

Response of Wheat to Residual N after Drought-stressed Corn

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Introduction

In 2012, extreme hot and dry conditions reduced corn crop yields. These drought-induced, low-yielding conditions likely resulted in low nitrogen uptake by corn. As a result, the potential exists for unused fertilizer N left in the soil. However, the potential carry-over of unused N fertilizer is uncertain because of the dynamics of N cycling.

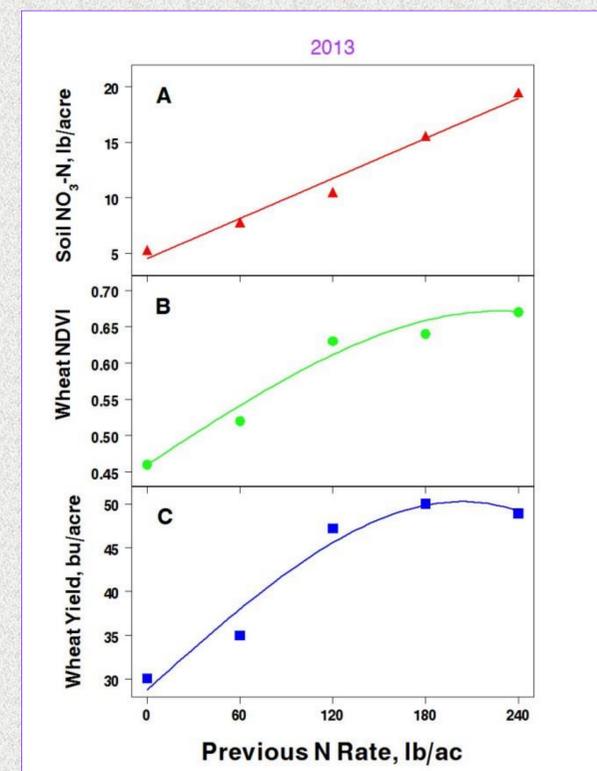
Rainfall and Temperature from 6/22/12 to 8/4/12 (Corn Reproductive Growth Period)

- Total Rainfall was 0.75 inches
- Avg. Maximum Air Temperature was 99.4 °F
 - 20 days of that period was ≥ 100 °F

Will there be any carryover effect from the N applied to the corn to benefit the following wheat crop?

Sequence of Events for Following Wheat Crop

- 10/8/12: Planted Everest @ 1.5 bu/ac with no tillage and no fertilizer
- 4/5/13: At first sign of jointing, took soil samples from 0-12" depth
- 4/9/13: At jointing, took NDVI (normalized difference vegetation index) readings with Trimble Greenseeker® Handheld Crop Sensor
- 6/25/13: Harvest



Objective

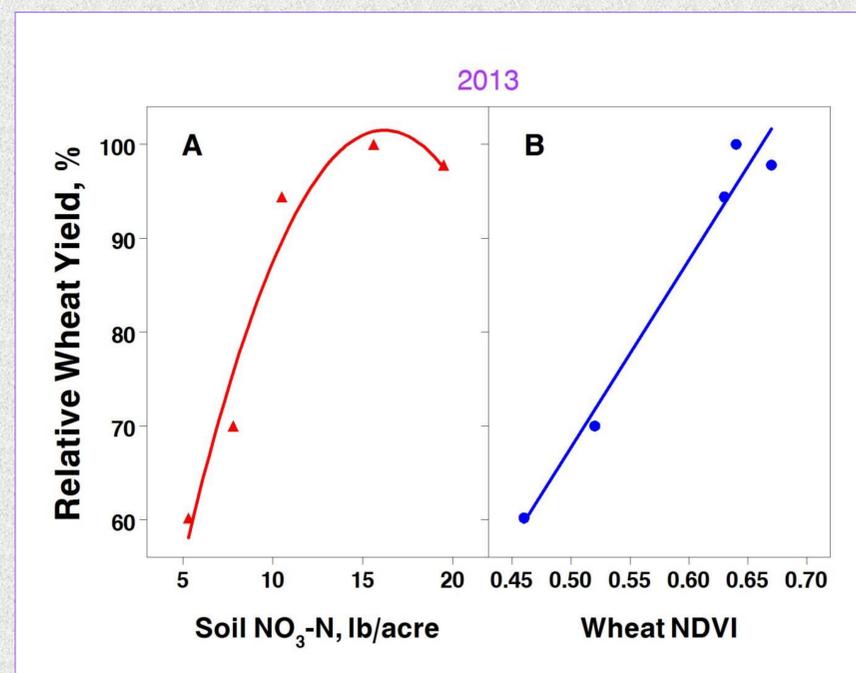
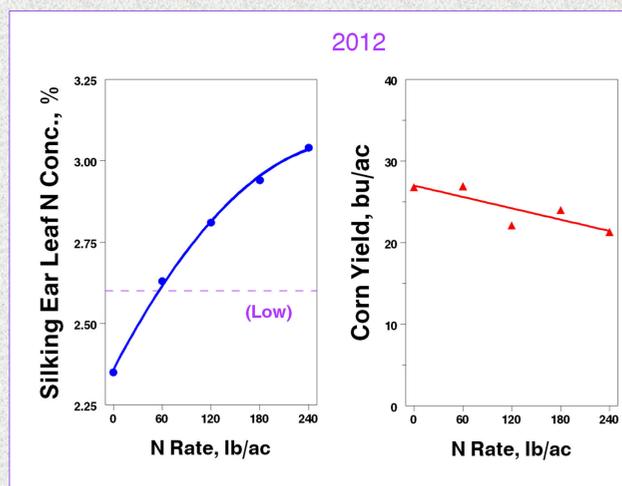
The objective of this study was to determine the effect of residual N that had been applied to a previous, drought-failed corn on the following wheat crop.

Corn Results...or lack of...

- Nitrification inhibitors did not affect corn yield, yield components (stand, kernel weight, ears/plant, or kernels/ear), ear leaf N concentration at silking, or grain N content.

Corn Treatments – 2012

- N Rates: 60, 120, 180, 240 lb/ac
- Nitrification Inhibitors
 - None
 - Experimental 1X rate (Koch)
 - Experimental 2X rate (Koch)
 - Instinct (35 oz/ac)
- Control: No N or Inhibitor



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Sequence of Events - 2012 Corn

- 4/11: Plant corn no-till at 22,700 seeds/ac
- 4/26: Rotary Hoed to help with emergence
- 5/4: Very poor emergence
 - Sprayed with Arrow 2EC
 - Replanted at 22,700 seeds/ac
- 6/6: V6 stand nearly 100%
- 6/26 – 7/1: Silking

Conclusions

- Preplant fertilizer N applied to corn that was later stricken by drought can carry-over and affect subsequent wheat yield.
- Inorganic soil N may not always be a reliable indicator of the residual effect of previous N rates on subsequent wheat yield.
- Differences in NDVI measurements of wheat made at jointing appear to be a good indicator of differences in final yield.