Nitrogen Management Tools for Maintaining Yields and Protecting Water Quality. (S04-vanes182104-Oral)

Authors:

- H.M.van Es* - *Cornell University*

Abstract:

The complexity and temporal dynamics of various N sources pose the most critical management challenge to insuring adequate, and not excessive, soil N levels for crop uptake, especially in humid climates. Depending on seasonal weather and cropping conditions, this may result in wide fluctuations in seasonal crop N needs. Farmers often apply insurance fertilizer applications to assure that sufficient N is available in the few years that the crop may actually need it. Excess soil N in the other years can then readily increase nitrate leaching losses. Such losses can be reduced by applying N sources close to the time of crop uptake and using tools to better predict seasonal N needs. Soil tests (PSNT, LSNT, and recently the amino sugar-N test) may allow for better prediction of crop N needs, but may be inaccurate and disadvantaged by labor and analytical costs. Variable-rate management within fields using precision agriculture tools has shown limited potential due to annual inconsistencies in spatial patterns. Real-time simulation modeling approaches use local weather records to more accurately predict crop N needs. Finally, nutrient management planning efforts attempt to better match N management with soil leaching potential and risk for water contamination.

Corresponding Author Information:

Harold van Es
Cornell University
1005 Bradfield
Ithaca, NY 14853-1901

phone: 607-255-5629
fax: 607-255-6143
e-mail: hmv1@cornell.edu

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