2005

# *Crop Watch* No. 2005-11, May 20, 2005

Lisa Brown Jasa
*University of Nebraska-Lincoln*, ljasa@unlnotes.unl.edu

# CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

University of Nebraska Lincoln

No. 2005-11, May 20, 2005


*With flooded fields and crusted soils*

# Determining when replanting is feasible

Torrential rainfall inundated fields and hail hammered corn seedlings, soil and property as thunderstorms rolled through south central Nebraska May 11. Stream banks weren't sufficient to contain the rising waters and many fields flooded. Even where crops were not flooded, the persistent hammering of rain and hail most likely caused thick soil crusts. How long can corn and soybean tolerate flooding? Also, prior to the storm, plants in some corn fields were emerging erratically. How do we decide whether replanting corn or soybean is beneficial? This issue of *CropWatch* includes several stories related to replanting decisions, including corn assessment, soybean assessment, insect considerations, potential nitrogen fertilizer losses, and extended weed control needs.

## Corn replant guidelines

**1. Determine the remaining plant population.** Calculate the plant population in several "random" areas in the affected part of the field to help estimate the potential yield. (This is assuming that everything else goes right during the remaining growing season.) Random does not mean that you go to the worst area and start counting, ignoring the better parts of the affected area. The idea is to characterize the field as well as you can. (For tips, see the NebGuide, *Guidelines for Soil Sampling*, G91-1000.

To estimate surviving plant stands, you will want to count plants in at least three places in the affected field. Count plants in at least 1/100 of an acre. Use *Table 1* to determine the length of row necessary to achieve 1/100 of an acre. (You also could sample 10 areas within a field, each representing 1/1000 of an acre.) The total linear feet of row necessary to end up with 1/100 of an acre for different row widths is shown in *Table 1*.

### Inside



*(Continued on page 103)*

## Soybean replant guidelines

Some soybeans were just starting to emerge last week when severe storms rolled through. The resulting floods and soil crusting may necessitate replanting in some areas. Crusted soils can reduce the total population of soybean due to reduced emergence and plant viability. The following guideline can help determine whether replanting is economical in your situation. Remember too that once soybeans emerge they often can compensate for these situations by branching out.

**1. Determine the remaining plant population.** At first sight, surviving soybean plant populations can be deceptive. Plants can appear extremely sparse; especially in narrow rows, and it will be helpful to develop a more objective plant count and assessment. Four to seven days after the storm calculate the total number of plants by selecting random areas within a field. The number of areas sampled will ultimately depend on stand uniformity. If you have pockets within your field that are better or worse than others, increase the sample. Although it is easy to go to the worst areas of the field and focus on "how bad" they are, don't ignore the better areas. (For sampling tips, see the NebGuide, *Guidelines for Soil Sampling*, G91-1000.)

When assessing your soybean crop, first determine seedling health. The loss of leaf tissue is not as important as damage to or loss of stem buds. Soybean must have

*(Continued on page 104)*

# Ag briefs

**Paul Hay, Extension Educator in Gage County:** We do have frost damage from light to moderate levels in a portion (20%) of our wheat fields dating to the frosts in early May. The damage is going to lower yields.

**Ron Seymour, Extension Educator in Adams County:** Much of the county received some storm damage last week. The western part received significant rainfall — in excess of 10 inches in the Kenesaw area. Other areas receive 2-5 inches. Many fields were under water for about two days. A band of hail damage about 1 mile wide occurred from 5 miles south of Hastings to about 10 miles north of town. Corn was in the 1- to 2-leaf stage and should recover. Wheat is in the boot stage and alfalfa is near first cutting. Hailed wheat, alfalfa and pasture are severely damaged.

**Andy Christiansen, Extension Educator in Hamilton County:** A few thousand acres were under water for a day or two, causing some silting and deep blankets of corn stalks at lower field ends.

**Douglas Anderson, Extension Educator in Nuckolls and Thayer counties:** We had small amounts of hail and wind in Nuckolls County. The corn is coming up good and bean planting is underway. Alfalfa and wheat are rebounding from the frosts.

**Randy Pryor, Extension Educator in Saline County:** Some low lying corn fields have been under water for three days. Frost and previous hail damage to alfalfa has prompted questions about first cuttings.

# Nebraska resources offer latest on soybean rust

So far this season soybean rust has not spread as quickly as many had predicted. The disease has been confirmed in one county in southwest Georgia and three counties in Florida. Surveys are ongoing throughout the southern states to search for soybean rust in native kudzu stands and soybean fields. Sentinel plots have been planted in most states, including plots in Nebraska. These sites will be scouted frequently for soybean rust.

Staying aware of where soybean rust is throughout the growing season will be critical to managing the disease. Two University of Nebraska resources will provide real-time information. The Soybean Rust Web site (***soybeanrust.unl.edu***) is a focused site with links to pertinent Web sites for managing soybean rust in Nebraska.

Another resource is a toll-free Soybean Rust Hotline with recorded updates specific to Nebraska, including soybean rust locations and conditions and management changes throughout the growing season. The hotline number is (877) NebRust or **(877) 632-7878**. This hotline is funded by the Nebraska Soybean Board.

