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NDSU Extension Service

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Inside this Issue...

Soybean Aphids Moving Field to Field and White Dwarfs Present 1
2008 Sunflower Survey 2
Insecticide Spray Timing for Control Sunflower Head Insects 2
Sub-Surface Drainage 3
Influence of Rain on Grain Ready to Harvest 4
Planting Winter Wheat in 2008 4
Rust on Dry Beans Appearinig in ND 4
Crop Rotation Following Valor Applied as a Desiccant 5
Weeds Diminish Light Quality to Crop 5
Hornets, Yellowjackets Causing Problems for Picnics! . 6
Irrigated Vegetable Tour 7
Weather & Climate 7

Note to subscribers:
This is the final scheduled issue of the Crop and Pest Report for 2007. A follow-up issue will be published sometime in mid-September.

entomology

SOYBEAN APHIDS MOVING FIELD TO FIELD AND WHITE DWARFS PRESENT

This past week there has been some calls about soybean aphid populations increasing and 'white dwarf' aphids in maturing R4 (full pod) to R5 (beginning seed) soybeans. In mid to late August, soybean aphids typically move around from field to field as soybeans mature. It's easy to find little white aphids called 'White Dwarfs'.

'White dwarf' soybean aphid

These are not baby aphids or diseased aphids. Many species of aphids do this in response to change, like hot temperatures, higher humidity, shorter day length, or change in plant nutritional quality. Be sure not to confuse them with the caste skins of aphids (see photograph) as they molt to the next growth stage.

Caste skin of soybean aphid.
Source: J. Gavloski, Manitoba Agriculture.

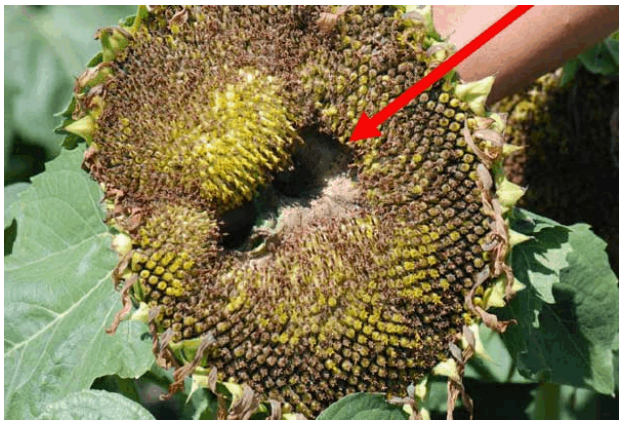
These are living, feeding and reproducing soybean aphids and should be included in your total plant population counts when assessing economic levels of soybean aphids. Research from University of Minnesota indicates that white dwarf aphids (those typically on lower leaves) live half as long and their lifetime fecundity is reduced 70% compared to the 'mountain dew' colored soybean aphids (source: D. Ragsdale). Thus if the population is only comprised of white dwarf aphids, the economic injury level (population of aphids that cause a yield loss) would probably not be reached in 7 days. An economic threshold (population of aphids that triggers an insecticide) has not been established for plants with primarily white dwarfs, however, it is obviously higher than 250 aphids per plant.

The other thing to keep in mind is that we are now past the critical day length (mid-August) and once soybean aphid experiences temperatures below 45F, the next generation will be sexual. Winged gynoparae will fly to buckthorn and leave soybean fields.

Remember, to continue scouting soybean fields for aphids until R6 or full seed! No insecticide sprays are recommended in R6 or later R7 (beginning maturity) as there is little or no economic return from treating.

