

# Corn: Nitrogen Planter Applications



- Effect of Nitrogen Fertilizer Addition to Planter Fertilizer in Dryland Corn (2005)
- Effect of Nitrogen Fertilizer Addition to Planter Fertilizer in Irrigated Corn (2005)

**Experiment:** Effect of Nitrogen Fertilizer Addition to Planter Fertilizer in Dryland Corn

**Year (Experiment Number):** 2005 (05-11)

**Date of Planting/Harvest:** May 5 / Oct. 24

**Hybrid:** Pioneer 37R71

**Plot Size (replications):** 4 row x 100 ft. (3)

**Soil Test Levels (ppm)**

pH: 6.5 C.E.C.: 7.6

OM: 1.9% P1: 37 ppm

K: 136 ppm (4.7% BS)

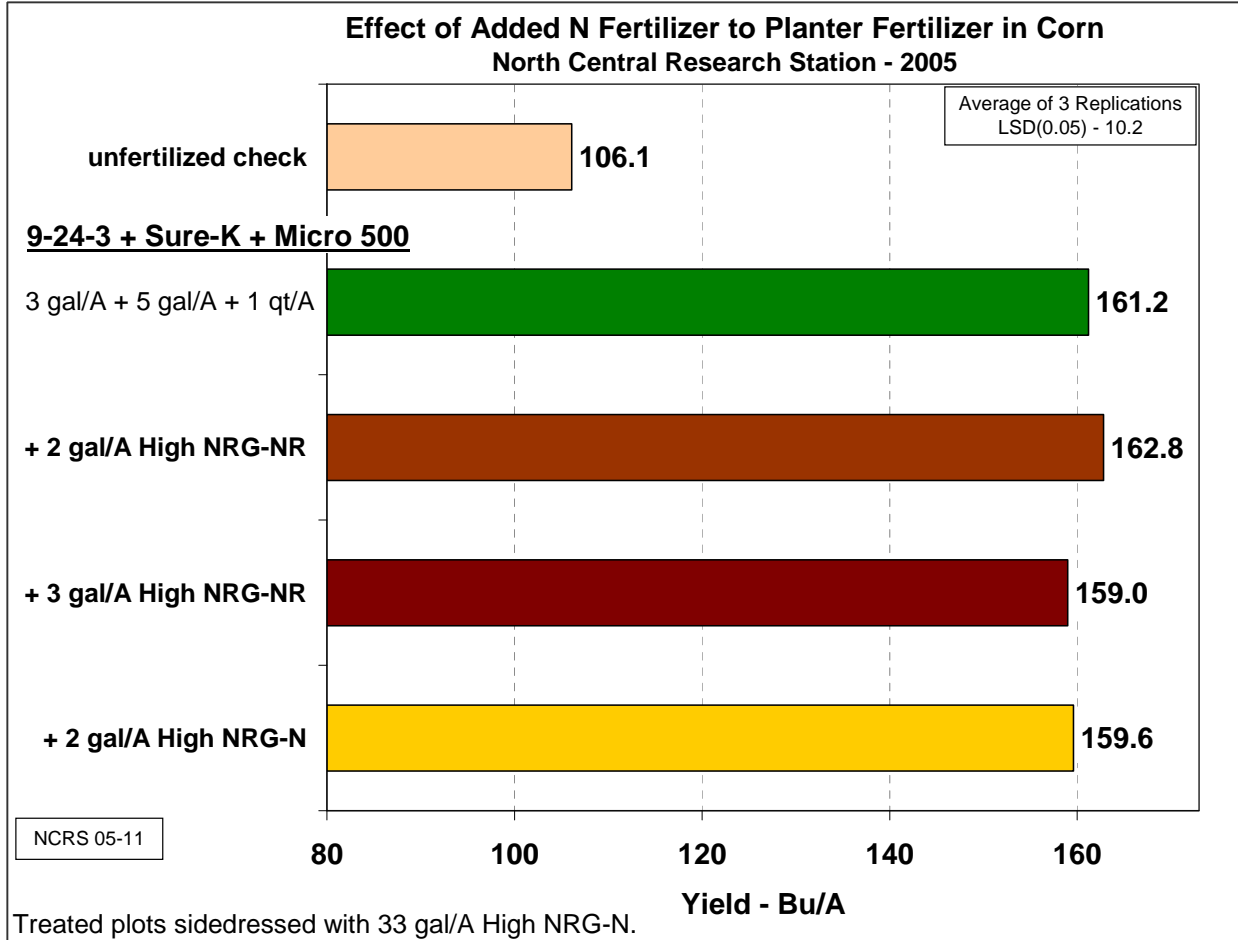
Some growers may want to “spike” their regular planter-applied fertilizer with additional nitrogen fertilizer. At the North Central Research Station, we have found that this has not resulted in yield increases and there is the potential for crop injury by stand reduction. The real nitrogen demand for corn does not occur until some 30 days after planting, and the nitrogen in the planter-applied fertilizer, such as Pro-Germinator 9-24-3, is sufficient for any early nitrogen demand. This experiment was conducted to further evaluate nitrogen additions, including the new formulation of urea-based N fertilizer called High NRG-NR, which is 24% nitrogen with 2.4 pounds of actual N per gallon.