UNL Cooperative Extension also has several publications related to identification and control of soybean rust. To order copies, contact your local Cooperative Extension Office or the IANR Publications Distribution Center, Box 830918, University of Nebraska, Lincoln, NE 68583-0918, as indicated below. Publications include:

- *Using Foliar Fungicides to Manage Soybean Rust* (SR-2005) is a national, full-color 56-page book covering all aspects of using fungicides for soybean rust management. (It also includes a section on identification.) Cost is $2.00.
- *Soybean Rust: How Great is the Threat for Nebraska?* (NF05-633) covers symptoms, life cycle, host range and potential impact of the disease on Nebraska soybean production. It is available from county offices or online at *http://ianrpubs.unl.edu/plantdisease/nf633.htm.*
- *Fungicides to Manage Soybean Rust: What are the Product Differences?* (NF05-634) covers soybean rust fungicides available in Nebraska. It is available from county offices or online at *http://ianrpubs.unl.edu/plantdisease/nf634.htm.*

**Loren J. Giesler**
**Extension Plant Pathologist**

CROP WATCH
*cropwatch.unl.edu*


***Crop Watch*** is published from March to November by Cooperative Extension and Communications and Information Technology in the University of Nebraska Institute of Agriculture and Natural Resources, PO Box 830918, 108 Agricultural Communications Bldg., UNL, Lincoln, NE 68583-0918. To order a print subcription or to change your address, write to ***Crop Watch*** at the above address or call (402) 472-7981. The newsletter also is available on the Web at **cropwatch.unl.edu**



Lisa Jasa, Editor; Email: ljasa1@unl.edu

## Replanting corn *(Continued from page 101)*

Now determine if the standing plants will survive or whether there are "skips" that need to be accounted for. Were skips the result of seed that hadn't emerged yet but will, or were they due to damage from insects, disease, frost, hail, etc? Considering the recent cool weather, it's possible that the seed just hasn't emerged yet. If this is the case, will they be able to break through the crust? If flooding is the cause, how long were plants flooded?

**2. Consider plant stand uniformity (if you expect uneven emergence).**

- If uneven emergence is row to row, that is, most rows are emerged but some are not, replanting will probably not increase yield.
- If the delay in emergence is less than two weeks between the early and late emerging plants, replanting may increase yields, but by only 5% or less. Replanting would probably not be economical.
- If one-half or more of the plants in the stand emerge three weeks later than the initial plant emergence, replanting may increase yields by about 10%. If this is the situation, go to *No. 5.*
- If the seed (or plant) is missing due to insects, frost, hail, crusted soil, drowned plants, etc. and the seed is not viable and will not emerge (or survive), go to *No. 3.*

**3. Calculate expected yield from the remaining original stand.** The original planting date plus the remaining plant population are used to estimate the yield potential of the field as it stands. *Table 2* summarizes planting date and plant population relationships. Use this table to estimate expected yield from the original stand using long-term yield averages from the same field. For example, if the original planting date was April 30, a population of 30,000 seeds/acre is expected to provide maximum yield, based on *Table 2*. If the population is only 20,000 plants/acre because of poor emergence or storm damage, yield potential is still 81% of maximum. If the long-term yield of this field were 200 bushels/acre, the estimated yield would be 162 bushels/acre. If several 4- to 6-foot gaps occur within the row, yields will be reduced an additional 5% relative to a uniform stand. Likewise, stand gaps of 16 to 33 inches will penalize yields by 2%.

**4. Estimate replant yield.** Expected planting date and target plant population are used to estimate the yield potential of the replanted field. Use *Table 2* for this too. Replanting this week on May 19 at 30,000 seeds/acre would result in about 99% of maximum yield. Compare the replanted crop to the original crop which was planted on April 30 at 30,000 seeds/acre and after the storm had 20,000 plants/acre (as in the example in No. 3) and consider the costs of replanting. Expected yields are 81% for retaining the old stand versus 99% of maximum for a

*(Continued on page 104)*

**Table 1. Total linear feet of row required to make 1/100 and 1/1000 of an acre at different row widths.**

| Row spacing (inches) | Row length for 1/100 acre (linear feet) | Row length for 1/1000 acre (linear feet) |
|---|---|---|
| 7.5 | 696 | 69.6 |
| 10 | 523 | 52.3 |
| 15 | 348 | 34.8 |
| 20 | 261 | 26.1 |
| 22 | 238 | 23.8 |
| 28 | 187 | 18.7 |
| 30 | 174 | 17.4 |
| 32 | 163 | 16.3 |
| 34 | 154 | 15.4 |
| 36 | 145 | 14.5 |
| 38 | 138 | 13.8 |

**Table 2. Influence of planting date and plant population on corn grain yields.**

| Planting Date | 4/20–5/5 | 5/13–5/19 | 5/26–6/1 | 6/10–6/16 | 6/24–6/28 |
|---|---|---|---|---|---|
| Final Stand* | Relative yield potential (percent) | | | | |
| 28,000–32,000 | 100 | 99 | 90 | 68 | 52 |
| 24,000 | 94 | 93 | 85 | 64 | 49 |
| 20,000 | 81 | 80 | 73 | 55 | 42 |
| 16,000 | 74 | 73 | 67 | 50 | 38 |
| 12,000 | 68 | 67 | 61 | 46 | 35 |

* Assumes a uniform plant spacing.
From: Iowa State University Extension. 2001. *Corn Planting Guide: Table 7.*

## Replanting with Bt corn

Since replanted corn fields will emerge up to three to four weeks later than neighboring fields which weren't replanted, they will flower later. Second-generation corn borer moths will be more attracted to later-planted fields than other fields, so consider using Bt corn borer resistant hybrids when replanting. Be sure to follow guidelines to maintain 20% or more of the acres in non-Bt corn borer resistant hybrids on your farm.

