

CORN YIELD RESPONSE TO POLYMER – AND NON-COATED UREA PLACEMENT AND TIMINGS FOLLOWING RED CLOVER IN NORTHEAST MISSOURI

Patrick Nash

Graduate Student

Peter Motavalli

Professor

Kelly Nelson

Research Agronomist

Nitrogen, tillage, and water management are important factors in corn production. However, properties of claypan soils increase the impact of management decisions for no-till corn farmers due to a greater potential for gaseous N loss and challenging seedbed conditions. Minimal tillage practices, such as strip-tillage, may greatly benefit production in the region, but agronomic research on this tillage practice in conjunction with use of enhanced efficiency fertilizers is limited. Integrating enhanced efficiency fertilizers and conservation strip-tillage systems may help farmers manage high-residue systems under no-till that use surface fertilizer applications. In addition, strip-till placement of polymer-coated urea (PCU) may allow farmers the option of applying this N fertilizer source in the fall as an alternative to anhydrous ammonia. The objective of this research was to determine the effect of PCU placement (strip-till and no-till, broadcast) and application timing (fall, early preplant, and preplant) on clover biomass and corn response compared to NCU and anhydrous ammonia in the presence or absence of a nitrification inhibitor.

Field research in 2008, 2009, and 2010 (high rainfall years) near Novelty, MO (40°1'N, 92°11'W) sought to determine the effect of polymer-coated urea (PCU) placement [strip-tillage (ST) deep banded and no-till (NT) broadcast] and application timing (fall, early preplant, and preplant) on red clover (*Trifolium pratense* L.) biomass and corn response compared to non-coated urea (NCU) and anhydrous ammonia (AA) in the presence and absence of nitrapyrin a nitrification inhibitor. Strip-tillage reduced clover dry weights 20% in 2008 and 2009, and early preplant ST reduced dry weights 40 to 45% in 2010 compared to NT (data not presented). Corn plant population was greater with strip-till compared to NT (data not presented). Preplant applications of AA plus nitrapyrin, AA, ST placement of PCU and NCU increased grain yields 16 to 19 bu/acre compared to fall applications of these fertilizer sources (Table 1). Fall and preplant ST placement of PCU increased grain yields 19 bu/acre compared to NCU. Strip-till placement of PCU and NCU increased yields 33 to 51 bu/acre over broadcast applications of these fertilizer sources. Strip-till placement of PCU synergistically increased yield over NCU and broadcast applications of PCU or NCU due to increased stands and possibly due to better plant utilization of the banded N fertilizer.

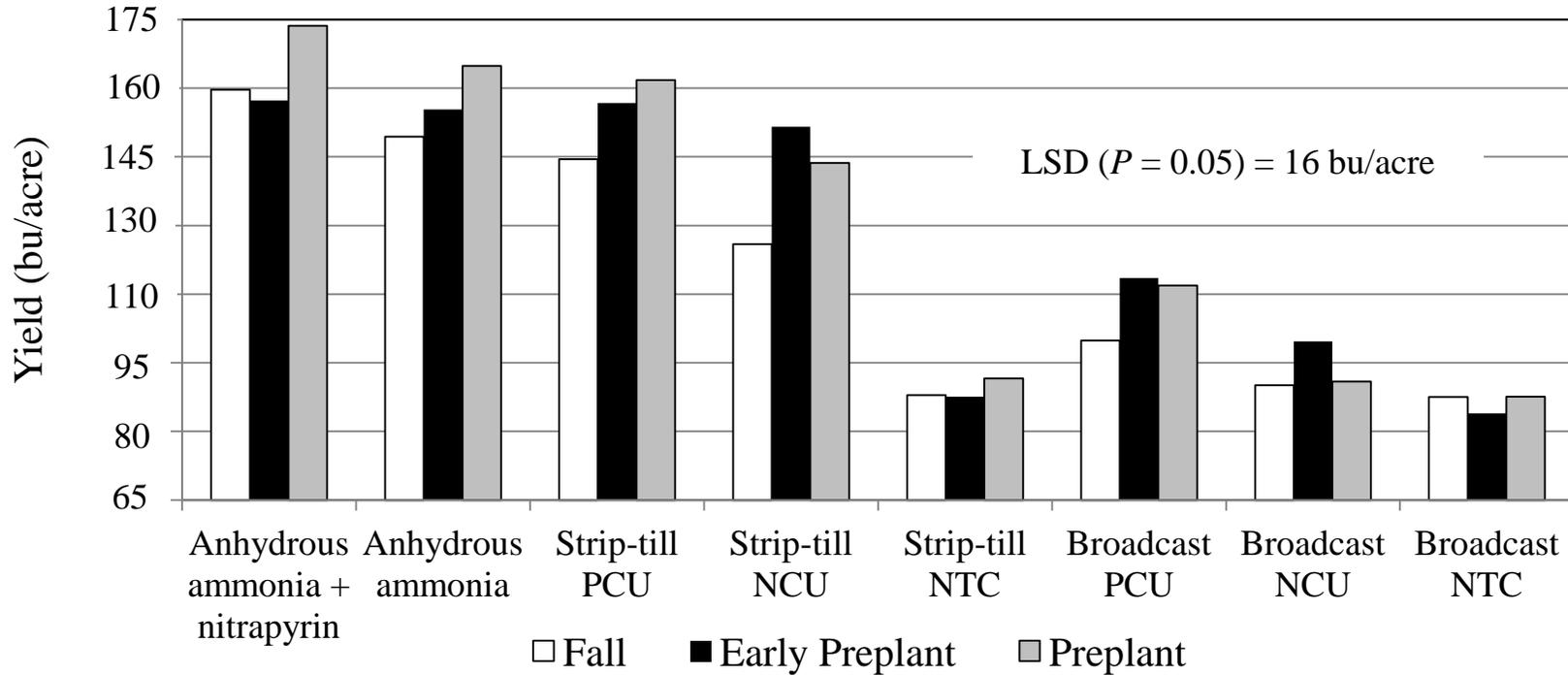


Figure 1. Corn grain yield response to fall, early preplant, and preplant applications of polymer-coated urea (PCU was ESN, Agrium AT, Inc., Calgary, Canada), non-coated urea (NCU), or anhydrous ammonia in the presence and absence of nitrapyrin (N-serve) at 1 qt/acre. Nitrogen was applied at 125 lbs N/acre except in the non-treated controls (NTC). Data were combined over years (2008, 2009, and 2010) in the absence of a significant ($P = 0.24$) year*application timing*fertilizer source interaction.