Pre-plant Nitrogen Management to Maximize Fertilizer Dollars

In-depth review and recommendations from the soil perspective.

FIELD CONDITIONS THAT WARRANT PRE-PLANT NITRATE TESTING (PPNT):

- **Crops grown: Corn, sweet corn, or winter wheat**
- **Normal precipitation over prior growing season and over winter**
- **Previous excess application of N (beyond crop need)**
- **Medium and fine-textured soil**

NITROGEN FERTILIZER RATES FOR PRE-PLANT N:

- **Corn and soybean rotation: N rates for corn should not exceed 1.0 lb. of applied actual N per expected bushel/ acre.**
- **Corn following corn: N rates should not exceed 1.2 lbs. of applied N per expected bushel/ acre.**

Capitalizing on management practices of inputs based on soil status could be the difference between ending up on the right end of the market versus an upside down status to kick off the 2016 growing season.

Beyond the economic reasons, leaching loss potential should be an additional motivator. Not only are applied nitrates (N) that are washed away from a field expensive and wasteful, but their expense to the environment and groundwater is costly.

The main goal in any N management program is reaping optimal yields while getting as close as possible to complete conversion of applied nitrates to nitrogen through the plants (as opposed to washing away).

Application rates based on assessment

Assessing N availability before application is the key factor to this efficient N management program. Such an assessment, combined with the expertise of a knowledgeable agronomist, can assist in determining the rate, timing, source, and placement on fields growing corn, sweet corn, and winter wheat grown on loamy soils (medium and fine textures), ultimately reducing over-application of N above and beyond the crops' needs - thus reducing costs.

Plant-available nitrate or nitrogen in the root zone is estimated through a Pre-plant Nitrate Test (PPNT). This test can account for N carried over from previous growing season applications, from manure applications, or supplied by prior legume crops (high in N production). If the test finds significant amounts of N, fertilizer applications may be reduced or even eliminated.

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AGRICULTURAL ANALYSIS

BUILD CONFIDENCE IN EFFICIENT APPLICATIONS

Pre-plant Nitrogen Testing Logistics

Collection

Corn or Sweet Corn: Soil samples should be gathered in the window of time between frost leaving the soil and before pre-plant application or planting the crop.

Winter Wheat: Soil samples should be gathered during the late summer season.

- Collect samples at a 2 foot depth in 1 foot increments
- A minimum of 15 soil cores sampled randomly from 20 acres is required
- Samples from various locations within the field that differ in both management practices and soil types are encouraged

Storage and Delivery

- Store samples in a cool place until delivery to the laboratory
- Delivery to the laboratory should be within 1-2 days of pulling the samples
- Freeze or air-dry samples to prevent changes if they cannot be delivered to the laboratory within 1-2 days of sampling

Credits

Corn or Sweet Corn

- Calculate based on N credits table (above)
- Subtract N credits from N application rates for corn to arrive at adjusted application rate
- For background soil nitrate content, the N credit is adjusted by subtracting 50lb N/a from the PPNT result

Winter Wheat

- Maximum Return to N (MRTN) rate guidelines have PPNT built in, and no additional adjustment is needed

Nitrogen (N) credits to corn and sweet corn crops based on Pre-plant Nitrate Test (PPNT) results.**

PPNT results (lb NO_3-N/a)	N credit
0-50	0
50-200	PPNT-50lb N/z (Apply a minimum of 50lb N/a)
>200	None*

*No additional N is needed.
** Laboski, 2012

PPNT Production Situation Applications

Preferred for corn following corn

- Sampling depth is deeper, creating a more complete assessment of residual nitrate amounts in the soil profile

Useful in corn following soybean

- Utilized to refine N rate recommendations for residential soil N
- Subtract the PPNT nitrogen credit from the UW Extension N rate guideline value for the soybean-corn crop sequence

Applicable for manured areas

- Measures only nitrate present when the sample is taken, so this analysis does not highlight N release from the manure
- In addition to the N credit based on the test result, a separate manure N credit must be taken

Sources:

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Learn more and find opportunities to collaborate or devise applications with the soil experts from Rock River Laboratory at the information below.

RockRiverLaboratory1 Rock River Laboratory, Inc.

920-261-0446
scott_fleming@rockriverlab.com
www.rockriverlab.com