**Bob Wright**
**Extension Entomologist**

## Replanting soybean *(Continued from page 101)*

viable buds remaining on the stem to survive. They should show signs of growth within four to seven days after the storm. When counting viable soybean plants, count any plant that appears to have intact or expanding buds or leaves. Sample an area at least 1/1000 of an acre; see *Table 1* for the proper row lengths for a given row width. It is best to sample 5-10 areas within the field. An easy method is to pick a number of rows, 30 for example, and walk diagonally across your field, stopping every 30 rows and counting the number of plants in the given row width (*Table 1*).

Record your values from the 5-10 areas sampled and calculate the average number of plants. Next take this average and divide it by the row length you used, to determine the number of plants you have per foot of row. If you have drilled soybean, use a population hoop to estimate the number of plants per acre.

**2. Consider plant emergence uniformity.** The soybean stand will likely be fairly uniform unless you have low spots in the field or areas that washed more than others from the recent rains. If you have large areas within the field that have much lower plant counts than other areas, you may want to consider replanting only those areas. Doing this, however, may increase the likelihood of damaging other areas of the field from equipment traffic, etc. and may not be worth the extra effort. Gaps between soybean plants likely will be filled in as the plant compensates throughout the season for the extra space by branching out. If there are numerous gaps larger than 2 feet in diameter, take these into account since the plant can't fill in these larger spaces.

**3. Calculate expected yield from the remaining original stand.** If your stands are fairly uniform (no large gaps in certain areas of the field), take your average number of plants per foot of row and look at *Table 3* to determine your existing plant population. Research studies from across the Midwest have found that yield potential decreases from 2 to 6% for every 10% reduction in stands below 150 000 plants per acre for stand reduction 2 to 4 weeks after planting. Most soybeans were not that far along last week so these estimated losses are extreme.

At the South Central Agricultural Laboratory (SCAL) near Clay Center, we have studied the effect of stand reductions in soybean at various growth stages during 2003 and 2004. The earliest stand reduction occurred at V3 (three trifoliates). Although none of the soybean crop in the state was at this stage when the storms came through last week, it is useful to look at this data and see the minimal impact losing plants early on in the season has. Although the loss in yield varied a little between the two years of research, we can average them to get a close idea of what the response would be this year.The uniform loss of plants at V3 caused a linear decrease in yield as severity increased. A 25%, 50% and 75% reduction in stand reduced yields only by 3.6%, 7.9%, and 12.1% relative to the control.

*(Continued on page 105)*

## Replanting corn

*(Continued from page 103)*

replant. Remember, however, that there is no guarantee of getting a good stand with replanting. Diseases like fusarium and especially pythium will be favored by the increased field moisture. (See "Conditions right for seedling diseases" in the May 6, 2005 CropWatch). Insects too can be more problematic in these fields. (See story on *page 6.*)

**5. Estimate replanting costs.** The cost of replanting a field is often the deciding factor. Costs include tillage, seed, fuel (for tillage and planting), additional pesticides, labor, additional dryer fuel for drying the crop in the fall, etc. Moreover, the chance of fall frost is higher for late-planted corn. Check with your seed dealer to see what hybrid seed is available and if there is any rebate or price reduction for replant situations.

**Roger Elmore**
**Extension Crops Specialist**
**Lori Abendroth**
**Research and Extension Associate**

### *Estimating drilled soybean*

In drilled soybeans, it may be easier to determine average population by using a population hoop. A hoop with an inside diameter of 40 inches will encircle 1/5,000 of an acre. By tossing the hoop and counting the plants within the 40-inch circle at five random locations in the field, a total of 1/1,000 of an acre will be counted.

A 40-inch hoop (inside diameter) can be easily made from a 10-foot 9-inch length of 1/2-inch black plastic water pipe and a double male hose barb connector (trim hose length depending on connector style). This will make a fairly rigid "oversized hula-hoop" which encircles 1/5,000 of an acre. A "fold-up" portable version can be made from a 10-foot 7.5-inch length of 3/8-inch EVA plastic hose (anhydrous ammonia hose) and the appropriate barbed connector. This flexible hoop can be "folded" by grasping opposite sides of the hoop and curling it up with a twist of the wrist. A three-coiled hoop is formed (similar to a folded V-belt) which will easily fit under the pickup seat.

**Paul Jasa**
**Extension Engineer**

## Replanting soybean *(Continued from page 104)*

This loss in yield is for irrigated soybean in the yield range of 55-75 bu/A. In 2004, yields were reduced more than in 2003 but even in 2004, yields were only reduced by 16.4% from the 75% stand reduction at V3. Remember that these yield losses occurred from stand reductions at V3. Therefore, considering the storms affected the soybean crop much earlier than V3 we would not expect yield losses to be greater than what occurred at V3.

**4. Is it necessary to replant?** Planting date does not need to be a concern when deciding whether to replant since a replant at this time will not reduce yield much in comparison to replants that would occur in early to mid-June. Producers need to only be concerned with their established stand and overall plant health. As mentioned above, soybean can compensate very well and achieve similar yields to a soybean crop at an optimum plant population if the plants are healthy and fairly uniform in distribution. Although a stand reduction of 50% to even 75% may seem like it should definitely warrant replanting, research findings indicate it may not.