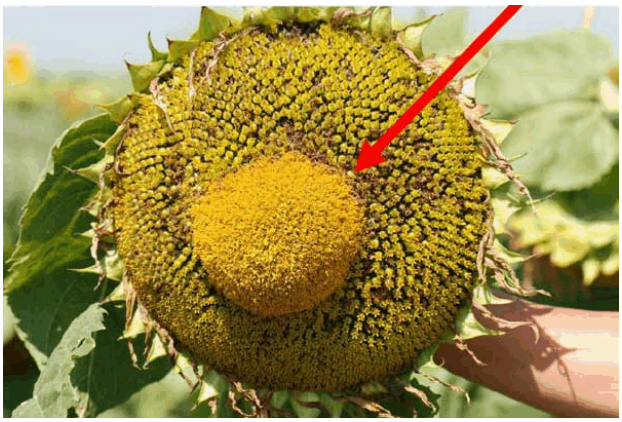
2008 SUNFLOWER SURVEY

The National Sunflower Association is conducting and sponsoring the 2008 sunflower survey for this cropping season again. This survey assess the major pest problems including insect pests, birds, diseases, weeds and agronomic problems in sunflowers grown in the Great Plains (ND, SD, MN, KS, CO, Manitoba). Two new insect pests will be surveyed - sunflower bud moth *(Suleima helianthana* (Riley)), and sunflower head maggot (*Neotephritis finalis* (Loew)). Many sunflower producers, seed companies, crop consultants, ... are concerned that these two insect pests are becoming more common and economically important causing an unknown yield loss. Larvae of both insects tunnel in the heads causing distorted heads (see photographs). Surveyors will be measuring the percent of plants that have distorted heads (or tunneling in the heads). In the past, entomologists claimed that injury caused by these insects are not economical; however, the recent increase in the percentage of head injured has many concerned. As a result, this survey data will help assess the impact of these insect pests in sunflower.

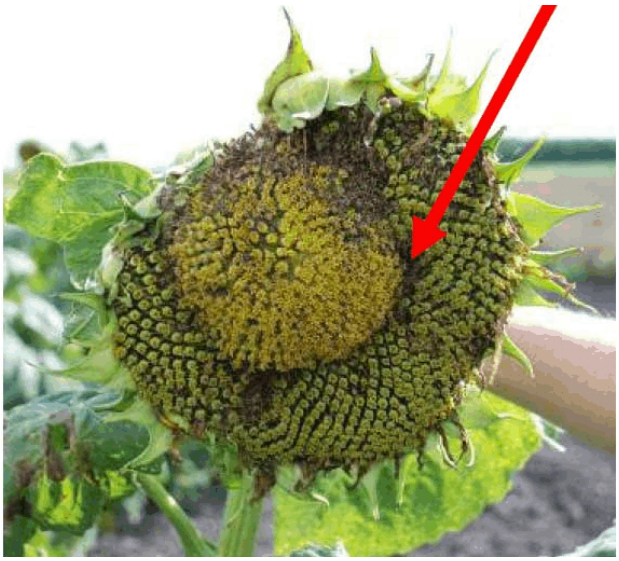


Sunflower bud moth damage

Sunflower bud moth damage



Sunflower head maggot damage



Sunflower head maggot damage

INSECTICIDE SPRAY TIMING FOR CONTROL SUNFLOWER HEAD INSECTS

Field reports indicate that populations of banded sunflower moth and red sunflower seed weevil are finally starting to decline. There has been some confusion with the timing of insecticides for these two insect pests. Insecticide spraying is targeted at the **adult** red sunflower seed weevil to prevent egg laying and at the **early instar larvae** of banded sunflower moth (after egg hatch).

The best time to treat is when more than half of the plants in a field are beginning to show yellow ray petals (R5.1) 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 (R4). Although insecticides applied to sunflower at the bud stage will kill seed 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. If spraying is done too early, weevils can re-infest a field requiring a second treatment.

At R5.1, the young larvae of banded sunflower moth are typically 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 for banded sunflower moth. Banded sunflower moth and red sunflower seed weevil can both be controlled with a well-timed spray, usually near 10% of the head shedding pollen or R5.1 in oilseed sunflowers. Confection sunflowers usually require two insecticide applications to control sunflower head insects: one near R5.1 and another one week later due to the industry standards for very low insect damage. Sunflower fields should always be scouted for both insect pests through R5.7.

