**Experiment**: Foliar Nitrogen Applications on Corn
**Year (Experiment Number):** 2008 (08-305, 08-515)
**Date of Planting/Harvest:** April 25/May 2 / October 22/15
**Variety:** DEKALB 5044
**Plot Size:** 15 ft. x 130/210 ft. (5 reps) 15 ft. x 50 ft. (4 reps)

**Soil Test Levels (305/515)**
pH: 7.2 / 6.9 C.E.C.: 4.5 / 13.0
OM: 1.8 / 2.7% P1: 34 / 30 ppm
K: 59 / 100 ppm (3.4 / 2.0% BS)

**Objective:** Evaluation of partial nitrogen sidedress rates with supplemental foliar nitrogen applications on corn.

With nitrogen prices on the rise, many growers are looking at ways to cut back on expenses and still produce satisfactory corn yields. Coron 25-0-0 plus 0.5% Boron, a Helena product, has been promoted to help with this situation. According to their label, foliar applied Coron can be used as a partial sidedress nitrogen replacement when applied to corn at the V6-V8 growth stage. See rate structure below.

**Coron partial sidedress replacement rates**

3 gal = 37.5 lbs of nitrogen
4 gal = 50.0 lbs of nitrogen
5 gal = 64.0 lbs of nitrogen

Agro-Culture Liquid Fertilizers product, NResponse is a low salt urea based nitrogen source, with an analysis of 24-0-0 with 1% sulfur. This product works well as a foliar application. For comparison, applications were made using the same rate structure as Coron, to determine the differences between the two nitrogen products foliar applied.

Two experiments were established at the North Central Research Station evaluating reducing the sidedress nitrogen program by 50 equivalent pounds per acre and replacing it with a foliar application at the V7 growth stage of either 4 gal/A NResponse or 4 gal/A Coron.

At each site, the corn was planted with an in-furrow application of Pro-Germinator, Sure-K and micronutrients according to soil test *(see Table 1 below).* Two different sidedress nitrogen sources were used, one at each site. Both sites were sidedressed with 210 pounds of equivalent nitrogen for the standard sidedress and 160 pounds of equivalent nitrogen for the partial sidedress. Please note, because the nitrogen sources are being applied at "equivalent" rates of nitrogen, these plots were only reduced by 39 pounds of actual nitrogen with 28% + eNhance and 30 pounds of actual nitrogen with High NRG-N. Rather than the 50 pounds per acre as suggested by the Coron label. Therefore, more actual nitrogen is being applied with foliar applications than recommended on the label. Sidedress was done on June 11th and both fields of corn were in the V5 growth stage and between 12-14 inches tall. Fertilizer sources and rates by site appear on Table 1 below.

## Table 1: Fertilizer Rates By Site

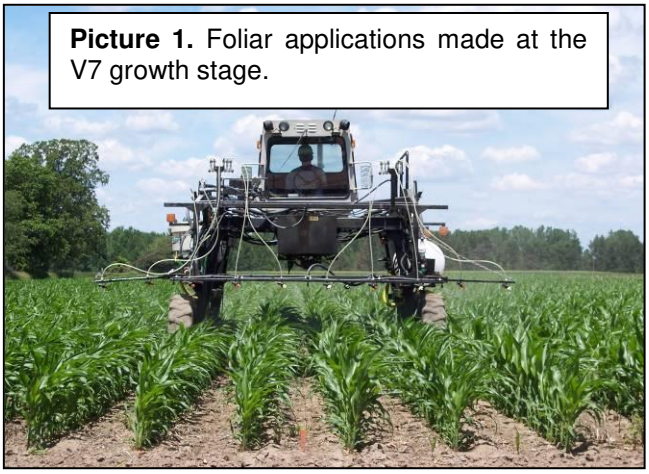
| | Site 1 *(08-305)* | Site 2 *(08-515)* |
|---|---|---|
| Planter Fertilizer | 2 gal Pro-Germ. + 8 gal Sure-K + 2 qt Micro 500 + 1 pt B | 3 gal Pro-Germ. + 6 gal Sure-K + 2 qt Micro 500 |
| Standard Sidedress | 56 gal 28% + eNhance | 42 gal Nresponse |
| Partial Sidedress | 43 gal 28% + eNhance | 32 gal Nresponse |

Treatments were the same at each site, with the only difference being the source and rate of sidedress nitrogen. Treatments are listed in the box below.