Although it is saddening to walk into soybean fields that are much sparser than they should be; if you have a healthy, fairly uniform stand of soybean, it likely will not pay to replant. With lower soybean populations you will want to pay more attention to weed pressure throughout the season since you will have reduced shading from the soybean canopy. Also remember that when soybean branches out, pod height will be lower and these plants will need extra attention at harvest.

**Table 3. Deriving plants per acre from field measurements of plants per row. An optimum planting rate is 150,000 seeds per acre in Nebraska and therefore the table increases up to roughly 150,000 plants per acre because this would be the maximum plants that would be possible. This table is from *Soybean Replant Decisions* (PM 1851), published by Iowa State University.**

| *Avg plants per foot of row* | *Row width (inches)* | | | | |
|---|---|---|---|---|---|
| | *38* | *36* | *30* | *20* | *15* |
| 1 | 13,800 | 14,500 | 17,400 | 26,100 | 34,800 |
| 2 | 27,500 | 29,000 | 34,800 | 52,300 | 69,700 |
| 3 | 41,300 | 43,600 | 52,300 | 78,400 | 104,500 |
| 4 | 55,000 | 58,100 | 69,700 | 104,500 | 139,400 |
| 5 | 68,800 | 72,600 | 87,100 | 130,700 | 174,200 |
| 6 | 82,500 | 87,100 | 104,500 | 156,800 | |
| 7 | 96,300 | 101,600 | 122,000 | | |
| 8 | 110,000 | 116,200 | 139,400 | | |
| 9 | 123,800 | 130,700 | 156,800 | | |
| 10 | 137,600 | 145,200 | | | |

**Lori Abendroth, Research and Extension Associate**
**Roger Elmore, Extension Crops Specialist**

# Flooding effects at various plant growth stages

| Crop | Condition | Potential for survival and problems |
|---|---|---|
| Small soybeans | Not completely submerged | Will survive a "long time" in standing water |
| Small soybeans | Completely submerged | Will survive several days to a week if air temperature is below 90°F. |
| Soybeans | 1 inch of water on surface at V4 and R2 for 2, 4, 7, and 14 days. (Univ. of Arkansas). | Variety differences evident (all were determinates); R2 flooding resulted in greater losses than at V4. Yields reduced between 0.8 and 1.9 bu/acre per day of flooding at V4 and from 1.5 to 2.3 bu/acre per day of flooding at R2. |
| Small soybeans | Saturated soils | Seed and seedling diseases like Phytophthora and Pythium may become a problem |
| Corn | Germinating | Genetic differences among inbreds (and we assume hybrids) exist for responses to flooding |
| Corn prior to 6th leaf stage | Underwater (6 inches of water on surface); air temperature *less* than 77°F. | Will survive for four days. Longer flooding results in lower yields especially at lower N levels. |
| Corn prior to 6th leaf stage | Underwater (6 inches of water on surface); air temperature *greater* than 77°F. | May not survive more than 24 hours |
| Corn prior to 6th leaf stage | Saturated, cold soils, flooding | Seed rots, seedling blights, various other pathogens, crazy top |

Compiled from various sources by Roger Elmore, Tamra Jackson, Loren Giesler, and Lori Abendroth, UNL Extension specialists. For a more complete article on this, see the June 27, 2003 *Crop Watch*.

# Estimating nitrogen loss in saturated soils

Heavy rainfall in central Nebraska last week has caused crop producers to question the availability of nitrogen (N) fertilizer applied this spring and with good reason. Some fields may have experienced significant nitrogen loss. There are several factors which will influence the amount of loss, including rainfall amount and intensity, soil texture, soil temperature, fertilizer source and application date. Loss pathways can include runoff, denitrification and leaching.

**Runoff**

If fertilizer had been recently applied to the soil surface, without incorporation or a gentle rain of 0.5 inch or more to move nitrogen into the soil profile, substantial nitrogen loss may occur in runoff. Rainfall was very intense in some areas last week, with precipitation exceeding 10 inches in some areas, resulting in severe erosion and loss of nutrients on or near the soil surface.

**Denitrification**

The primary nitrogen loss mechanism from saturated, fine-textured soils may be denitrification. This is the process of anaerobic bacteria present in soil converting nitrate-N into gaseous forms (nitric oxide, nitrous oxide, dinitrogen) which can be lost to the atmosphere. In fields where most fertilizer nitrogen was applied preplant, likely four to eight weeks ago, much of the N may have been converted to nitrate by the microbial process of nitrification. This nitrate is then susceptible to loss via denitrification or leaching.

**Leaching**

If nitrogen existed in soil in the nitrate or urea forms, significant leaching loss may have occurred, more so on coarse-textured soils.

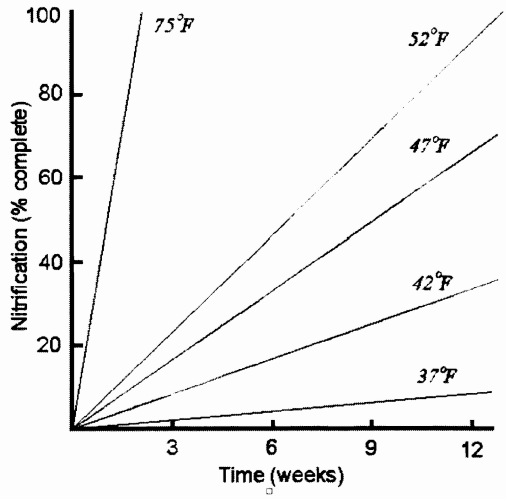


**Figure 1. Estimated nitrification over time.**

Some of this nitrogen may have leached deep enough into the root zone to be unavailable to the crop, at least early in the season. Continued precipitation or irrigation may leach this nitrogen out of the root zone entirely.