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plant science

SUB-SURFACE DRAINAGE

Although the 2008 growing season has been generally dry in the western part of ND, there was excess rainfall in the Red River Valley in June and notably large amounts of rain in the second week of August. Saturated conditions early in the season usually have a negative impact on crop production. Now at the end of the season, excess moisture can set back the harvest of cool season crops. Delayed harvesting may result in reduced crop quality. Although many agricultural producers have developed field ditch systems to remove the surface water quickly, managing excess moisture in the soil profile is still a relatively new farm management practice.

Tile drainage installation (sub-surface drainage) has increased in North Dakota in the last decade. The recent adoption of this technology in the region is mainly due to increased rainfall since 1993, and prompted by higher land values, better crop prices, and high input costs. In many years producers have been unable to plant crops in a timely fashion, in the spring, due to the wet conditions. Delayed planting of cool season crops reduces the yield potential. Tile drainage allows soils to warm-up and dry out faster in the spring. Spring field operations on tiled fields will most likely be possible at an earlier date than fields without tile drainage.

Increased rainfall also has caused salinity to become a problem due to rising water tables. Tile drainage can potentially control and reduce salinity in wet soils. Salt is removed when water moves through the soil profile. This process of land reclamation may take a few years and depends on the amount of rainfall and leeching of the salts out of the soil profile via the tile. Some impacts of tile drainage with respect to water quality are positive and some negative. In general, phosphorus and soil particle losses from tile drained fields decrease, while losses of nitrate-nitrogen and other dissolved constituents (salts) increase.

In the Red River Valley many of the fields do not have much fall. Level fields can be drained as long as minimum grades of 0.05 to 0.1% are maintained for tile laterals. A tile at 0.1% grade has 1 foot of fall per thousand feet of tile. A typical tile drainage system provides an outlet where water can drain freely (by gravity) into a surface ditch. Where topography does not allow for a gravity outlet, pumped outlets are used, provided a surface waterway exists to discharge the drainage water. A pumped outlet or "lift station" provides the lift required to get the drainage water from the elevation of the tile, to the ground surface and into the receiving waterway. Pumps add to the initial investment and there is a cost to operate and maintain the lift station.

The greatest benefits of tile drainage are realized in wet years, but because drainage promotes deep root development, crops will have better access to soil moisture in dry years. During extremely dry years it is conceivable that a tile-drained field might have less available water at some point during the growing season than an undrained field. In general, where poorly drained soils exist, crop yields will be more uniform from year to year with tile drainage. The newest technology incorporates a control structure in the tile line which provides the opportunity to manage the water table in the field and therefore even further reduce the production risk. With a control structure there is the opportunity to let some water out in the spring to provide the ideal planting conditions. During the summer the control structure could be set to retain water for crop production or let water flow out of the tile in case of excess moisture conditions.

A research field has just been established on one of the NDSU research farms (NW 22) to collect data on the crop response to tile drainage of major ND agricultural crops.

Tile plough installing tile on a NDSU research site.

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INFLUENCE OF RAIN ON GRAIN READY TO HARVEST

In parts of the state we recently had significant rainfall on mature grain that was nearly ready to harvest, some of it was even laying in the swathe. A frequently asked question this past week was how will this rain impact test weight? Test weight is a measure of density or the weight of grain in a given volume. Test weight, therefore, measures the weight of the kernel and how well the kernels "pack" into a standard cup when filled using a standard process. The weight of the kernel will not be affected by rainfall unless, of course, it remains wet enough for germination to begin. Wetting can effect how well the kernel packs. A dry kernel that imbibes water will swell. When the kernel dries down, it will have a slightly different shape (it begins to wrinkle) than before it imbibed water. This altered shape will not pack as well as the original, sound kernel, so test weight tends to decline after a wetting event. The good news is that a single wetting event usually has a limited impact on test weight. However, if grain is subject to repeated cycles of wetting and drying then test weight can decline dramatically. Research conducted with soft wheat in the eastern US found that test weight declined about 1.2 lbs/bu for every wetting and drying cycle. For more on this study follow this link:

http://www.ext.vt.edu/news/periodicals/cses/2006-06/wheattestweight.html.