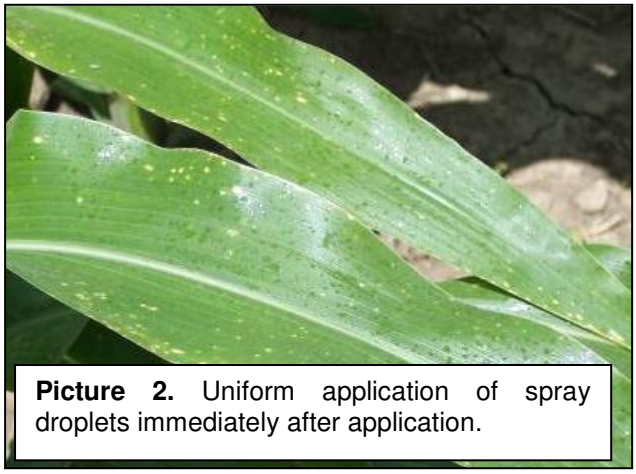
## Treatments:

1. **Standard Sidedress**
2. Partial Sidedress
3. **Standard Sidedress** + 4 gal NResponse
4. Partial Sidedress + 4 gal NResponse
5. **Standard Sidedress** + 4 gal Coron
6. Partial Sidedress + 4 gal Coron

Foliar applications were made with self-propelled plot sprayer with a total volume of 10 gal/A at 40 psi. Applications were made on June 24th; the corn was in the V7 growth stage and between 22-24 inches tall.
See application pictures 1 and 2 below.



**Picture 1.** Foliar applications made at the V7 growth stage.



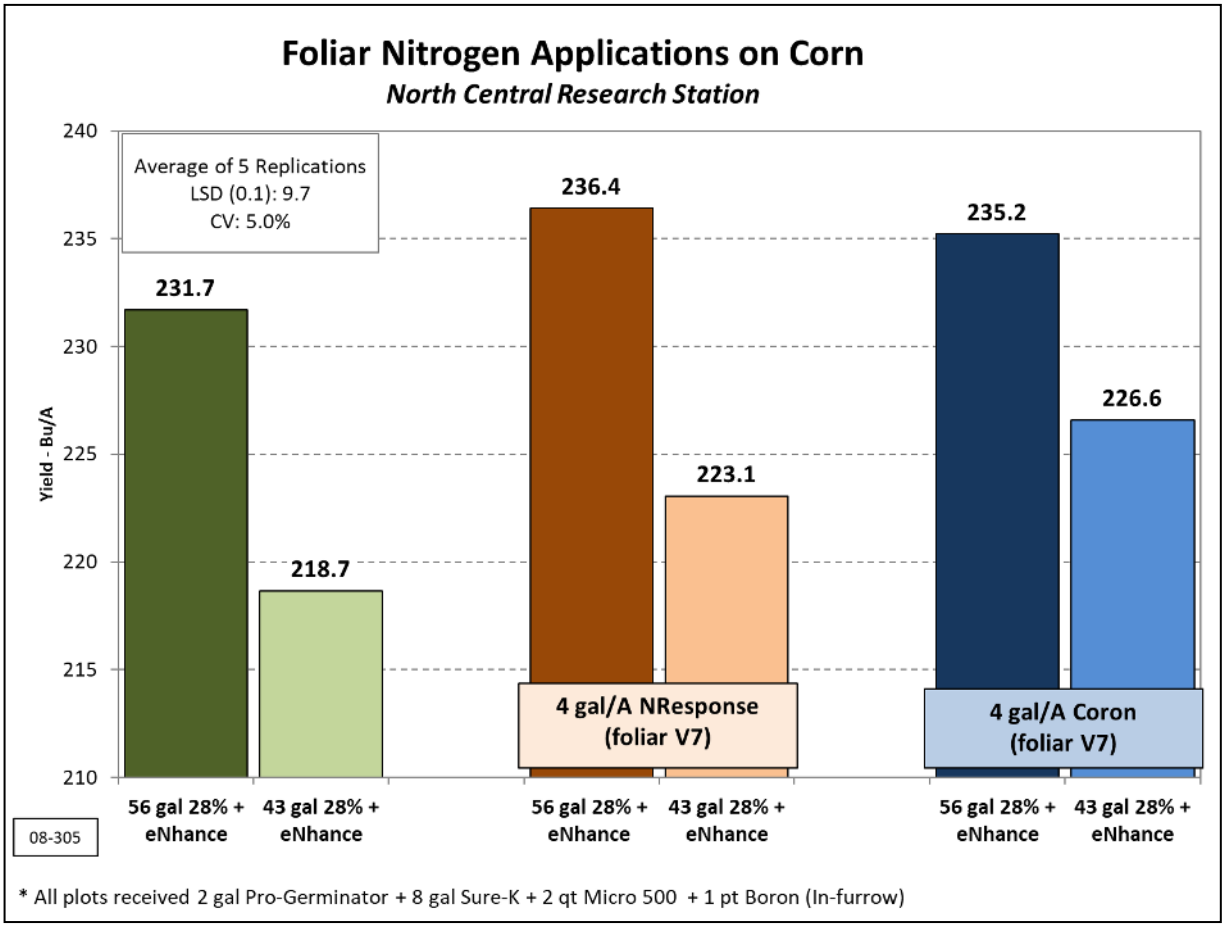
**Picture 2.** Uniform application of spray droplets immediately after application.

