UK COOPERATIVE EXTENSION SERVICE
University of Kentucky – College of Agriculture

LEXINGTON, KY 40546

Cooperative Extension Service
Kenny E. Perry
Graves County
251 Housman Street
Mayfield, KY 42066-1165
Phone: 270-247-2334
Email: keperr2@uky.edu
Web: http://ces.ca.uky.edu/graves

Grain Crops Newsletter

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ESTIMATING NITROGEN LOSSES FROM WET SOILS

Lloyd W. Murdock – Extension Soils Specialist
University of Kentucky

Wet soils cause nitrogen losses, and determining how much nitrogen is lost is necessary to choose the proper management options. In cases where high intensity rain results in high runoff, leaching losses will probably be low. The primary nitrogen loss mechanism in saturated soils is denitrification, which occurs when soil nitrate nitrogen (NO_3-N) is converted to nitrogen gas by soil bacteria. Two to three days of soil saturation is required for bacteria to begin the denitrification process. Well-drained upland soils that have been wet from a series of rains probably have not experienced much denitrification. Soils in lower landscape positions that stay saturated longer will likely lose more N. Losses can be calculated by estimating 3 to 4 percent loss of fertilizer NO_3-N for each day of saturation. Use the Table on page 2 to determine how much fertilizer NO_3-N was in the soil.

EXAMPLE: Determining the Amount of N Loss

A farmer applied 175 lb nitrogen (N)/A as urea to corn grown on poorly drained soil. Because of a series of heavy rains, three weeks after application the field became saturated for seven days. How much N was lost?

Step 1. Determine the amount of applied N that was in the nitrate (NO_3-N) form.

According to the table, 50% of the urea will be in the NO_3-N form three weeks after application. 175 lb N X 50% = 88 lb N.

Step 2. Determine the amount of N lost.

Remember that two days are needed for the bacteria to begin the denitrification process. Therefore, denitrification occurred for five days (seven days total saturation minus two days to start the process). With 4% lost each day for five days, 20% would have been lost. 88 lb N x 20% = 18 lb N lost and 157 lb N remaining. The N loss calculated in this example is not as high as most people would assume. A soil N test can verify this estimation.

Table 1. The amount of applied fertilizer that is in the nitrate nitrogen form 0, 3, and 6 weeks after application			
	Week After Application		
	0	3	6
N Source	% Fertilizer as NO_3-N		
Anhydrous Ammonia (AA)	0	20	65
AA with N-Serve*	0	10	50
Urea	0	50	75
Urea with N-Serve*	0	30	70
UAN	25	60	80
Ammonium Nitrate	50	80	90
*Nitrification inhibitor that slows transformation of ammonium to nitrate.			

Nitrogen Soil Test

An additional tool for determining NO_3-N in the soil after flooding is a NO_3-N test. The soil sample should be taken down to 12 inches deep, and several samples should be taken in each field of both the low and higher ground. The samples should be mixed well and a subsample sent for nitrate analysis.

If the nitrate-N is less than 11 ppm, there is a low amount of plant-available N in the soil. Therefore, there is a good chance corn will respond to a sidedress application of N ranging from 100 to 150 lbs. N/acre.

If the nitrate-N is between 11 and 25 ppm, there is a greater amount of plant-available N in the soil, indicating corn may or may not respond to sidedress N. The recommended sidedress N application at this soil test level is 0 to 100 lbs N/acre. If the soil test nitrate-N is close to 11 ppm, then higher sidedress N rates would be used. Lower rates would be used as nitrate-N approaches 25 ppm. The test is least accurate in this range, so the test results can only be used as a broad guide.

If soil test nitrate-N is greater than 25 ppm, there is adequate plant-available N in the soil, which indicates corn will probably not respond to sidedress N application.

Nitrogen Broadcast Prior to Rain

Farmers sometimes broadcast fertilizer nitrogen on a field within 24 hours of a heavy rain. In most cases, very little nitrogen is lost to runoff, especially if the field was under no-till soil management. The nitrogen fertilizer begins to dissolve almost immediately after being applied to the soil surface and will dissolve completely in a short period of time. As rain begins, the first water that falls moves into the soil, taking most of the fertilizer nitrogen with it. Once in the soil, most of the fertilizer nitrogen is protected from runoff. The only exception is a very intense rain soon after application that also erodes topsoil from sloping areas. Even in this situation, the loss would probably be less than one third of the fertilizer applied.

New Farm Vehicle Licensing Options Available

Kentuckians who use a farm license plate on their vehicles now have a choice to make. New legislation passed earlier this year allows for three weight classifications for Kentucky vehicles using farm plates. Kentucky legislators took action after numerous producers received citations in Illinois. The weight limit for a vehicle with farm plates in Illinois is 26,000 pounds. Illinois has always had a reciprocal agreement with KY, but they failed to renew that late last year.

For vehicles that won't be exceeding the 26,000 gross vehicle weight rating (GVWR), the fix is pretty simple. A trip to the county court clerk is all that's needed to request an amended receipt. Vehicles that will be hauling loads exceeding the 26,000 GVWR should be licensed using one of the upper classes (and should probably stay out of Illinois). Call or stop by the county clerk's office for more information.