Perhaps of greater concern is the impact on the grain of prolonged wetting on pre-harvest sprouting and falling numbers. Sprouting can render the grain unusable in the milling and brewing (in the case of barley) industry and as a seed source. Most hard red spring wheat varieties are dormant for a period after maturing and resist pre-harvest sprouting (PHS), even when appropriate environmental conditions exist. White wheat tends to be very susceptible to pre-harvest sprouting. There are, however, differences in varietal response in pre-harvest sprouting within the red wheat class. The University of Minnesota regularly screens new varieties for their propensity for pre-harvest sprouting. This information can be found at:
http://www.maes.umn.edu/08varietaltrials/redspringwheat.pdf.

If no visible sprouting is observed in the harvested grain that has been wetted before harvest, I would recommend that you still conduct a falling numbers test on grain intended for use as seed. Low falling numbers indicate that the seed lot had begun the germination process. Seed lots will low falling numbers, even though they may have good germination, have been found to have low seedling vigor and should be avoided as a seed source.

PLANTING WINTER WHEAT IN 2008

In the parts of the state that were not ravaged by drought, winter wheat yields were good again this season. If you are planning on planting winter wheat this fall, the following are a few suggestions:

- Planting date: The optimum planting date for the northern half of the state is September 1-15 and for the southern half September 15-30. The last date that winter wheat can be planted will depend on the weather. The seed must germinate in the fall so that the crop will be vernalized in the spring. A larger plant will over winter better than a seedling or a sprouted seed.
- Planting depth: Adequate moisture for establishing winter wheat is often a concern as the soil profile is usually depleted of moisture in the fall. If there is little or no moisture in the soils surface, planting shallow (1 to 1.5 inches deep) and waiting for rain is recommended.
- Seeding rates: Generally a seeding rate of 900,000 to 1 million viable seed per acre is adequate. Higher seeding rates may be appropriate if planting late or when planting into poor seedbeds.
- Plant in to crop residue: The best winter survival is achieved when winter wheat is no-till planted into standing crop residues that are able to catch and retain snow. Planting winter wheat into a low residue crop such as soybean increases the risk of winter kill, so only the most winter hardy varieties should be grown (see data on winter survival in 2005/06 in the following table and at www.ag.ndsu.nodak.edu/aginfo/smgrains/WWsurvial.htm.
- Variety selection: In addition to agronomic characteristics such as plant height, yield, and disease and lodging resistance, also carefully consider the winter hardiness of a variety. In many years there is a direct correlation between winter survival and yield. Yield data from the 2008 season are being posted on the Small Grains Page http://www.ag.ndsu.edu/smgrains/. Data from previous years' trials are available at http://www.ag.ndsu.edu/variety/index.htm. . Sources of certified winter wheat seed are ND State Seed Department or at the Small Grains Page.

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plant pathology

RUST ON DRY BEANS APPEARINIG IN ND

The appearance of rust on dry beans has been sporadic this year, but is severe in localized areas in the state. Rust can cause yield loss when severe.

Rust can be identified by small (about 1/8 inch) reddish-brown pustules on leaves. Reddish-brown spores (urediniospores) are produced in the pustules, which can easily be rubbed off with your finger. The ability to rub off spores distinguishes rust from other diseases such as bacterial blights.

Rust can progress quickly in fields when temperatures and moderate, and when heavy dews occur in the mornings. As the season progresses, the rusty-colored spores in the pustules will be replaced by black spores (teliospores), which are hard to rub off. Once the color change of the spores is apparent, disease progression will grind to a halt.

