lb/a. Within these increasing nitrogen rates, we controlled weeds either preemergence, at a recommended 4-inch height, at a 12-inch height, and a weedy check. Weeds were controlled postemergence with glyphosate in the Roundup Ready corn. The 12-inch height was used to mimic a time delay that might occur because of rainy or windy weather or other delays. The time difference between the 4-inch height and the 12-inch height was 8 days in both years.

A few key findings:

- When weeds were sprayed at 4 inches, they had accumulated an average of 12 lb/a N. However, by 8 days later, they had accumulated an average of 25 lb/a N when they were 12 inches tall.
- The nitrogen uptake by the weeds reduced the nitrogen that the corn was able to accumulate. Corn had 15 lb/a less nitrogen (or 18% less) at tasseling when weeds were controlled at 12-inches tall as compared to when weeds were controlled preemergence.
- Surprisingly, corn yields were similar when 200 lb/a N was applied, regardless of whether the weeds were controlled preemergence or when they were 12-inches tall. How could that be? Apparently, we replaced the nitrogen that the weeds robbed from the corn early in the season to regain this yield. (When the weeds were controlled preemergence, the corn had excess nitrogen that it did not use efficiently.) The economic optimum nitrogen rate was at least 100 lb/a lower when weeds were controlled preemergence or by 4-inches tall compared to when weeds were controlled at 12-inches (Table 1).

Table 1. Economic optimum nitrogen rates in corn with four weed management treatments at a 0.15 nitrogen:corn price ratio.

	Economic optimum nitrogen rate (lb N/a)	
	Weed management treatment	
	2006	2007
Weed-free (preemergence)	96	39
4-inch weed control timing	97	79
12-inch weed control timing	200	220
Weedy (nontreated)	200	193

- Corn yield loss averaged 15 bu/a or 7% in 2006 and 25 bu/a or 11% in 2007 when weeds were not controlled until they were 12-inches tall compared to the preemergence timing. This yield loss would not be acceptable at $2/bu corn and certainly would be outrageous at $5/bu corn. The bulk of this yield loss must have been caused by competition for nitrogen.

- At the end of the season, the best weed control (or fewest weeds) may not always provide the best corn yield. In 2006, the plots sprayed at the 12-inch timing had the fewest weeds at the end of the season, but not the highest yield. Remember, the goal of weed management is to protect crop yield.

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around the state

South-Central ND

Since July 15, the region received rain ranging from 0.4 inch at Pillsbury to 1.9 inches at Wishek, based on NDAWN (North Dakota Agricultural Weather Network). NDAWN daily water use estimate on July 28 for row crops ranged from about 0.1 to 0.25 inches. Timely rains will be needed to support yield potential of our row crops during the next 3-4 weeks.

Winter wheat and barley harvest is underway in the southern portion of this region. Corn is entering the reproductive stage of growth, with many early-planted or early-maturing hybrids in the tassel to silking stages. However, the crop continues be to behind in development compared to previous years. Corn planted on May 1 at Carrington was at about 1065 growing degree day (gdd) units, Linton at 1165 gdd units, and Oakes at 1275 gdd units as of July 28, with these sites at minus 100 to 140 gdd units compared to the 5-year average. Soybean are in the full-flower to pod-formation stages (R2-R4) of development. Most sunflower are in the pre-flower stages (R2-R3).

Leaf disease and scab incidence continues to be low and should have minimal impact on yield and quality of small grain. Soybean aphids generally can be found at low levels in the region, including as far west as McIntosh and Wells counties, as indicated by the Extension IPM field scouting program. Also, rust is present in the region's sunflower fields, so monitoring for economic levels of the disease, as well as head insects, is recommended during the next 3-4 weeks.

