

# GROWING KNOWLEDGE®

A KEY SOURCE FOR LOCAL AGRONOMIC INFORMATION



Growing Knowledge®

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1107

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## CURRENT NEWS AND UPDATES

The condition of corn and soybean crops in Iowa is very good with the exception of areas affected by heavy rain and flooding. Areas that have been experiencing heavy rains and extended wet conditions may benefit from late season or rescue applications of nitrogen. Corn needs more nitrogen during the reproductive stages than early in the growing season. Normally, nitrogen applied early in the season is available, but excess rain can lead to losses.

Corn rootworm larvae are actively feeding. Now is a good time to evaluate rootworm larval damage. Refer to the last issue of Growing Knowledge for the procedure for evaluating rootworm damage. Soybean aphids and late season corn insect monitoring are covered in articles in this issue.

Both corn and soybeans are entering the critical reproductive stages of development. Final yield potential is determined by the reproductive process. High commodity prices have everyone looking for opportunities to maximize yields. Foliar leaf diseases rob yield in both corn and soybeans. Maintaining plant health with fungicide applications may reduce the affect of leaf diseases and add yield. Higher commodity prices make returns from fungicide applications even greater. Please note information in this issue regarding timing of fungicides.

## Denitrification and Leaching

Nitrogen (N) loss is a major concern after soils have become saturated from heavy rainfall. Denitrification (microbial conversion of nitrate to nitrogen gases) and leaching are the processes involved with saturated soils that can result in significant N loss. Estimating N loss is not an exact science; however, below are some guidelines that can help with N assessment.

**Denitrification.** This occurs under anaerobic (lack of soil oxygen) soil conditions. Nitrogen in the ammonium-N form ( $\text{NH}_4^+$ ) is not subject to denitrification or leaching. Loss can occur rapidly if nitrate-N is present, soils are saturated or flooded, and soil temperatures are  $> 50$  °F. Studies conducted in Illinois showed that up to 5% nitrate-N loss through denitrification occurred each day soils were saturated. In these studies, all-nitrate fertilizer was applied when corn was in the V1 to V3 growth stage. Urea converts to nitrate quicker than anhydrous ammonia; approximately 2 weeks and 4 weeks, respectively. University of Nebraska data (Table 1) demonstrates the potential nitrate-N loss for every day of saturation at various temperatures. The potential for N loss due to denitrification increases rapidly as soil temperature increases.

**Leaching.** With frequent, "flushing" rains, nitrate-N can be pushed deep into the soil and out of the rooting zone, or carried out of the field through drainage tiles, making it unavailable for plant use. Traditionally, this is more of a potential concern with sandy soils, because they allow rapid downward movement of water, however this year, because of heavy amounts of rainfall throughout the area, it may be a concern on all soil types. Ammonium nitrate and urea ammonium nitrate (UAN) solutions are more susceptible to leaching than anhydrous ammonia, with differences due to the rate of conversion to nitrate. Once fertilizer N is converted to nitrate, there will be no difference in the behavior of N in the soil profile between any sources of fertilizer N.

**Sidedressing** may be a solution if economical and significant amounts of nitrogen have been lost, and if equipment is available. A rescue N application chart, below, outlines appropriate N sources that can be used on taller corn. It is important to remember that uptake of nitrogen continues through blacklayer. During grain fill, nitrogen uptake to supply the ear and shank

to pg. 2 ▶



IOWA

### Field Day Season Is Upon Us

We hope you will take advantage of some of the opportunities to attend a field day in your area within the next several weeks. More information with more specific details should be coming soon.

Your local Monsanto representatives are very excited to be bringing you several new corn and soybean products and technologies for 2012, and feel they will continue to help you maximize yield potential and profitability potential on your farm.

Thank you for your business, and have a safe and enjoyable summer!



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from pg. 1 *Corn Plant Development: VE—V6*

is approximately 6 lb N/acre/day. The corn plant will not reach maximum yield potential if it does not have enough N available.

