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FINE TUNING NITROGEN IN SEASON

This week I want to mention some information from a regional study on nitrogen rate prescription, corn hybrid, plant population and the effect of nitrogen applied. The researchers involved include Richard Ferguson, University of Nebraska-Lincoln; David Franzen, North Dakota State University, Fargo, ND; and Newell Kitchen, USDA-ARS, Columbia, MO.

Nitrogen (N), an essential element, is often limiting to plant growth. We put N on in the fall or spring and if it rains too much it can leach or denitrify. With today's fertilizer and crop prices, there is great value in determining the optimum quantity and timing of N application to meet crop needs while minimizing losses.

Growing conditions vary greatly each year resulting in differing nitrogen needs and complicating recommendations. Applying a portion of the total N during the growing season by sidedressing or with chemigation allows for adjustments which can be responsive to actual field conditions.

UNL has the Maize-N model developed to estimate the economically optimum N fertilizer rates for corn by taking into account your local management decisions, field and climate conditions. For more information, go to hybridmaize.unl.edu.

We are getting better with calibrating crop sensors for in-season recommendations and this study evaluated both the model and sensor based approach. At Clay Center the corn-on-corn plot had 132 lbs of residual N in the top three feet preplant , 4% organic matter soil and 10 lbs N expected from irrigation water. The maize model and sensor treatments had 75 lbs of N preplant, one treatment had zero N applied and one treatment had 250 lbs N preplant. All plots were replicated and randomized.

Both the hybrid maize model and Rapidscan sensors at V10 stage said do not apply no more N, so no additional N was applied. The final result was no significant difference in yield between all plots. Zero N applied yielded the same as 75 lbs preplant and 250 lbs preplant. It was 250 bu/acre irrigated corn. How could that yield happen last year with no additional nitrogen applied?

The lack of response to N at Clay Center was due to high N mineralization during March of 2012 (very warm conditions, no substantial rain), and continued high mineralization through the growing season (regular irrigation, no substantial rain) in a high organic matter soil. Plus, there was no significant difference in yield between two different Pioneer hybrids (Pioneer 33D49 and Pioneer 1498) at two planting populations of 32K and 42K. This is a one-year research result. Farmers fine tuning N applications in the future now have active sensor data that can be recorded at V10 stage. This is the best source of in-season assessment we have right now. Dr. Ferguson would rely less on foliar samples – there is too much variation to such data.

This study used a Holland Scientific RapidScan sensor, however, other sensors could be used – OptRX (same wavelengths as RapidScan), Greenseeker, – even a chlorophyll meter with a reference strip. Other than a reference strip or sensor based approach we don't know of any other

good signal to accurately decide if you need more N in season. By the time you see it, (leaves are yellowing) some corn yield is already lost.

Randy Pryor, Extension Educator
University of Nebraska-Lincoln Extension in Saline County
306 West 3rd Street, Wilber, NE 68465

Phone (402) 821-2151 • Fax (402) 821-3398 • e-mail: randy.pryor@unl.edu