



## Nitrogen management options for water logged fields

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When intense rainfall occurs during the summer, growers may have areas of their fields under saturated conditions for extended periods of time. This undoubtedly led to yellow, stunted corn. The yellowing may reflect nitrogen (N) or other nutrient deficiencies in the corn, but the soil is not necessarily N deficient. The real culprit is oxygen deficiency in the soil. There is little, if anything, you can do in terms of management to relieve this crop stress. As Dr. Emerson Nafzinger, corn agronomist at the University of Illinois, reminds us “Applying foliar forms of nitrogen or dry forms such as urea will not do much good until the water goes away and the roots start to take up oxygen” (Nafzinger, 2010). If the water subsides or drains without causing too much delay in corn growth, yields may not be overly suppressed. During periods of soil saturation, not only is plant growth inhibited but the applied N fertilizer is susceptible to loss via leaching or denitrification. So when corn growth resumes, less N is available in the soil system. If these conditions occur, as they have this year, past the point where conventional sidedress application equipment can enter a field, there may not be many additional corrective options growers have at their disposal. So, what can we learn from the 2010 growing season? From a nutrient management perspective, we can learn where the areas of the field are where application of fertilizer technologies may be beneficial.

There are two fertilizer technology products that can be beneficial on periodically saturated soils: poly-coated urea (PCU) and nitrification inhibitors. The PCU is beneficial because the urea is not exposed to the soil environment where it can be hydrolyzed into ammonium and nitrified into nitrate. In seasonally wet soils in Missouri, Noellsch et al. (2009) determined that there was an economic advantage to applying PCU over urea in parts of the landscape that are subject to saturation. Nitrification inhibitors work because the inhibitor product will kill off or interfere with the metabolism of soil bacteria (*Nitrosomonas*) responsible for the first step in the nitrification process in the area around the urea granule. A few weeks ago at the Crop and Pest Management Workshop at the Arlington Agricultural Research Station, I hosted a demonstration trial where no-till corn was fertilized with ammonium nitrate, urea, urea+Agrotain® (urease inhibitor) and SuperU® (urease and nitrification inhibitor). The corn plots that were fertilized with a nitrification inhibitor exhibited less N deficiency symptoms (yellowing of lower leaves) compared to corn fertilized with urea or ammonium nitrate. Whether or not this will lead to improved yields remains to be seen, but these visual observations suggest that N was conserved in the soil system.

Overall, I would encourage growers to experiment with PCU and nitrification inhibitors on parts of the field most prone to saturated conditions. Consider both agronomic and economic incentives when deciding to utilize these technologies on your fields. Remember - the benefit of these products may not be real-



ized in every year and only realized when N is not over-applied.

References:

Nafzinger, E. Can Flooded Corn Be Salvaged? The Bulletin, Issue 12, Article5/June 25, 2010. University of Illinois Extension.

Noellsch, A.J., P.P. Motavalli, K.A. Nelson and N.R. Kitchen. 2009. Corn response to conventional and slow-release nitrogen fertilizers across a claypan landscape. *Agron. J.* 101:607-614.