

CORN RESPONSE TO AN IN-ROW BAND OF POLYMER-COATED UREA COMPARED WITH UREA

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Nitrogen fertilizer placed in close proximity to the seed may cause seedling damage or toxicity. The osmotic effects and/or ammonia toxicity may result in stand loss; therefore, avoiding close contact with the seed is desired. Fertilizer placement with the seed has been used as an efficient fertilizer application method to reduce expense and increase uptake efficiency of small grains in the Canadian prairies and sorghum in Kansas. In Kansas, urea as a seed placed starter caused stand loss and reduced yield when compared to polymer coated urea (PCU); however, there was no effect on seed germination when PCU was placed with the seed (Whitney and Gordon, 1998; Whitney et al., 2000). We hypothesized that placement of polymer coated urea in close proximity to corn seed would have no effect on corn plant establishment which would result in increased grain yields when compared to urea. The objective of this research was to determine corn response to rates and placement of polymer- and non-coated urea.

A field trial with three replications was established at the Greenley Research Center in 10 by 50 ft plots in 2007 and 2008. This research was arranged as a split-plot design with fertilizer source (polymer-coated urea as ESN or non-coated urea placed in the row in front of the planter row unit or 2 inches over & down) as the main plot and rate (50, 100, or 150 lbs N/acre) as the sub-plot. 'DK 63-46' was no-till planted at 32,000 seeds/acre 24 April 2007 and 15 June 2008. Plants were evaluated for injury and population was determined for both center rows prior to harvest. Grain yield was adjusted to 15% prior to analysis. All data were subjected to ANOVA and means separated using Fisher's Protected LSD at P=0.10.

There was no interaction between fertilizer placement/source and rate. In-row placement of fertilizer did not come in direct contact with the seed. In-row placement was in front of the no-till coulter in a concentrated band surrounding the seed. The beside-row placement was incorporated with a double-disk opener typical of dry fertilizer application with a screw auger using a dry fertilizer applicator attachment on a JD 7000 planter. There was no significant effect of fertilizer placement on corn population or grain yield in 2007 (Table 1). There was a rate response to N fertilizer in 2007 (Table 2).

References:

Whitney, D.A. and W.B. Gordon. 1998. Evaluation of polymer-coated urea as a starter nitrogen source for wheat. Kansas Fertilizer Research. Report of Progress, 829. pp. 11-12.

Whitney, D.A., W.B. Gordon, and A.J. Schiegel. 2000. Controlled-release nitrogen fertilizer in starter for sorghum production. Kansas Fertilizer Research. Report of Progress, 868. pp. 89-91.

Table 1. The effect of fertilizer placement on corn grain yield in 2007. Data were averaged over fertilizer rate.

Placement	Source	Population plants/acre	Yield bu/acre
In-row	Urea	30,900	161
	Polymer-coated urea (ESN)	30,200	166
2 in. over and down	Urea	30,700	173
	Polymer-coated urea (ESN)	32,000	178
LSD (P=0.10)		NS	NS

Table 2. Grain yield response to urea rates in 2007. Data were averaged over placement and source.

Rate Lbs N/acre	Yield bu/acre
50	146
100	169
150	194
LSD (P=0.10)	14