*(Continued on page 107)*

# *Consider insect control options with replanting*

Late planting corn and soybeans can increase the likelihood of injury from some insects. This often is because the later planted crop is in an earlier stage at the end of the season and is more attractive to certain insects. This shouldn't affect your replant decision, although it does mean that you should be ready to scout for insects later in the season.

For example, replanting corn now will likely increase the likelihood of injury from second generation European corn borers and possibly corn earworms. Later planted corn also may be attractive to corn rootworm beetles in August, as the early planted corn fields reach the brown silk stage. Corn rootworm beetles will fly to nearby fields if they are in the green silk stage. If abundant, rootworm beetles could interfere with pollination of the late planted corn by feeding on the silks. Also, if this late planted field is replanted to corn in 2006, there's a good chance that rootworms will be a problem. In soybeans, later planted fields will be green later in the season and may attract bean leaf beetles in August and September.

If you used an insecticide at planting in corn and are replanting now, you may still want to use an insecticide. Although the risk of injury from seedling insects such as wireworms and seed corn maggots is reduced with a later planting, there is no postemergence treatment for these insects. If you think there is moderate to heavy pressure from rootworms in the field, an insecticide at planting may be important. Rootworm larvae will be hatching out of eggs in late May and early June and can severely injure the root system of small plants.

If you used a planting time insecticide in corn, read the label before re-using it in a replant situation. Many insecticides have a maximum amount per season that can be used on a field. If you want to treat the replant crop, you may need to use a different insecticide. If you are considering switching to a different crop such as soybeans when you replant, check the label of what you applied earlier in the season. Some insecticides have restrictions on how soon you can plant to another crop. For example, Aztec 2.1 G has a 30-day plant back restriction for any crops after corn.

**Bob Wright**
**Extension Entomologist**

## Nitrogen loss *(Continued from page 106)*

For more information on soil processes influencing nitrogen management, view the *Nitrogen Chapter* of the Cooperative Extension publication, *Nutrient Management for Agronomic Crops in Nebraska.*

**Table 1. Potential field loss of nitrogen, depending on temperature and time since application.**

| Time *(days)* | Temp. *(degrees F)* | N Loss *(percent)* |
|---|---|---|
| 5 | 55–60 | 10 |
| 10 | 55–60 | 25 |
| 3 | 75–80 | 60 |

Denitrification loss will be less with soils having less than 1% organic matter.

### Management options

Unfortunately, there are many variables interacting to influence the potential for nitrogen loss from heavy rainfall, making it difficult to estimate how much fertilizer N has been lost, and whether producers should apply more fertilizer. *Figure 1* and *Table 1* can be used to help derive rough estimates of potential loss. For anhydrous ammonia applied 6 weeks ago, perhaps at least 50% of the nitrogen has been converted to nitrate. If soils have remained saturated for a week, perhaps 10-20% of the nitrate nitrogen has been lost to denitrification, with additional loss due to runoff or leaching. Whether remaining nitrogen will be adequate to optimize yield potential depends on the initial application rate, and growing conditions during the rest of the season.

Soil sampling is one option to evaluate what is left, but results may be difficult to interpret. If nitrogen fertilizer has been banded, many samples will be required to integrate what the plant will have access to. Samples should be collected to a depth of three feet in one foot increments. Consider having samples analyzed for ammonium as well as nitrate, since substantial nitrogen from many fertilizer sources may remain in the ammonium form. Interpretation of soil test results for both ammonium and nitrate may require help from a soil scientist. Even then accurate prediction of fertilizer nitrogen availability will be difficult.

If producers can sidedress nitrogen or apply it through an irrigation system, they may want to supplement loss they believe may have occurred. The challenge will be to know what rate to apply. Over-fertilization will increase the cost of production and potentially increase the loss of nitrogen to the environment, while under-fertilization will reduce yield.

Carefully monitoring the crop for nitrogen status may be the best option, primarily between now and silking. This is especially helpful if producers have the option to sidedress, fertigate or apply nitrogen with high clearance equipment. Most corn hybrids will take up most of their nitrogen requirement in this period.

Visual observation for signs of nitrogen deficiency is one option, (lower leaves yellowing, inverted "V" yellowing pattern of leaf tips) although yield potential may be reduced by the time nitrogen deficiency is visually evident. Another option is to use a chlorophyll meter to detect nitrogen stress before it's visible. To calibrate chlorophyll meter readings, it is best to have one or more strips in the field with nitrogen applied at a rate high enough to be non-yield limiting to serve as a reference.

For more information on the use of a chlorophyll meter to manage nitrogen, see NebGuide 1171, *Using a Chlorophyll Meter to Improve N Management.*

**Richard B. Ferguson**
**Extension Soils Specialist**

## *May 11 rains set 100-year records*

Heavy rainfall fell in the central Platte River valley May 11, with unofficial reports of more than 11 inches in 6-8 hours. The highest official report was from Wood River with 10.63 inches. This is short of the state record rainfall of 13.15 inches in 24 hours set May 8-9, 1950 in York.

According to statistics for May 11, Grand Island recorded a 100-year 24-hour and 12-hour event, while Hastings recorded a 100-year, 6-hour event. In fact, over five inches of rain fell within a 90-minute period at Hastings, which statistically would exceed a 200-year event.

