

LATE NITROGEN APPLICATION DEMONSTRATION – CORN YIELD UPDATE

John Sawyer, Professor, Department of Agronomy, Iowa State University

Nitrogen (N) Rate Trial Demonstration – Yield Update

Each year at the ISU Field Extension Education Laboratory we run a N rate demonstration where fertilizer N rates (0-250 lb N/acre in 50 lb increments) are applied to corn at planting (rates have been applied for 11 years to the same plots each spring). This year (2010) we only applied the at-planting N to half of the plots and left the other half with no N applied (in continuous corn).

During the Field Diagnostic and Crop Management Clinics this summer attendees asked if the corn that did not have N application would respond (growth and grain yield) to N applied at the time of the clinics. The corn on July 12 was near tasseling (tassels in the whorl but not emerged), and was severely N deficient in all plots with no N applied (similar deficiency with all previous N rates). The field was not flooded, so plant N deficiency symptoms were from high rainfall and lack of available N.

To take a look at what would happen if N were to be applied at that late timing (corn stage and calendar date), ammonium nitrate was surface broadcast to the soil (dribbled between each row on July 14) in the 50 and 100 lb N/acre plots where no spring N had been applied in 2010. The late N was applied at 50 and 100 lb N/acre to those two respective N rate plots. The first significant rain after that N application was approximately one inch total on July 18/19, with total rainfall more than thirteen inches from July 14 to August 13.

An earlier Current Topic article written on [August 16, 2010](#) discussed visual plant response to the late applied N. This is not a replicated study, with grain yield from only a few plots. There were also other fertility demonstrations in the overall plot area, so definite interpretation is not possible, nor is statistical analysis. Therefore, do not over-evaluate the results. As found with the visual plant response, the corn grain yield did respond to the late N application. Yield in the neighboring plots where no N was applied, the grain yield was 63 bu/acre. In the plot with the 50 lb N/acre late-applied N, the yield was 112 bu/acre, and in the plot with the 100 lb N/acre late-applied N, the yield was 126 bu/acre. These are yield improvements, however, in the plots where adequate N was applied at planting the yield was 175 bu/acre. So yield potential was lost with the severe and extended N stress.

It is impossible from this demonstration to know what late-applied N rate would be best in this particular situation. Of course it would have been much better to not have the corn get so N stressed, and for so long, but it is interesting the plants did respond to the late N and increased yield. This small demonstration does show the potential for supplemental N applications to help corn production when conditions have caused N loss or made planned and timely applications impossible. Other discussion and information on in-season N applications is provided in the following references.

Resources for In-Season N Application Decisions

Sensing Nitrogen Stress in Corn:

Soil Fertility: Current Topic

October 26, 2010

<http://www.extension.iastate.edu/Publications/PM2026.pdf>

In-Season Nitrogen Management for Corn Production:

<http://www.agronext.iastate.edu/soilfertility/info/NC2007-p38-Sawyer.pdf>

ISU Agronomy Extension Soil Fertility Web site:

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