Fungicides can be used to manage rust, and several fungicides are available for rust control, including Folicur, which just received a Section 3 – Full registration for management of rust on beans. The supplemental label is available at http://www.cdms.net/LDat/ld6AK031.pdf. The supplemental label must be in your possession if a fungicide application is made. Other fungicides can be found in the 2008 ND Field Crop Fungicide Guide (PP-622) available at http://www.ag.ndsu.nodak.edu/extplantpath/

If fungicide application is something you're considering, it is vital to keep a couple things in mind. First, be certain your beans are infected with rust, and not something else. We are observing lots of bacteria diseases throughout the state, which cannot be controlled with fungicides. For more information about bacterial disease, including symptomatic pictures, please refer to my article in the last issue of the crop and pest report at http://www.ag.ndsu.nodak.edu/aginfo/entomology/ndsucpr. Secondly, as the season progresses, the likelihood that new rust infections will cause yield loss decreases. As the weather turns cooler rust will develop more slowly and eventually cease when teliospores are produced. Additionally, as beans mature, rust is less detrimental to yield, and thus, fungicides are not economic.

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Weeds

CROP ROTATION FOLLOWING VALOR APPLIED AS A DESICCANT

Valor has received full federal registration for use a desiccant in dry edible beans. Information on application is contained in the label and on page 29 in the ND Weed Control Guide. Valor has performed equal or better than other registered dry bean desiccants. Like other desiccants, Valor requires maximum sunlight and temperatures for maximum activity. Valor is not a panacea for dry bean desiccation and growers should not expect Valor to desiccate dry beans as well under cloudy and cool weather. Valor has provided greater desiccation in these less than optimum conditions than the other products.

Apply Valor at 1.5 to 2 fl oz with an MSO adjuvant. Adjuvants containing MSO provides the greatest enhancement of Valor. If an applicator chooses a petroleum oil adjuvant (COC) instead of an MSO then performance will decrease. Valor will desiccate dry beans but will not desiccate weeds. Valor can be applied with gramoxone for weed desiccation. MSO adjuvant will enhance both Valor and gramoxone.

Earlier this year a grower asked me a question, "What will be the crop rotation restrictions for Valor applied as a dry bean desiccant as compared to a preemergence application applied in the spring?" This is important in that growers want to have flexibility in choosing which crop to plant the next year. Supplemental Labeling shows that any crop can be planted the following season (>4 calendar months) after Valor applied as a PRE after crop planting or as a desiccant at 2 oz/A or less.

Valent, through research conducted in ND, has found some response from canola in no-till conditions. Valent may increase the restriction for canola on the next label submission. They found no canola response in conventional tillage systems.

WEEDS DIMINISH LIGHT QUALITY TO CROP

It is commonly taught that weeds reduce crop yield by capturing light, moisture, nutrients, and space. Dr. Clarence Swanton, University of Guelph, Ontario has found another way weeds compete with crops - light quality. He found that the quality of light detected by a crop as it emerges and grows during the first few weeks may be a yield-limiting factor. Swanton has studied how crop plants react to having other green plants nearby as they emerge and grow by measuring crop plant reactions to different ratios of red and far red light reaching the plant. The far-red light is the reflected red light and not the optimum light that comes directly from the sun. The larger the red/far red ration the better for crop plants to develop.

Weeds that are near crop plants reflect far red light to crop plants which has a negative affect on growth. Swanson has observed at least three things from this reflected light. One - there is a delay in the rate leaves develop. Two - the total above ground weight of crop plants is less. Three - the total biomass of roots are less. With hours after crop plants emerges, they sense their external environment by sensing light quality.

This and other research confirms the most critical period for weed control in corn, is from the 3-leaf to 8-leaf stage. Weeds that emerge after that period do not compete for yield but may add to harvest problems and to the weed seed bank.

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horticulture

HORNETS, YELLOWJACKETS CAUSING PROBLEMS FOR PICNICS!