With the heavy rainfall, widespread flooding was reported on the Platte, Wood, and Blue rivers. At Grand Island, streamflow rates on the Platte River were running approximately 220 cubic feet per second (cfs) prior to the event, peaking at 8000 cfs two days after the event. On May 17 the Platte had a streamflow rate of 1000 cfs, which was close to the long-term normal.

The Blue River at Dorchester peaked out at 10,000 cfs on May 12. Prior to the event, streamflow rates were measured at 72 cfs and as of May 17 stood at 1270 cfs.

While it's difficult to gauge the long-term impacts of this rain on the drought, small ponds and shallow aquifers likely saw significant improvements. We'll probably be able to determine the degree of improvement to the Platte River in a couple weeks.

One thing is certain: These storms resulted in flooding, the magnitude of which hasn't been seen in the central Platte River valley since 1967. Even the 1993 flooding across the central United States did not cause such an intense flood in central Nebraska.

**Al Dutcher**
**State Climatologist**

# Post-storm weed control issues

With the recent rough weather in central and eastern Nebraska, it will take longer than normal for the crop to canopy and take over weed suppression. This means any preemergence herbicides previously applied will need to provide protection an extra week or two. This may be further complicated by the fact that in some areas, heavy rain may have contributed to accelerated herbicide dissipation, shortening the period of effective weed control. Given the longer period from herbicide application to crop canopy, herbicide effectiveness may begin to fade before the crop reaches this stage. As a result, more fields than normal may need to be treated postemergence.

For fields that will be replanted and were earlier treated with a preemergence herbicide, do not retreat the field with a preemergence herbicide. Manage weeds in the replant crop with postemergence herbicides. It is very difficult to estimate how much of the original preemergence treatment remains.

Since some of the same active ingredients are contained in both preemergence and postemergence herbicides, be sure any post-emergence treatments comply with labels of all products involved regarding total amount of herbicide allowed per season, etc.

Then monitor fields closely for developing weed problems. Timely applications to small weeds can mean lower herbicide rates, a smaller investment, and better weed control.

**Alex Martin**
**Extension Weeds Specialist**

*In corn*

# Selecting the right post herbicide

It always seems like just as soon as you finish planting soybeans, it's time to start spraying corn. In this article we'll look at herbicide options for post-emergent corn.

Consider several factors when choosing a post-emergence herbicide. First and most important is the efficacy it will have on the weed species present. You obviously want a herbicide to work well to warrant the expense. Some herbicides provide better control on some weeds than others.

Next, make sure you take into account crop safety and application timing. For example, a certain herbicide may have good activity on many grass and broadleaf weeds but it has a label restriction that does not allow it to be applied to corn over 12 inches tall. All herbicides carry some timing restriction and pushing that limit can easily result in crop injury or reduced weed control, and in the end, it can result in lost income from yield loss.

Often, efficacy is influenced by the rate used. Choose a herbicide that allows you to use the required rate for different weed sizes. For example, 24 oz/ac of glyphosate will do well on most velvetleaf plants in the 1-3 inch stage; however, if you are dealing with 4-8 inch weeds, increase the rate to 1 qt/ac. Caution should be used when increasing rates of most herbicides as this can also increase the possibility of crop injury.

Finally, follow label recommendations regarding additives. Many labels will suggest adding crop oil, AMS, or other additives to enhance herbicide uptake or movement into the plant. The right additive can change average weed control into great weed control; however, the wrong additive can cause serious crop injury and/or poor weed control, which once again translates into yield loss. As always, read and follow the label recommendations and restrictions for maximum herbicide efficacy and crop safety.

**Brady Kappler**
**Extension Educator, Weed Science**

## Two herbicides in line for sunflower

The limited supply of Spartan® herbicide is causing concern for sunflower growers in the state. In response to this shortage, the National Sunflower Association has worked to get other sulfentrazone products labeled in sunflower. These other products include Blanket® herbicide, which is marketed by Tenkoz, and Authority® herbicide, which is marketed by DuPont. Blanket® now has a supplemental label that includes sunflower in the states of Colorado, Kansas, Minnesota, North Dakota, Nebraska, Oklahoma, South Dakota, Texas and Wyoming. Applicators will need to have the supplemental label in their possession when making the application.

Authority® will require a Special Local Needs (SLN) 24(c) label. The Nebraska Department of Agriculture and Nebraska Pesticide Board must approve Section 24(c) labels, and only received the request for Authority on May 5. Due to the extensive review process required for state approval of a Section 24(c) request, the Authority label may not be approved in time for use on this year's sunflower crop.

**Drew Lyon**
**Extension Dryland Crops Specialist**
**Panhandle REC, Scottsbluff**

## Injury and economics suggest grazing wheat

This year producers should consider the value of harvesting wheat as forage rather than combining wheat for grain. With the current value of gain for stocker cattle, wheat may be worth more per acre harvested as pasture than being cut for grain. Stocker cattle can be expected to gain well on wheat during May and early June. For more information on this topic and tips for assessing the economics of various options, see *CropWatch* online at *http://cropwatch.unl.edu/archives/2005/crop05-10.htm*