Sources: R. Ferguson. Part 1, *Fertility Principles. Nutrient Management for Agronomic Crops in Nebraska.* University of Nebraska. <http://cropwatch.unl.edu>; R. Hoelt. 2004. *Predicting and Measuring Nitrogen Loss.* The Bulletin: pest management and crop development information for Illinois. No. 10, Article 8. <http://www.ipm.uiuc.edu/>. Verified 6/28/2011.

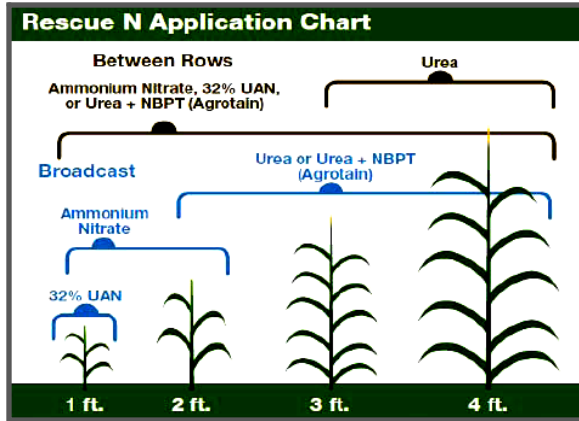


Figure 1. Taller corn may benefit from rescue treatments, if equipment is available. Source: Kelly Nelson, University of Missouri agronomist.

**Links to Sidedress Nitrogen Application Calculators:**

<http://plantsci.missouri.edu/nutrientmanagement/nitrogen/Nitrogen%20Loss%20Scoresheet%2008.htm>

<http://extension.agron.iastate.edu/soilfertility/nrate.aspx>

<http://cropwatch.unl.edu/web/soils/resources>

<http://www.extension.umn.edu/corn/components/NitrogenWorksheet.pdf>

**Nitrogen Calculation Steps**

1. Calculate N Present as Nitrate: (N applied multiplied by percent in nitrate form)
2. Calculate N Denitrified: (pounds nitrate/acre from step 1 multiplied by percent denitrified from Table 1).

Note that the conversion to nitrate occurs almost immediately with N applied as urea. With 28% UAN, half of the N is in the urea form, 25% is found as ammonium, and the remaining 25% as nitrate. The nitrate is already subject to loss, and the other fractions are readily converted. Conversion of N applied as anhydrous ammonia is delayed 10 to 14 days following application, regardless of any stabilizer added.

Soil temperature has a large influence on conversion of ammonium to nitrate. It takes approximately 2 weeks for complete conversion at 60°F and 1 week is needed at 70°F.

Table 1. Estimated Denitrification Losses as Influenced by Soil Temperature and Days of Saturation.

Soil Temperature (°F)	Days Saturated	Nitrate N loss (% of Total N Applied)
55-60	5	10
	10	25
75-80	3	60
	5	75
	7	85
	9	95

Source: R. Ferguson. Part 1, *Fertility Principles. Nutrient Management for Agronomic Crops in Nebraska.* University of Nebraska. <http://cropwatch.unl.edu>

**National Corn Growers Association National Corn Yield Contest**

This will be the 47th year for the National Corn Growers Association's (NCGA) National Corn Yield Contest (NCYC). Over the past 46 years, the winning yields have increased dramatically. This contest can be a tremendous educational experience. As stated in the 2011 entry form, NCGA wants to challenge you to take advantage of this opportunity to explore new ideas and production techniques, while gleaning knowledge to enhance your future yield potential.

To encourage agronomic learning through participation in the NCYC, Monsanto, on behalf of the DEKALB® brand, will pay your yield contest entry fee plus your NCGA membership fee or renewal when your DEKALB contest entry is submitted. More detailed information is available at [www.asgrowanddekalb.com](http://www.asgrowanddekalb.com), click under the Yield Information Tab then click on DEKALB Yield Chasers/NCGA & NSP Contests. To take advantage of this opportunity, please call your local Monsanto representative for more information.

