



# Complete Nitrogen Management Effect on Sorghum and Corn

September 11, 2024

Sorghum, shown growing here, is an important crop in Kansas. Photo courtesy of K-State Research

*Sorghum, shown growing here, is an important crop in Kansas. Photo courtesy of K-State Research and Extension and reprinted here under this license:*  
<https://creativecommons.org/licenses/by/2.0/>.

---

Multiple facets must be considered to increase fertilizer use efficiency, minimize loss to the environment, and increase profitability. Determining the 4Rs (source, rate, time, and place) is a critical component of nutrient management. While all these different facets could affect the fertilizer use of both grain and forage crops, often research focuses only on one aspect of nutrient management with a limited number of site-years.

Researchers from Kansas State University conducted a combined analysis of independent field studies from 2008 through 2013 on grain sorghum, forage sorghum, and corn. These studies had four fertilizer placement methods, three fertilizer types,

five fertilizer additives, three fertilizer application times, and six fertilizer rates that varied by location and year. They quantified the impact of fertilizer source, rate, placement, additive, application timing, and environment on forage and grain yield.

The results indicated that rate had the greatest impact on yield regardless of crop considered. Fertilizer placement and timing had crop-specific importance as they only affected one crop, but the main effect of additives were not significant for any of the crops. Environment and crop type influenced crop response to N fertilizer rate, timing, placement and additives.

### **Adapted from**

Holman, J. D., Ruiz Diaz, D. A., Obour, A. K., & Assefa, Y. (2024). Nitrogen fertilizer source, rate, placement, and application timing effect on sorghum (grain and forage) and corn grain yields. *Agrosystems, Geosciences & Environment*, 7, e20469. <https://doi.org/10.1002/agg2.20469>

---

*Text © . The authors. CC BY-NC-ND 4.0. Except where otherwise noted, images are subject to copyright. Any reuse without express permission from the copyright owner is prohibited.*