

# ANALYSIS OF 13 YEARS OF NITROGEN RATE AND TIMING WORK IN OKLAHOMA WINTER WHEAT

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## ABSTRACT

In 1999, Raun and Johnson estimated that the world's nitrogen use efficiency (NUE) in cereal grains was 33%. After two decades of improvement (Omara et al, 2019) revised the prior world NUE for cereal grains to 35%. This improvement can be partially attributed to the change in producer practices of timing of nitrogen applications from an all pre-plant application to a split application of both pre-plant and in-season. The experiment that is analyzed within this study was established in 2009 with the intent to evaluate the effect of nitrogen application rate and timing of nitrogen application on Oklahoma winter wheat (*Triticum aestivum* L.) grain production as a random complete block design (RCBD). Over the course of thirteen years this experiment was conducted over seven experimental locations (Lahoma, Lake Carl Blackwell, Hennessy, EFAW, Perkins, Chickasha, and NOE) where sixteen treatments tested two application timings (pre-plant and in-season) and seven nitrogen rates (28, 56, 84, 112, 140, 168, 224 kg N ha<sup>-1</sup>), resulting in 51 site years of grain yield data. Nitrogen source used in this study was UAN-28. Data collected from this experiment was captured using a Kincaid 8X-P small plot combine equipped with a five foot header and a harvest master unit. Statistical analysis of the grain yield data collected in this study was analyzed using SAS 9.4 and the general linear model procedure (GLM) procedure at an alpha level of .1. Results from the initial analysis of variance indicated that grain yield responded positively to the application of nitrogen in thirty-one site years. Of the thirty-one site years in which there was a response to nitrogen, fourteen of which the main effect of timing significantly increased grain yield. In nine site years split applications of both pre-plant and in-season top-dress resulted in grain yields statistically greater than applications made that were solely as a pre-plant.