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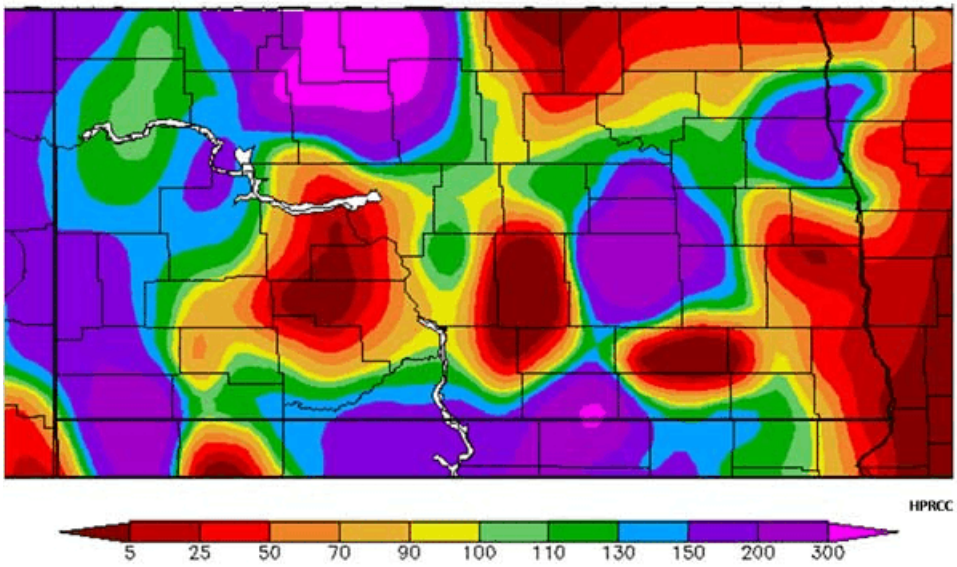
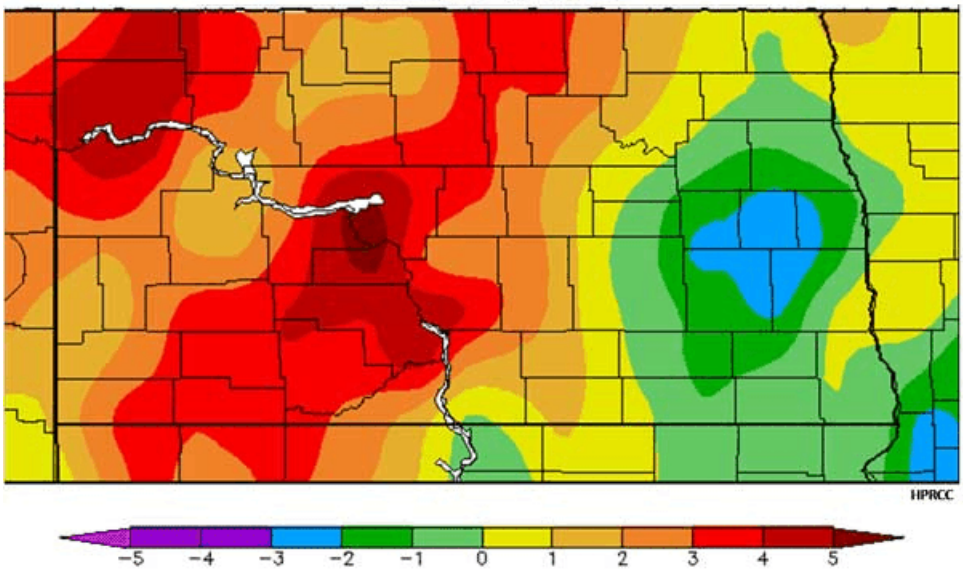
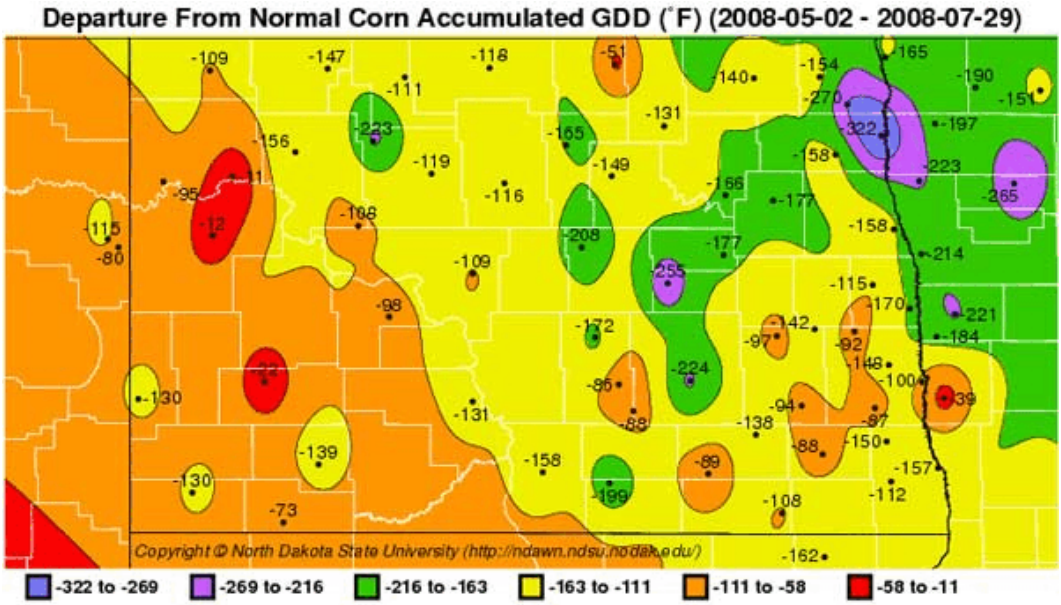
weather