**The Insect Migration Risk Forecast (IMRF) Tool**

The Insect Migration Risk Forecast (IMRF) tool combines weather and trap data to track insect migration patterns. Real-life cases in 2006 and 2007 illustrated that trap count increases corresponded with increased migration risks. A 60-year history of trap data along with current trap counts from all across the United States is used to help make source region predictions. The IMRF can be accessed at: [www.insectforecast.com](http://www.insectforecast.com) for the latest CEW predictions.



## Corn Pollination Basics

Two weeks prior to pollination through two weeks after is a critical time for determining yield potential.

**Pollination Basics.** Corn typically sheds pollen for 5 to 7 days. Silks generally emerge 1 to 2 days after pollen shed begins. Most pollination occurs in late mornings and early evenings. Pollen grains land on moist, receptive silks and within 24 hours, grow down the pollen tube to fertilize the ovule. With good conditions, silks will grow 1 to 1.5 inches a day until they are pollinated.

**Factors Inhibiting Pollination.** Moisture stress can reduce pollen shed to 2 or 3 days and delay silk emergence by 4 to 5 days. This can result in not enough viable pollen being available for pollination, especially near the ear tip. Anything that inhibits moisture absorption can induce this response, such as drought, root feeding, and compaction.



**Figure 2.** Example of an ear being checked for pollination progress. Attached silks indicate ovules were fertilized.

Temperatures above 95° F can decrease pollen viability. Moisture stress coupled with temperatures above 90° F can increase the potential for delayed silk emergence.

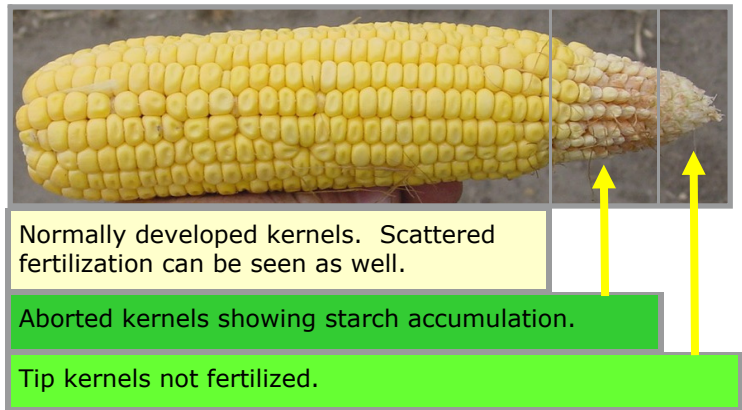
Japanese beetle, corn rootworm, and other silk feeding insects are more attracted to later planted and later silking fields. If silks are clipped to less than 1/2 inch before 50% pollination has occurred and beetles are present, a foliar insecticide may be justified. Check requirements for treating refuges of various YieldGard® or Genuity® insect protection traits before a foliar insecticide application.

**Evaluating Pollination Progress.** Pull an ear and remove the husks, being mindful not to damage the silks. Gently shake the ear. Kernels with the silk still attached have not been pollinated (Figure 2). Pollination starts at the butt and progresses toward the tip.

**Abortion After Fertilization.** After fertilization, a few kernels usually abort at the tip of each ear. Heat and moisture stress can cause abortion to continue down the ear. Generally aborted kernels have some starch accumulation, causing them to have a different appearance than kernels not fertilized (Figure 3). This is important to differentiate when determining the cause of kernel loss.

Source: Richie, S. 1993. *How a corn plant develops*. Iowa State University. Science and Technology. Special Report 48.

**Figure 3.** Corn ear with aborted kernels.



## Soybean Aphids and Insecticide Treatments

Now is the time to start spot-checking soybean fields for aphid activity. During vegetative growth, examine new leaves, petioles, and stem tissue in the upper and lower part of the crop canopy.

The threshold for soybean aphid treatment is 250 aphids/plant through the R4 (full pod) growth stage. Under drought stress, economic damage can occur very quickly at these populations. After R5 (beginning seed fill), aphids should be treated if there are more than 250 aphids/plant and the plants are under drought stress. Soybean aphids generally do not cause damage to soybean plants after R6 (full seed).