All planter-applied fertilizer was applied in the seed furrow through tubes attached to Keeton Seed Firmers. The effect of nitrogen fertilizer addition on plant stand is shown in Table 1.

Table 1. Effect of planter fertilizer on corn stand		
Planter Fertilizer (PF): 3 gal/A 9-24-3+ 5 gal/A Sure-K + 1 qt/A Micro 500		
Fertilizer	Placement	Plants per acre
1. PF only	In-Furrow	24,885
2. PF + 2 gal/A High NRG-NR	In-Furrow	25,119
3. PF + 3 gal/A High NRG-NR	In-Furrow	24,415
4. PF + 2 gal/A High NRG-N	In-Furrow	26,293
5. No planter fertilizer	--	24,298
no signif. differences		

- There was no statistically significant difference in plant stand from in-furrow fertilizer application compared to no fertilizer.
- The addition of nitrogen fertilizer to the planter fertilizer did not reduce stand.
- It is not understood why there was no stand reduction in this experiment, and there was severe reduction in the previous experiment. They were on different farms at the NCRS, but conditions were not substantially different, although slightly different planter fertilizer rates were used and there were different hybrids. Planting dates were within 3 days of each other. This just illustrates the potential danger of in-furrow application of nitrogen.

Treatment effects on yield are in the following chart.



- There was no benefit to addition of nitrogen fertilizers to planter fertilizer.

**Experiment:** Effect of Nitrogen Fertilizer Addition to Planter Fertilizer in Irrigated Corn  
**Year (Experiment Number):** 2005 (05-06)  
**Date of Planting/Harvest:** May 2 / Oct. 24  
**Hybrid:** Pioneer 36B11  
**Plot Size (replications):** 4 row x 210 ft. (5)

<b>Soil Test Levels (ppm)</b>	
pH: 6.8	C.E.C.: 8.8
OM: 2.4%	P1: 42 ppm
K: 111 ppm	(3.2% BS)

It is often thought that addition of nitrogen fertilizer to planter fertilizer applications for corn will result in increased yield. However, in-furrow application of liquid nitrogen solutions increases the chance of crop injury. Previous work at the *North Central Research Station* has not shown increased yield with addition of several gallons of N fertilizer to planter fertilizer. Additionally, in some years addition of High NRG-N to in-furrow fertilizer applications has reduced stand and in some years it has not, even at rates up to 5 gallons or more per acre. But no yield increase has been demonstrated. The strong nitrogen demand by developing corn does not start until around 30 days after planting (the time of sidedress), and the nitrogen from Pro-Germinator 9-24-3 can meet plant needs until that time.

