

CAN SOIL INFORMATION BETTER INFORM CANOPY SENSOR ALGORITHMS FOR CORN?

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ABSTRACT

Corn production is often limited by the loss of nitrogen (N) due to leaching, volatilization and denitrification. The use of canopy sensors for making in-season N fertilizer applications has been proven effective in matching plant N requirements with periods of rapid N uptake (V7-V11), reducing the amount of N lost to these processes. However, N recommendation algorithms used in conjunction with canopy sensor measurements have not proven accurate in many fields of the U.S. Cornbelt, resulting in poor N recommendations. Objectives for this research were to evaluate the performance of published canopy reflectance sensing algorithms used for making in-season corn N fertilizer recommendations and to determine if soil information could be used to make canopy reflectance sensing algorithms more accurate. This presentation summarizes the first year of a three-year study. Nitrogen response trials were conducted across eight states, totaling 16 sites (two per state) in soils ranging in productivity. Reflectance measurements at $\pm V9$ were related to economic optimal N rate (EONR). An algorithm developed in Missouri alone was not an accurate predictor EONR. When the Missouri algorithm was adjusted using either measured percent soil organic matter or USDA SSURGO plant available water content (top 90 cm of the soil profile) the N recommendations averaged within 25 kg/ha of EONR. This suggests the incorporation of soil information into the Missouri algorithm can greatly enhance its accuracy at predicting site-specific EONR.

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