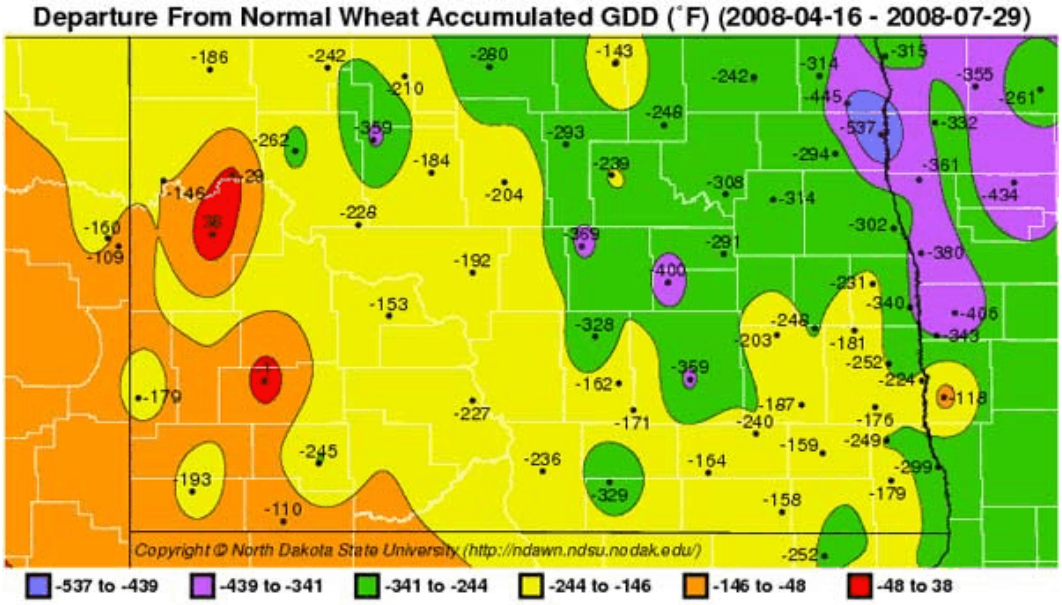
Last 7-Day Percent of Normal
Precipitation(%)
7/22/2008-7/28/2008



Last 7-Day Departure From Normal
Temperature(°F)
7/22/2008-7/28/2008







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