## Post-emergence herbicides for corn

| Herbicide | Primary Activity | Timing | Rate/ac | Additive[1] |
|---|---|---|---|---|
| ATRAZINE | Broadleaf + grass | Corn <12", BL[2] 2-6", grass <1" | 1.4-2.2 lb | COC[3] 1qt |
| ACCENT | Grass | Corn up to 20", BL <4", grass <3" | 0.67 oz | COC 1gal/100** |
| ACCENT GOLD | Broadleaf + grass | Up to V6, weeds 1-3" | 2.9 oz | COC 1 gal/100 gal, UAN [4] 1-2 qt |
| AIM | Broadleaf | 2 leaf to 48" | 0.5 oz | NIS[5] 1 qt/100 gal, COC 1 gal/100 gal, or UAN 2-4 qt/ac |
| BANVEL | Broadleaf | Corn spike to 5"* | 0.5-1.0 pt | # |
| BASIS | Broadleaf + grass | Corn spike to 2-collar, 4-leaf | 0.33 oz | COC 1-2 gal/100 + UAN 1-2qt/100** |
| BASIS GOLD | Broadleaf + grass | Up to V6, weeds 1-3" | 14 oz | COC 1-2 gal/100 gal** |
| BEACON | Broadleaf + shattercane | Corn 4-20", BL <4", grass <3" | 0.38-0.76 oz | COC 1 qt** |
| BICEP II MAGNUM | Broadleaf + grass | Corn up to 12" | 2.1 qts# | None |
| BUCTRIL | Broadleaf | Corn 2-leaf to V6, BL 2-6" | 1.0-1.5 pt | # |
| CALLISTO | Broadleaf | Corn 0-30" | 3.0 oz | COC 1 gal/100; UAN 2.5 qts/100 gal or AMS 1% |
| CELEBRITY | Broadleaf + grass | Corn 4-36" """ | 6.67 oz | NIS 1-2 qt/100 gal + UAN 2-4 qt/ac** |
| CELEBRITY PLUS | Broadleaf + grass | Corn 4-24" """ | 4.7 oz | NIS 0.25-0.5% + UAN 1-2 qt/ac** |
| CLARITY | Broadleaf | Corn 8-24"* | 0.5-1.0 pt | # |
| CONNECT | Broadleaf | Corn after emergence and prior to tassel | 1.25-1.87 lb/ac | COC 1% v/v |
| DISTINCT | Broadleaf/some grass | Corn 4-24"* | 4-6 oz | NIS 1 qt/100gal + UAN 5 qt/100 gal** |
| DUAL II MAGNUM | Broadleaf + grass | Layby | 0.67-1.5 pt | None |
| EQUIP | Broadleaf + grass | Corn V4-12" | 1.50 oz | MSO 1.5 pt + (UAN 2 qt or AMS 2lb) |
| EXCEED | Broadleaf | Corn 4-20", BL 2-12" | 1.0 oz | COC 1 qt** |
| GLYPHOSATE*** | Broadleaf + grass | Corn up to 24" | 24-42 oz | 8.5 -17 lbs AMS/100 gal |
| HORNET | Broadleaf | Corn spike to 20", BL <8" | 1.6-4.0 oz | NIS 1qt/100gal; COC 1gal/100 gal |
| HORNET WDG | Broadleaf | Corn spike to 20", BL , 8" | 2.0 –5.0 oz | NIS 1qt/100 gal; COC 1gal/100 gal |
| LADDOK S-12 | Broadleaf | Corn <12", BL 2-4" | 1.3-2.3 pt | COC 1 qt** |
| LIBERTY*** | Broadleaf + grass | Weeds 1-4" | 24-28 oz | AMS 3 lb |
| LIBERTY ATZ*** | Broadleaf + grass | Corn <12" | 40 oz | AMS 3 lb |
| LIGHTNING*** | Broadleaf + grass | Corn to 12", weeds up to 4" | 1.28 oz | NIS 1qt + UAN 1-2 qt |
| MARKSMAN | Broadleaf | Corn before 5-leaf | 2.0-3.5 pt | COC 1 qt** |
| NORTHSTAR | Broadleaf/some grass | Corn 4-20"[a] | 5 oz | NIS 1 qt/100 gal** |
| OPTION | Grass | Corn 0-16" | 1.5 oz | MSO 1.5 pts UAN 1.5 qts or AMS 1.5 lbs |
| PERMIT | Broadleaf | Corn spike to 20", BL 2-6" | 0.66-1.33 oz | COC 1 gal/100** |
| PROWL | Some broadleaf + grass unemerged | Corn spike to layby | 1.8-3.6 pt | None |
| PURSUIT | Broadleaf + grass | Weeds <4" | 4 oz | COC 1.5-2 pt + UAN 1-2 qt** |
| RESOLVE | Grass/small broadleaves | Corn up to 12" | 1 oz. | NIS 1 qt/100 gal. + UAN 2 qt** |
| RESOURCE | Broadleaf | Corn 2-10 leaf, BL <4" | 4-6 oz | COC 1 qt** |
| ROUNDUP WeatherMAX*** | Broadleaf + grass | Corn up to 24" | 11-28 oz | 8.5 -17 lbs AMS/100gal |
| SENCOR | Broadleaf | Corn up to 8", BL 2-4" | 1.5-2 oz | 28% N 2-4 qt |
| SPIRIT | Broadleaf/some grass | Corn 4-20" | 1 oz | NIS 1-2 qt/100 + UAN 2-4 qt** |
| STARANE | Broadleaf | Corn up to and in V5 | 2/3 pt | NIS 1 qt/100 gal |
| STEADFAST | Grass | Corn up to 12" or <6 collar | 0.75 oz | COC 1 gal/100 gal, UAN 2 qt |
| STEADFAST ATZ | Broadleaves + grass | Corn up to 12" | 14 oz | (COC or MSO 1gal/100 gal or NIS 1qt/100 gal) + (UAN 2 qt or AMS 2 lbs ) |
| TREFLAN | Grass weeds unemerged | Corn 2-leaf to layby, weeds unemerged | 1.5-2.0 pt | none |
| WIDEMATCH | Broadleaf < 8" | Corn up to and in V5 | 1.33 pt | none |
| 2,4-D AMINE | Broadleaf | Spike to 8" | 1-2 pt | # |

