

David G. Hallauer
Meadowlark Extension District Agent
Crops & Soils/Horticulture

Fall Anhydrous Applications - Why Waiting IS Important?

As harvest wraps up, other fall field work starts to become a priority. For those planning to apply anhydrous ammonia, attention to soil temperature is the guiding force behind the start of the application window.

The 'why' can be complicated! In short, we don't want to experience nitrogen loss from wet soils. Nitrogen in the form of nitrate is the N form that can potentially be lost from soils due to these wet conditions via leaching and denitrification (conversion to nitrogen gas). Anhydrous ammonia (which converts to ammonium in water), is not leached or lost by denitrification.

Temperature is the largest influence on the rate of soil nitrification. Research indicates that the optimum temperature for nitrification is around ninety degrees F. Below fifty degrees F, the rate slows rapidly, but nitrification continues until freezing (make sure the temperature is trending downward!!). Since we can't control soil temperatures, we have to manage to avoid the effects they have on N loss.

While nitrification inhibitors can slow the conversion of ammonium to nitrate, they aren't foolproof or permanent! Over time, they degrade in the soil, reducing effectiveness. Soils too warm for anhydrous applications will also speed their breakdown, further reducing effectiveness.

Waiting isn't foolproof! We could remain warm well in to the fall. Spring conditions may be warm and wet, increasing the potential for nitrate loss. Sometimes soils freeze, but not for very long, opening up the opportunity for further conversion of ammonia to nitrate and increasing loss potential. Our soils tend to warm earlier in the spring than northern corn belt soils, meaning conversion starts anew (as a general rule, if the wheat has greened up, the soil is warm enough to support nitrification) and N loss can occur before corn can utilize in the spring.

If you must apply in the fall, make sure you are north of I-70 (eastern and central Kansas), avoid application to sandy soils, and wait until soils are below fifty degrees, using a nitrification inhibitor to help reduce nitrification rates.

Want to know what soil temperatures are doing in Kansas? Check out the Kansas Mesonet site at: <http://mesonet.k-state.edu/weather/soil/> for a look at how temperatures are trending. Validate temperatures locally using a soil thermometer left in the ground at a four inch depth for a time during the middle of the day to see where soil temperatures really sit.