

Sensors for Detecting Crop Nitrogen Needs



With increasing costs for crop inputs, corn farmers are interested in better methods to help them precisely apply the rate of nitrogen (N) fertilizer that will give them optimal profit. Additionally, environmental concerns continue because a large amount of N from agricultural fields moves into streams, rivers, and the ocean. Since more N fertilizer in the U.S. is applied to corn than any other crop, interest is high for exploring new technologies for improved N management for corn. In recent years, light reflectance sensors have been proposed as a technology on which to base side-dress variable-rate N applications. Research was conducted to assess the utility of these sensors for determining the most profitable N rates in corn. *Findings over all soil types demonstrate sensor-based variable-rate N fertilizer applications could generate an increase in returns ranging*

from \$5 to \$20 per acre. However, as fertilizer cost increases relative to the price of corn grain, the value of using canopy sensors for N management improved. Also, a different story emerged when profit was examined by different soil types. Our findings suggest canopy sensing for N applications is better suited for deep loess soils, with profits ranging from \$10 to \$50 per acre. The results of this study are being used to develop the procedures and decision rules for how much N to apply in corn. Farmers will benefit because they can reduce excess N applications, which with increasing N fertilizer cost, should save them money. If fertilizer can be better matched with crop need, N loss to lakes and streams will be reduced and the environment will be improved. USDA-NRS has approved this practice as one to qualify for EQIP funding (\$36/acre in 2009).

See details of this practice in the Missouri USDA NRCS Agronomy technical note 35: Variable-rate nitrogen fertilizer application in corn using in-field sensing of leaves or canopy:
<http://www.mo.nrcs.usda.gov/technical/agronomy/technote35.html>

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