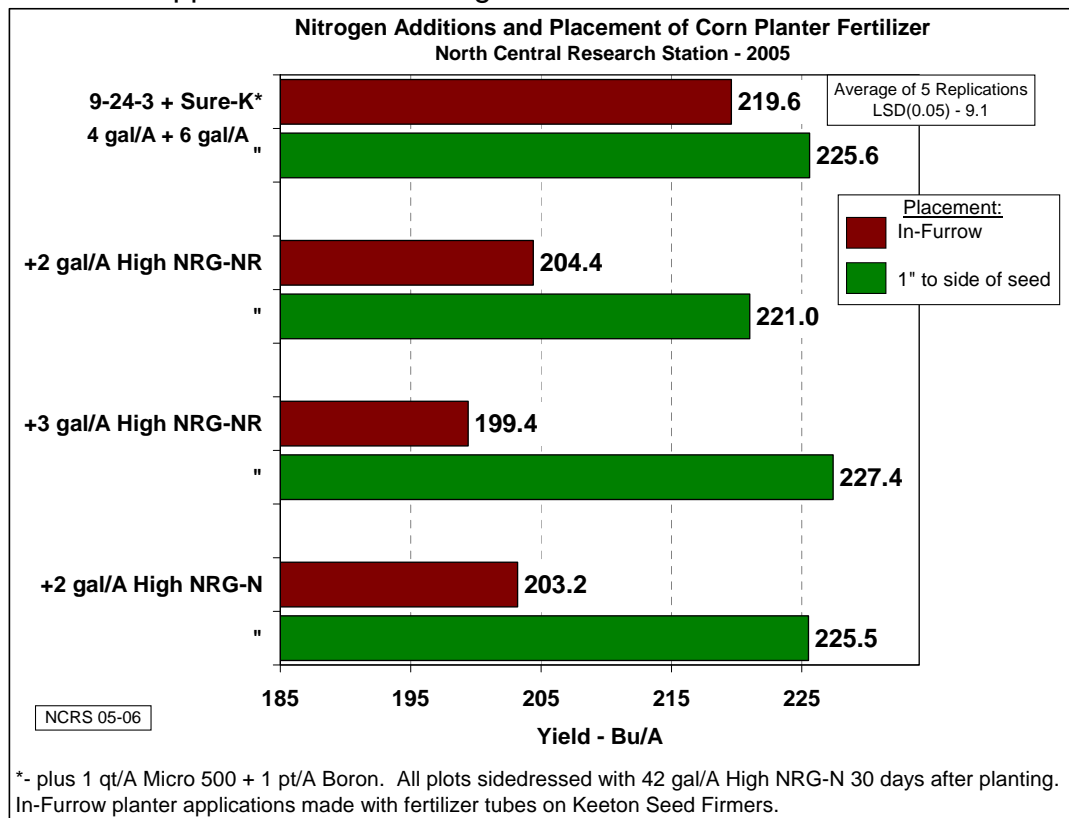
Agro-Culture Liquid Fertilizers has developed a new experimental formulation of nitrogen fertilizer that is urea-based called High NRG-NR. High NRG-NR is 24% nitrogen, and 2.4 pounds of actual nitrogen per gallon. It is not formulated for slow release like High NRG-N, and perhaps would be better suited for early nitrogen response by corn. In 2004, addition of 3 gal/A of High NRG-NR to planter fertilizer resulted in an 11 Bu/A yield increase in corn. This application was beside the row and not in-furrow.

Based on this, an experiment was conducted to further evaluate nitrogen application with the planter-applied fertilizer, both in the seed furrow and beside it. A 2 and 3 gal/A rate of High NRG-NR and a 2 gal/A rate of High NRG-N were used. (Note: nitrogen applications with planter-applied fertilizers are in addition to the sidedress nitrogen. The sidedress rate of 42 gal/A High NRG-N was not adjusted to reflect planer applied nitrogen.) For this soil, a planter-applied program of 4 gal/A Pro-Germinator 9-24-3 + 6 gal/A Sure-K + 1 qt/A Micro 500 + 1 pt/A Boron was used for all treatments. Treatments were applied either and inch to the side of the row or in the seed furrow with fertilizer tubes attached to Keeton Seed Firmers. All plots were sidedressed with 42 gal/A of High NRG-N 30 days after planting. Stand counts appear in the following table.

Table 1. Effect of planter fertilizer and placement on corn stand		
Planter Fertilizer (PF): 4 gal/A 9-24-3+ 6 gal/A Sure-K + 1 qt/A Micro 500 + 1 pt/A Boron		
Fertilizer	Placement	Plants per acre
1. PF only	In-Furrow	31,622
2. "	1" to side of seed	30,108
3. PF + 2 gal/A High NRG-NR	In-Furrow	23,734
4. "	1" to side of seed	30,848
5. PF + 3 gal/A High NRG-NR	In-Furrow	24,298
6. "	1" to side of seed	30,214
7. PF + 2 gal/A High NRG-N	In-Furrow	22,467
8. "	1" to side of seed	30,989
LSD(0.01)		4,665

- In the absence of added nitrogen (treatment 1 and 2), placement did not have a significant effect on stand.
- Addition of nitrogen to the In-Furrow treatment had a significant negative effect on corn stand. Although this may not occur all the time, it illustrates the potential danger of this application.

Yield data appears in the following chart.



- In the absence of added nitrogen, there was no statistically significant difference in yield due to fertilizer placement, although the higher yield was with placed to the side of the seed.
- All additions of nitrogen fertilizers to the planter-applied fertilizer resulted in significant yield reduction, as reflected by the reduced stand counts.

- The addition of nitrogen fertilizer to treatments placed to the side of the seed did not result in increased corn yield compared to the standard planter-applied treatment without nitrogen. This indicates that early nitrogen is sufficiently supplied by the nitrogen in the Pro-Germinator 9-24-3 and Sure-K.
- These results are contrary to those in 2004 where the addition of 3 gal/A of High NRG-NR did result in a significant yield increase, when placed 1" to the side of the seed. This is likely due to the 2004 growing season being ideal for corn growth, and the corn used the additional nitrogen. But 2005 was more normal with weather stresses, and nitrogen was not the yield limiting factor.
- So it is not recommended to place nitrogen fertilizer in the seed furrow due to injury potential and lack of a proven yield benefit.