Alex Cleveringa

Poster Abstract

Nitrogen (N) deficiency is the leading limitation on crop yields worldwide. Additionally, it is one of the leading costs farmers incur. It is not only financially expensive, but energy-intensive. Approximately 2 percent of the energy consumed globally creates ammonia to be used as fertilizer through the Haber-Bosch process. Unfortunately, as expensive as nitrogen fertilizer is, not very much of it is taken up by the crop. The global nitrogen use efficiency (NUE) is 33 percent. This is higher efficiency than a few decades ago, but progress has since slowed. The nitrogen not taken up by the crop escapes to the environment where it may cause damage to the ecosystem, from reducing water quality to contributing to algal blooms and the hypoxic zone in the Gulf of Mexico. For these reasons, increasing NUE is of great importance to the environment, society, and producers. Unlike previous research that produces regional estimates of N rate recommendations, the research presented here uses on-farm data to evaluate management practices at a field-scale level. Recent studies show that N rate alone is an insufficient tool for predicting optimal N rate applications. In this study, we used directed acyclic graphs (DAGs) to evaluate which management practices contribute the most to late-season corn stalk nitrate test (CSNT) results. The results show that previous crop, tillage, and N fertilizer form are three key factors that influence CSNT values. Identifying the practices and circumstances that lead to the overapplication of N will inform the agriculture industry on how to improve the precision of their operations.