Armyworms? Yea, Maybe

By Doug Johnson and Patty Lucas

Last week we reported a significant rise in armyworm (AW) moth counts and a warning that they were following the trend set in 2006 and 2008. These years proved to be problematic for armyworm damage especially on hay. This week the story is not so clear.

Unfortunately, our armyworm traps at the Princeton site, just the ONE we needed to see, were damaged by thunderstorm winds. Traps at the Lexington location were not damaged, and no other traps at the Princeton location were damaged. We know that 90 AW moths were captured in two of the seven nights. But captures for as many as five nights may have been lost. So there is just no way to know if the population is increasing or decreasing. We will simply have to wait another week to see what is happening. The trap capture in Lexington did decrease. That may be some sort of indicator, but not necessarily a strong one. It certainly is unnerving that this trapping date occurs at the same corresponding date as the peak flight dates of the 2006 & 2008 outbreak years. It will still pay to keep your eyes open for this pest.

Fortunately we have some time on our side. Since the moth is not the damaging stage, we really only need to know when the caterpillars will appear. Our first real jump in moth numbers was on April 8th.

Using our degree-day model as an estimator, caterpillars from those moths should begin to appear about April 30th. However, there may be a small number of caterpillars out before this date as AW moths have been flying since late March, but in very small numbers. Just remember there is always some risk of AW, the question is whether or not there is an elevated risk this year.

It is probably a little early, but it never hurts to check for the larvae. Caterpillars are likely quite small but may reach about 1.5" long when fully grown. Caterpillars are greenish brown with a narrow stripe down the middle of the back and two orange stripes long each side. The head (very diagnostic) is brown and honeycombed with dark lines. AW is likely the only caterpillar to appear in large numbers in our grass pasture / hay fields and small grains this time of year. For a quick check, look at lodged grain along field edges. Additionally, they prefer low light conditions so check at soil level and in the morning and late afternoon.

Figure 1. Armyworm caterpillar. Note especially the mottled brown head capsule

Remember your fields are likely to be infested at some minimal level. That is no surprise. It is the number of caterpillars present that is important. In small grains the threshold is 16 caterpillars from ½" to ¾" long per four square feet. Larger caterpillars have already done what damage they will do and are about ready to pupate and change to moths. In corn thresholds are 2 or more caterpillars per plant on 25-30% of the plants or 1 caterpillar per plant on 70% of the plants. Thresholds for grass hay are not well established. Watch for very large numbers of caterpillars and obvious damage to grass stands.

If controls are needed, insecticides registered for use against armyworms may be found in Ent-16, 17 or 47; Insecticide Recommendations for Corn or Small Grains or Alfalfa and Pastures & Hay), available at:
http://pest.ca.uky.edu/EXT/Recs/welcomerecs.html
or from the Graves County Extension Office.

Mudding in corn could cause sidewall compaction

By Katie Pratt

Recent rains have slowed corn planting progress across the state. However, it's important for producers to wait for optimal planting conditions to ensure they get good yields at harvest time, said Edwin Ritchey and Lloyd Murdock, extension soils specialists with the University of Kentucky College of Agriculture.

According to the Kentucky Weekly Crop and Weather Report, only 13 percent of the state's corn was in the ground as of April 17. That is well below the 31 percent that was planted by this time in 2010 and lower than the five-year average of 22 percent.

Planting, tilling or trafficking in fields during wet conditions could cause compaction. In most soils, the greatest amount of compaction occurs when a field is at a moisture level that can be tilled but is a little too wet for tillage.

"If the soil stays moist during germination then the roots can penetrate the compacted soil and establish a root system," Ritchey said. "However, if the soil dries and hardens after planting, the roots will not be able to penetrate it."

When planting into wet soils, sidewall compaction can occur due to the opening discs smearing the sidewall of the planter furrow. When sidewall compaction occurs, plant roots will grow mainly in the planting furrow.

"Although plants may look normal at emergence, they will begin to show problems associated with nutrient deficiency and drought stress after the corn is several inches tall," Murdock said. "This problem can be more common in no-till soils because they have better structure and are easier to traffic in wet conditions."

The key to preventing sidewall compaction is waiting until the ground is dry enough to plant. Corn producers can test the moisture level in their fields by molding the soil into a ball with their hands. If the ball will not easily crumble, it's too wet to plant.

Corn planted in the first part of May has an average yield decrease of 1 bushel per acre per day, and corn planted in the latter part of May has an average yield decrease of 2 bushels per acre per day. In a normal year, Kentucky's corn crop is in the ground by May 15 to maintain average yield potential.

Planting dates are important and do influence yields, but it is only one factor used in determining yields. Other factors, such as weather and soil conditions, influence yields too and, in some cases, have a greater impact on yields than planting dates. For example, flooding in 2008 slowed planting progress across the state, but due to rain in July and August, some of the state's highest yielding corn was corn planted after May 1.

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Cooperative Extension Service
University of Kentucky
Graves County
251 Housman St
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