Visual evaluations were made on July 8th, which was 2 weeks after application. There was no noticeable tissue burn on the Coron treated plots. However, slight speckling was seen on the NResponse treated plots. *(See picture 3 to the right)* The injury was noticed on what would have been the upper most fully developed leaf at the time off application with no injury seen on the newly developed leaves above it. The speckling was determined to be slight tissue burn from the NResponse droplets that would have no effect on yield as the plant seemed to develop normally with good growth and color after application. When comparing **Picture 2**, the droplets after application to **Picture 3**, the tissue burn note that not all of the NResponse droplets caused tissue burn.

**Picture 3.** Tissue burn, two weeks after application of NResponse. No yield decreases occurred.

Yields for each site appear on *Chart 1* (site 1) and *Chart 2* (site 2) below.

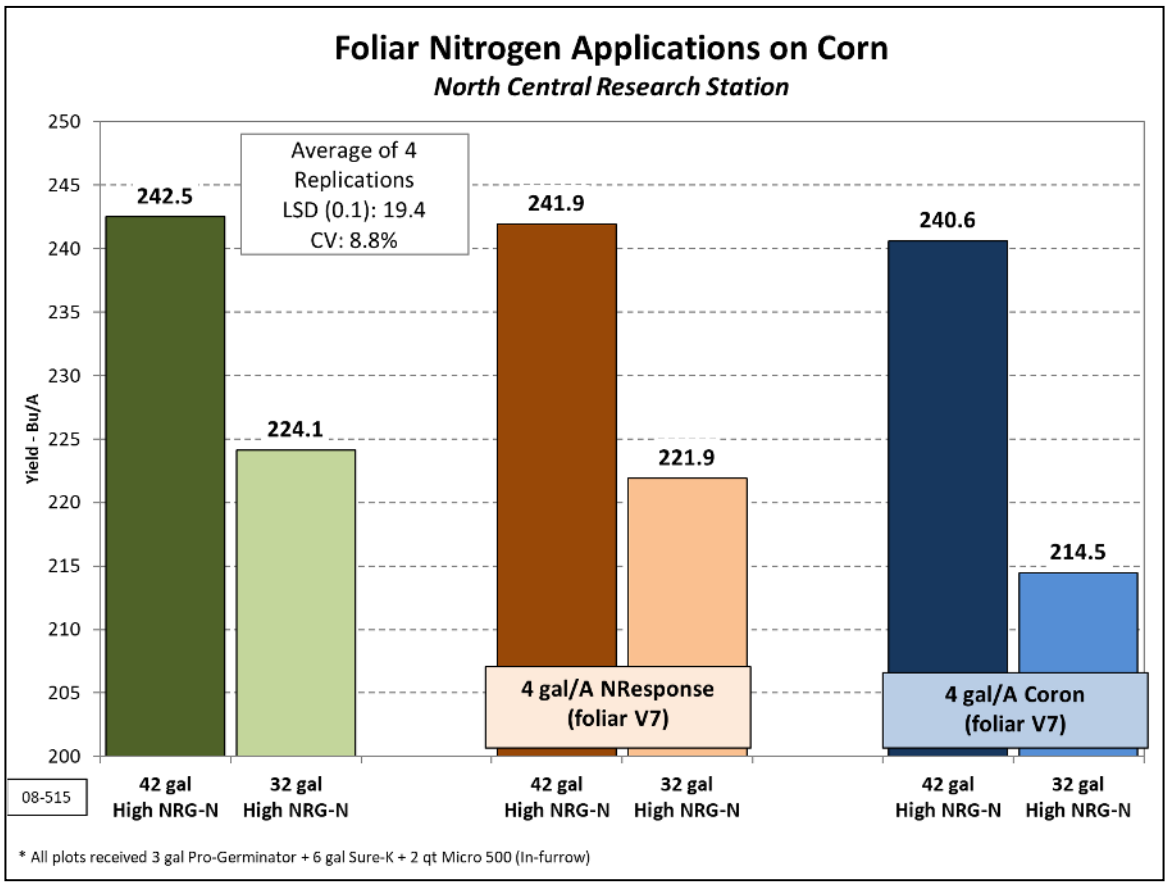
## Site 1 (08-305)




**Site 1 Results:**

- The partial sidedress rate (160 lbs equivalent N) yielded significantly lower, than the standard sidedress rate (210 lbs equivalent N) in each comparison. (No foliar: 13 bu/A, NResponse: 13.3 bu/A and Coron: 8.6 bu/A.)
- The addition of 4 gal NResponse increased corn yield by over 4 bu/A for both sidedress nitrogen rates.
- Coron applied at 4 gal/A increased corn yield over 4 bu/A at both nitrogen rates compared to the no foliar applications.