The hot dry summer has been good for many insects including hornets and yellowjackets. The heat has been pushing insect development resulting in larger numbers of hornets and yellowjackets this year. Hornets and yellowjackets belong to the family Vespidae which includes hornets, yellowjackets, and paper wasps. Hornets are wasps that build nests, but are considered yellowjackets by entomologists. All yellowjackets sting and their stinging behavior is considered a defensive reaction when the colony is threatened. They can sting more than once because their stinger stays with the wasp. Yellowjackets are more aggressive during August into September and more likely to sting people. Although yellowjackets are actually a beneficial insect feeding on other insects, they often become a pest problem when nests are located near homes, schools, picnic areas, or playgrounds. Pest control is often warranted.

Biology: These wasp are social insects and build nests of paper-like material. Nests generally resemble a teardrop-shaped soccer ball and often seen hanging in trees. Sometimes nests are located underground in mammal burrows, cavities or inbetween house siding. In the northern temperate climates, only the mated queen wasp overwinters from the previous year's colony. Queens are inactive during the winter, hiding in protected places like under tree barks, attics, ... In early spring, the overwintering queen builds a new nest and lays an egg in each cell. Larvae hatch from the eggs and are dependent on the queen for food. The queen forages outside the nest and brings food (caterpillars and other insects) back to the larvae until pupation. Sterile female workers emerge from pupae and take over nest building and brood rearing, while the queen stays in the nest. During late summer into early fall, adult males and newly produced queens leave their parent colony. The colony dies off, and only newly mated queens will find a protected place to overwinter.

Control: Vespid wasps are active outside the nest during the daylight hours. Nearly the entire colony is in the nest during the evening and night-time hours, so control measures should be applied to the nest then. There are many insecticide labeled for control of hornets and yellowjackets. The difficulty is making the treatment without being stung. Usually an aerosol spray of one of the many fast-acting wasp killer aerosol will quickly kill all workers present in nest. Examples are permethrin, synergized pyrethrins or pyrethroid insecticides. A slower-acting insecticidal approach is to apply a dust of carbaryl (Sevin) directly onto the exposed nest and entrance hole. After treatment, check the nest for any activity the following day and re-treat if necessary. Nests should be removed to avoid attracting dermestid beetle infestations at some later time and to keep wasp pupae from possibly reestablishing the nest. If dealing with yellowjacket nests in structures like homes, the nest entrance should never be plugged from the outside. If constrained yellowjacket workers cannot escape to the outside, they may locate a way to escape toward the inside of the home or structure, creating a possible stinging threat for people inside. Yellowjacket nests become an important source of carpet and other dermestid beetle infestations in the home, so the nest should be removed whenever possible. When outside enjoying your picnic, avoid wearing bright colors and perfumes which are attractive to hornets and yellowjackets.

Yellowjacket - *Vespula spp.* *(Source: Susan Ellis, Bugwood.org)*

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IRRIGATED VEGETABLE TOUR

Commercial vegetable production and the Devils Lake Irrigation Test Project will be featured on a Cando area tour scheduled for Wed., Sept. 3.

Cabbage and other vegetable crops as well as processing facilities will be viewed on the farms of Mike Johnston and Mike Parker, both Devils Lake Irrigation Project participants. Weed control in vegetable crops will be discussed by NDSU Researcher Dr. Harlene Hatterman-Valenti. Dr. David Hopkins, NDSU Project Co-Leader for the Devils Lake Irrigation Project will provide an overview and update on the project. Mike Liane, NDSU Irrigation Agent will discuss irrigation development in ND and will demonstrate drip irrigation.

An overview of ND vegetable production and marketing will be provided by Rudy Radke, NDSU High Value Crops Specialist. Holly Mawy, Director of the Entrepreneurial Center for Horticulture in Bottineau will discuss activities at the center as well as the North Dakota Farmers Market Association.

The tour will begin at 11am at the Mike Johnston farm. From the intersection of highways 281 and 17 go one mile east on 17, then ¾ mile south.

Lunch will be sponsored by Ken Storm of KT Irrigation.

The tour will conclude at approximately 3pm. There is no registration fee and the public is welcome to attend.

