# IMPROVING NITROGEN FERTILIZATION EFFICIENCY FOR NO-TILLAGE CORN PRODUCTION

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## INTERPRETIVE SUMMARY

The environmental concern over nitrogen (N) fertilization of row crops has increased the emphasis to improve N efficiency. The need for improving efficiency is greater when surface application is considered for no-till (NT) corn production. Previous research indicates N efficiency for NT corn production can be increased by injecting rather than broadcasting N, but efficiency may also be increased through management practices. These practices include applying N after planting and root system establishment. Additional considerations would include N source to apply and the N rate to apply. Research was conducted over a 3-year period (1996-1998) on two loess-derived soils (Memphis silt loam and Collins silt loam) to evaluate strategies for increasing N efficiency for NT corn. Nitrogen treatments included broadcasting urea and urea-ammonium nitrate (UAN) at 150 lb N/A at planting, injecting UAN at 150 lb N/A at planting, and injecting UAN at the 6- to 8-leaf growth stage at 150, 130,110, and 90 lb N/A. Some treatments received a 10 lb N in-furrow starter. Pioneer 3245 was planted on the Memphis soil and Pioneer 3163 was planted on the Collins soil. The experimental design was a randomized complete block with six replications. Delayed N applications were 51, 52, and 44 days after planting (DAP) on the Memphis soil and 43, 42, and 48 DAP on the Collins soil. Ear leaves were collected at mid-silking for N analysis.

The effect of N treatments on both yields and leaf N concentrations varied over the 3 years for yields produced on both soils. The 3-year average yields need to be considered since N recommendations are based on multi-year data.

In most environments, NT corn yields, leaf N concentrations, and N efficiency can be increased by delaying N application until the corn is in the 6- to 8-leaf growth stage. However, the benefit from the delayed application is dependent upon weather conditions between planting and the delayed application. These data indicate that delaying the N application can increase yields by 5 to 15% if rainfall is not a limitation and the N rate can be reduced by 15 to 20% without reducing yields. During certain years, leaf N concentrations were increased by delaying the N application, but yields were not increased due to drought stress between silking and black layer. These observations are worthy of consideration for either improved yields through management or reducing N rates either during a time of restricted capital or for production close to environmentally sensitive areas.

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