- As seen with the NResponse the partial sidedress rate with foliar Coron did not achieve a yield as high as the standard sidedress rate.
- Little difference in yield was seen with each set of three treatments with the same sidedress nitrogen rate *(56 gal: 231.7 bu, 236.4 bu, 235.2 bu and 43 gal: 218.7 bu, 223.1 bu, 226.6 bu).* Therefore, it can be concluded that the slight tissue burn seen with NResponse did not affect corn yield.

## Site 2 (08-515)




**Site 2 Results:**

- The partial sidedress rate (160 lbs N) yielded significantly lower, than the standard sidedress rate (210 lbs N) in each comparison. (No foliar: 18.4 bu/A, NResponse: 20 bu/A and Coron: 26.1 bu/A.)
- At this site, no yield increase was seen with either foliar applied NResponse or Coron for both of the sidedress rates.
- The addition of NResponse foliar applied to the partial sidedress yielded significantly lower than the standard sidedress rate, over 20 bu/A.
- Similarly, a foliar application of Coron yielded 28 bu/A lower than the standard sidedress rate of 42 gal/A High NRG-N
- Little difference in yield was seen with each set of three treatments with the same sidedress nitrogen rate *(42 gal: 242.5 bu, 241.9 bu, 240.6 bu and 32 gal: 224.1 bu, 221.9 bu, 214.5 bu).* Therefore, it can be concluded that the slight tissue burn seen with NResponse did not affect corn yield.

**Summary:**

It is obvious by these two studies that more work needs to be done to determine the effects and advantages of partial sidedress nitrogen applications with supplemental with foliar nitrogen.