About The Preplant Soil Nitrate Test

The preplant soil nitrate test (PPNT) has been available to Wisconsin corn growers since 1989. The PPNT is recommended on medium or finer textured soils when corn follows corn in the crop rotation and previous climatic and management conditions (see previous page) suggest that nitrate carry-over is likely.

Soil samples for the PPNT should be collected in the early spring after frost has left the soil and prior to planting or any preplant applications of N. Soil samples need to be collected in one foot increments to a depth of two feet. Previously, the suggested sampling depth was three feet. Sampling depth studies have shown a relationship between the nitrate content in the first two feet and the third that allows the nitrate content of the third foot to be estimated; thus, eliminating the need for the third foot sample. The 0–1 and 1–2 foot samples need to be separated. The best way to do this is to collect the soil samples in two buckets—each labeled for the appropriate depth. A minimum of 15 soil cores taken randomly from 20 acres is the recommended sampling intensity. Separate samples need to be taken from field areas that differ in soil or past management practices. Mix the samples from each depth and obtain a composite 1 cup subsample. The subsample should be taken to a soil testing lab within a day. If this is not possible and the samples must be stored prior to lab delivery, they *must* be frozen or air-dried to prevent changes in nitrate content during storage. If moist soil samples are stored at warm temperatures, the nitrate content of these samples will increase and N recommendations based on soil nitrate test results will be too low.

The PPNT does not measure the N released from alfalfa when corn follows hay in the rotation. Likewise, the N supplied by fall, winter, or spring applications of manure will not be fully measured by the PPNT. This is due to the sampling period for the PPNT. With early spring sampling, soil temperatures have not warmed sufficiently to allow either of these organic forms of N to convert to plant-available forms of N, such as nitrate. Nitrogen credits for manure and legumes in these cases should be assessed using standard N crediting techniques (see Tables 3 and 4). Another option for assessing these credits could be the use of the pre-sidedress nitrate test (PSNT).

When the PPNT is used, N fertilizer recommendations (Table 1) are adjusted to reflect the residual soil nitrate present. Nitrogen fertilizer rates will decrease as the amount of soil nitrate increases. University of Wisconsin N fertilizer recommendations are adjusted for residual soil nitrate as follows:

- **For soils testing 0 to 200 lb N/acre:**
  N Recommendation = Base N Rec. - (Soil test N - 50 lb N)
  (Note: A minimum N application of 50 lb N/acre is recommended)
- **For soils testing over 200 lb N/acre:**
  N Recommendation = 0

About The Pre-sidedress Soil Nitrate Test

The pre-sidedress nitrate test (PSNT) is another soil test available to corn growers for improving the efficiency of N applications. Soil samples for PSNT are taken after planting at a time when the mineralization of organic N sources to plant-available forms of N has occurred. Consequently, the PSNT can predict the amount of N released from previous legumes, fall, winter, or spring manure applications, and soil organic matter as well as residual nitrate in the top foot of soil. The PSNT can be a valuable tool for a grower wanting to confirm the amount of N credited from manure or previous legume crops.

PSNT samples should be taken when corn plants are 6 to 12 inches tall, usually four to six weeks after planting. Unlike preplant nitrate test (PPNT) samples, PSNT soil samples are collected only to a depth of one foot. The sampling intensity is similar to PPNT as are the sample storage and handling techniques. As with the PPNT, the PSNT is not recommended on sandy soils (sands and loamy sands).