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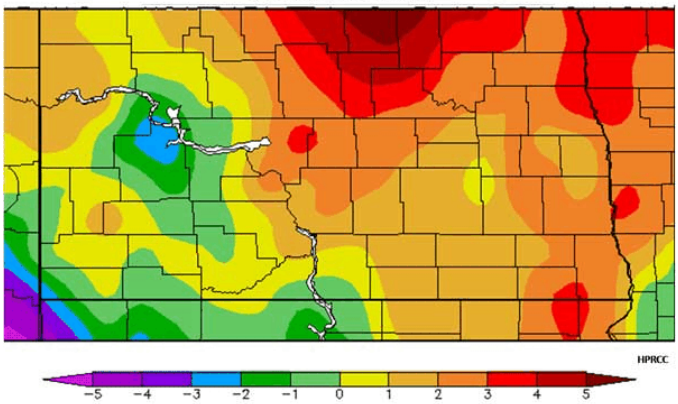
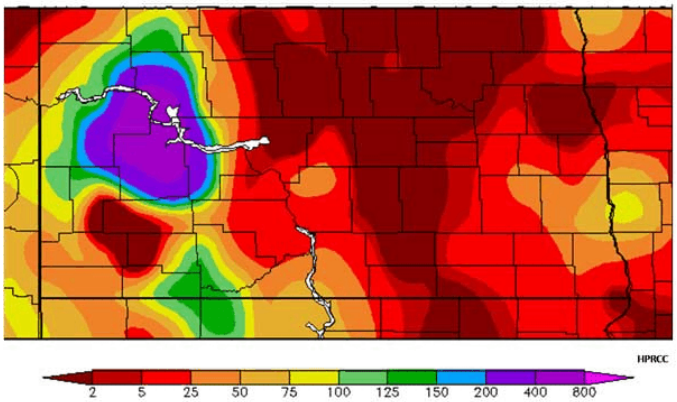
weather

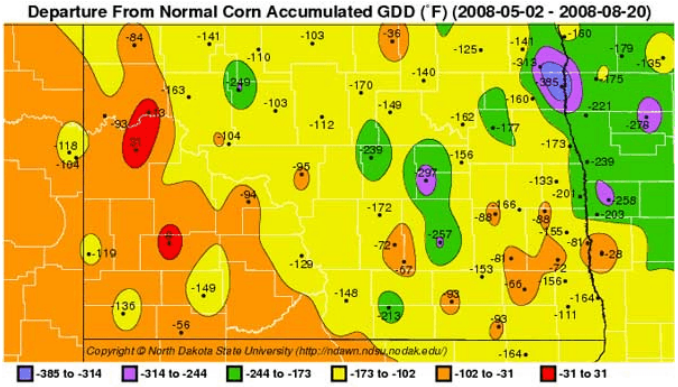
Last 7-Day Departure From Normal Temperature(°F)
8/13/2008-8/19/2008



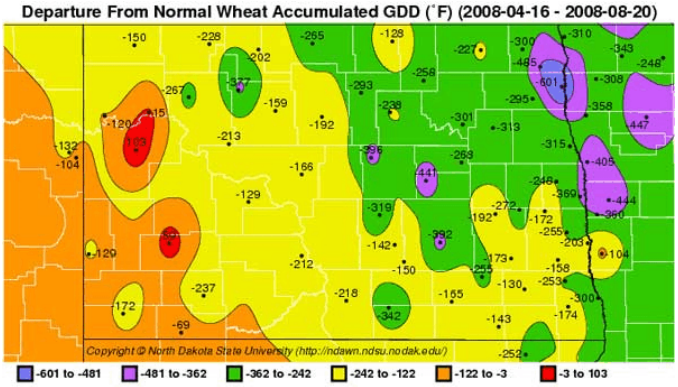
Last 7-Day Percent of Normal Precipitation(%)
8/13/2008-8/19/2008



Departure From Normal Corn Accumulated GDD (˚F) (2008-05-02 - 2008-08-20)



Departure From Normal Wheat Accumulated GDD (˚F) (2008-04-16 - 2008-08-20)



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