**Management.** Insecticide application timing for soybean aphid control is critical. The optimum treatment time is from R1 to R3 (corresponds to beginning flowering to beginning pod) and should be based on observations from numerous plants throughout the whole field. Early

applications generally reduce beneficial insect populations more than aphids. Late applications are generally past the point of maximum return from an insecticide application.

Once threshold levels are reached, fields can be treated with an organophosphate or pyrethroid insecticide.

- Organophosphates work somewhat like a fumigant when applied and may be suitable for heavy canopies and during hot weather. They offer a quick “knock-down” of aphids.
- Pyrethroids have some residual aphid control which may not be needed for a late-season treatment. They are most effective at temperatures below 90° F.

Sources: Cullen, E. 2010. *Soybean Aphid (Aphis glycines)*. University of Wisconsin. [www.plantpath.wisc.edu](http://www.plantpath.wisc.edu) (7/22/2010).  
Hodgson, E. 2009. *Scout for corn leaf aphids before tasseling*. Iowa State University. [www.extension.iastate.edu](http://www.extension.iastate.edu) (verified 7/26/2010).  
Pedersen, P. et. al. 2003. *Soybean aphid*. Crop Advisor Institute, Iowa State University. [compact disc] Version 1.0.

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**2011 Headline® Fungicide Recommendations—Corn**

The 2011 BASF recommendation for applications of Headline® on corn is to first apply Headline® at the 6 fl. oz/A rate between V5 to V8, then follow up with an application of Headline AMP™ fungicide at 10 fl. oz/A at VT to R3. (See graphic interpretation below).

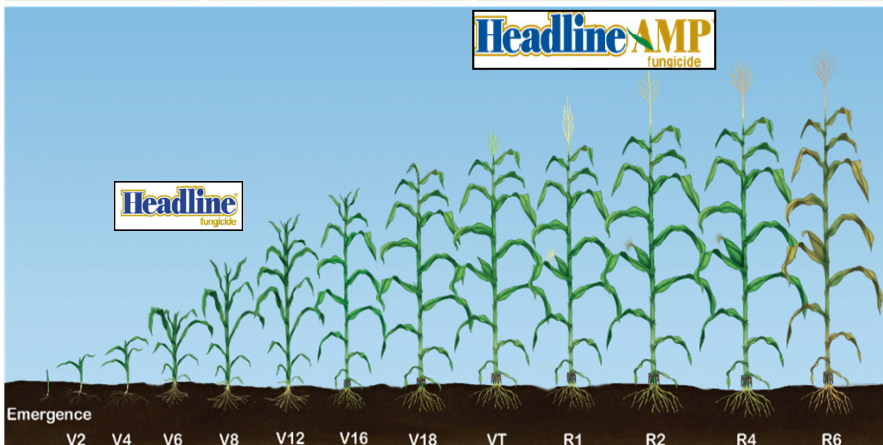
**Two Application Program to Help Maximize Yield Potential**

Headline rate: 6-9 oz/A	Adjuvant Usage		
	Allowed	Adjuvant Not Allowed	Allowed
Ground or Aerial application	Allowed	Adjuvant Not Allowed	Allowed

An adjuvant may be used with **Headline** prior to the V8 stage and after corn reaches the VT stage.

A compatibility agent, another fungicide, or an insecticide may be included in the tank mix, if needed, and labeled for use on corn.

The optimal application timing for **Headline** on corn is the VT to R3 stages (full tassel to milk) or prior to the onset of disease.



**Headline AMP fungicide**

**Headline fungicide**

Emergence V2 V4 V6 V8 V12 V16 V18 VT R1 R2 R4 R6

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Before opening a bag of seed, be sure to read, understand and accept the university requirements, including application and storage instructions, and the University's Biotechnology Safety Policy. The Biotechnology Safety Policy is available at [www.monsanto.com/biotech](http://www.monsanto.com/biotech). After opening and using a bag of seed, you are reaffirming your obligation to comply with the most recent university requirements.

VT stage begins when the last branch of the tassel is completely visible outside of the whorl.