

ASSESSMENT OF ENHANCED EFFICIENCY UREA PRODUCTS ON MAIZE IN MISSOURI

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ABSTRACT

Urea is the most commonly used N fertilizer, but has been found to be easily lost to the environment through volatilization and leaching. Enhanced efficiency fertilizers (EEF) have been developed to help prevent these losses. Field studies were conducted from 2009 to 2011 to determine the efficacy of five enhanced efficiency (EE) urea products compared to untreated urea, when surface-applied to no-till maize (*Zea mays* L.) grown on a Mexico Silt Loam (fine, smectitic, mesic, Vertic Epiaqualf). To determine NH₃ volatilization, a static semi-open chamber system was used. Cumulative volatilization losses at 82 d after application ranged from 163 mg N m⁻² to 767 mg N m⁻² (2.57% to 8.37% of the applied N). Soil NO₃⁻ and NH₄⁺ levels were also measured and were highest at approximately 30 days after fertilization and then significantly declined. Products that delayed the release of N the longest, such as Duration-75 and ESN, produced higher yields independent of ammonia volatilization.

Maize leaf or canopy characteristics were assessed using a chlorophyll meter, reflectance spectrometry, and aerial. Normalized difference vegetative index (NDVI) and green normalized difference vegetative index (GNDVI) were calculated based on spectroradiometer measurements and NDVI was also calculated based on aerial imaging. It was determined that both NDVI and GNDVI correlated best with N concentration early in the season. Through aerial imaging, yield maps were produced that gave indication of the effectiveness of each product.