

# On-farm Corn Fertilizer and Related-Product Trials

## RFR-A1310

### Methods

Most cropping systems require fertilizer inputs in order to maintain crop yields. In 2013, five trials utilizing various methods of fertilizing corn were investigated (Table 1). In Trial 1, nitrogen (N) rates based on the “Adapt-N strategy” developed at Cornell University were compared with rates based on the Maximum Response to Nitrogen (MRTN) strategy based on corn yield response research in the Midwest. The Adapt-N strategy uses site-specific information, including soil type and climate data to make N fertilizer recommendations for corn. The MRTN method utilizes data from corn response to N trials and prices of N fertilizer and corn to make nitrogen recommendations. The corn nitrogen rate calculator (<http://extension.agron.iastate.edu/soilfertility/nrate.aspx>) utilizes the MRTN method.

### Results

Most research comparing the two methods has shown the Adapt-N method tends to result in lower than optimum rates of N fertilizer compared with the MRTN method in the Midwestern states. However, in this trial the Adapt-N method resulted in an application of about 70 lb/acre more N than the MRTN method, which resulted in a yield increase of 14 bushels/acre (Table 2). With the excess spring rainfall resulting in greater losses of nitrate-N, it is not surprising that a greater yield was obtained with the higher rate of N fertilizer. Also, this may be a unique site where the Adapt-N method usually results in higher recommended rates of N than the MRTN method.

In Trial 2, a “Cattawater” plant extract treatment was compared with an untreated control. No difference in yield was seen between treatments. In Trial 3, a starter fertilizer application of 5 lb/acre N, 10.5 lb/acre P<sub>2</sub>O<sub>5</sub>, and 5 lb/acre K<sub>2</sub>O was compared with an untreated control. There was a significant yield increase of about four bushels/acre with the starter fertilizer. The yield increase could have been partially due to the extra N, because the rate of N was not adjusted upward in the control. In Trial 4, a foliar application of CORON-N was compared with an untreated control using two different corn hybrids. CORON-N is marketed as a “controlled release nitrogen” for foliar application. No response in yield was seen with the treatment with either of the hybrids. In Trial 5, a micronutrient seed coating was compared with an uncoated seed treatment. No response in yield was seen with the seed coating.

**Table 1. Hybrid, row spacing, planting date, planting population, previous crop, and tillage practices from fertilizer trials in corn.**

Exp. No.	Trial	County	Hybrid	Row spacing (in.)	Planting date	Planting population (seeds/A)	Previous crop	Tillage practices
130404	1	Humboldt	Wyffels W-5072	30	5/13/13	35,000	Soybean	Strip till
130115	2	Lyon	Wensman 9325	30	5/13/13	34,700VR	Soybean	Spring strip till
130311	3	Crawford	Pioneer 34F07	30	5/14/13	29,500	Soybean	No-till
130608	4	Cass	Pioneer 1151AM and 1498AM	30	5/15/13	33,000	Soybean	No-till
130618	5	Mills	NT 5F811 AM	30	5/16/13	32,000	Soybean	No-till

**Table 2. Yield from corn fertilizer trials.**

Exp. No.	Trial	Treatment	Yield (bu/A)****	P-value
130404	1*	Adapt-N Rate (135 lb/A sidedress)	149.0 a	<0.01
		MRTN N Rate (62 lb/A sidedress)	135.1 b	
130115	2	Cattawater Ag plant extract	219.6 a	0.73
		Control	220.5 a	
130311	3	Starter fertilizer (in-furrow)**	168.7 a	0.03
		Control	164.9 b	
130608	4a***	Foliar Coron N @ 3 gal/A	158.5 a	0.44
		Control	165.0 a	
	4b***	Foliar Coron N @ 3 gal/A	164.1 a	
		Control	156.9 a	
130618	5	Micronutrient seed coating	174.4 a	0.49
		Control	173.0 a	

\*62 lb/A N applied in both treatments prior to the sidedress application.

\*\*5 gal/A (5 lb/A N+10.5 lb/A P<sub>2</sub>O<sub>5</sub> +5 lb/A K<sub>2</sub>O).

\*\*\*Hybrid was Pioneer 1151 AM in Trial 4a and Pioneer 1498 AM in Trial 4b.

\*\*\*\*Values denoted with the same letter within a trial are not statistically different at the significance level 0.05.