1. Rates for additives are on a per acre basis unless noted otherwise.
2. BL = Broadleaf
3. COC = Crop Oil Concentrate
4. UAN = Urea Ammonium Nitrate
5. NIS = Nonionic Surfactant

# Not typically used due to crop injury

* Corn over 8 inches tall, use drop tips
** Other additives may be used; check label
*** Requires herbicide-resistant corn hybrid
""" Corn over 20 inches tall, use drop nozzles
# Do not apply over 3.25 qts/ac of Bicep II Magnum on corn or apply more than 2.5 lbs active ingredient of atrazine on corn

For corn and soybean

# Foliar applications of plant growth hormones

Potential benefits of foliar growth hormone products for corn and soybean are initiating some discussion among farmers. While products containing plant growth hormones have been around for years, two products (HappyGro and MegaGro L) are now offering a yield increase guarantee. If you're considering these options, be sure to approach them as you would any new product — learn exactly what they are and whether they'll benefit your particular production system.

MegaGro L contains indole-3-butyric acid (IBA) and kinetin; whereas, HappyGro contains solely kinetin (a higher rate than what is within MegaGro). These chemical compounds are plant growth hormones and fall within broader plant hormone categories: IBA is a type of hormone called auxin, while kinetin is a type of cytokinin. These growth hormones are classified differently based on their chemical structure, but they can cause similar physiological responses in the plant.

Auxin and cytokinin are critical growth hormones in plant development and are naturally present within the plant at variable concentrations throughout the season. Their presence and activity are different from other hormones which act more in an on-off manner and are present only at specific times.

Cytokinins regulate many cellular processes and stimulate cell division. Cytokinin is synthesized largely in root tissue and then travels upward to the shoots; some production also occurs in developing leaves. Nutrients will move and accumulate in plant tissue where higher levels of cytokinin are expressed. Auxins are primarily produced in areas that are experiencing rapid growth such as shoot tissue, young leaves and developing seeds. Auxins inhibit primary root elongation but do promote lateral root development. Senescence (death) and shedding of leaves is regulated by both auxin and cytokinin. During the reproductive stages, the abortion of flowers as well as flower and seed development are regulated and promoted by auxin and cytokinin.

Each of the products mentioned earlier call for the first application to occur in the early vegetative stages for both crops. Research documenting the effect of growth hormone application onto foliage is largely focused on applications that occur near flowering because of auxin and cytokinin's critical roles in seed development. Due to the available research, we can only discuss the impact later applications of these growth hormones may have in a field situation due to a lack of information concerning earlier vegetative applications.

Plant responses to cytokinin and auxin have been variable. We will focus primarily on field research here although laboratory research reports also are available. In one study, cytokinin was applied to soybean at R1 (initial flowering) yet no difference in the pod number, seed number, seed weight, or seed yield resulted in comparison to an untreated control (Nagel, 2001). Other researchers looked at the effect of cytokinin when applied to two soybean varieties (small and large seeded) at R1 or R3. The varieties did not perform the same which shows that varietal differences exist. The small-seeded variety had increased seed weights and seed yield following treatment at R3, whereas, the large-seeded variety had increased seed weight and pod number but not increased seed yield with the R1 treatment. The application of growth hormones may increase pod numbers, seed weight or seed yield but this will vary based on varietal sensitivity and correct application timing (Cho, 2002). Laboratory research conducted on immature corn ears (prolific and non-prolific types) showed cytokinin to have little or no effect on ear growth or development. Ear growth and development was increased though when auxin was included in the treatment mixture (Leal-León, 2002).

Although there is a possible benefit to applying these growth hormone products, it is possible to also cause detrimental effects to the plant. With the foliar application of these products the normal level of these hormones within the plant are increased, causing a redirection of the plant's energy. In some instances, plants with cytokinin applied have appeared smaller and have a less developed root system. Although reduced plant height and root system differences may not correlate to yield differences, it is important to realize that the plant is being impacted by these treatments.

The concentrations of cytokinin and IBA in HappyGro and MegaGro L are not clear and the results obtained may not be similar to the results mentioned from the noted research. It is also difficult to know how the plant will respond to growth hormones applied at early vegetative stages since previous research has been focused largely on later applications.

It is important to test these products in field environments to determine if they are beneficial products for Nebraska producers. Extension Educators Jennifer Rees, Andy Christensen and Gary Zoubek are working with farmers in the Quad County On-farm Research project who are conducting field research with these products on soybean. It is important to watch these trials throughout the season to determine the impact these products have on soybean growth, development, and final yield.

**References**

Nagel et al. 2001. Annals of Botany. 88: 27-31.

Cho et al. 2002. Plant Growth Regulation. 36: 215-221.

Leal-León et al. 2002. Plant Cell, Tissue and Organ Culture. 71: 133-139.

**Lori Abendroth**
**Research and Extension Associate**
**Roger Elmore**
**Extension Crops Specialist**