

Nitrogen Management: Pre-Sidedress Nitrate-N Test (PSNT)

The amount of nitrate present at sampling is directly related to the N supplying capability of the soil during the entire growing season.

PSNT is especially appropriate for farms that are utilizing manure.

Introduction:

The pre-sidedress nitrate-N soil test (PSNT) is a late spring nitrogen management tool that can be used to aid in more accurate nitrogen management decisions for corn production. It is an especially appropriate test for fields with relatively high in organic matter. The PSNT therefore, is almost exclusively promoted for fields that have received manure or other organic amendments or where corn is following a forage legume crop. This is because the availability of nitrogen from organic matter decomposition can often be uncertain. The PSNT conducted on soils that do not have a manure history or previous forage legume crop rarely show nitrogen levels high enough to prompt a decision.

Over-application of N from fertilizer and manure can result in N loss throughout the growing season, and especially after crop harvest in the fall, which increases production costs.

The PSNT should be conducted when corn measures 10–12 inches tall from the ground surface to the center of the whorl (about 5-6 weeks after planting). The amount of nitrate present at sampling is directly related to the N supplying capability of the soil during the entire growing season. At this stage of corn growth, mineralized N and fertilizer N will move rapidly to the active root zone even if the fertilizer is not incorporated into the soil.

Nitrogen transformations occurring in soil are dynamic and strongly influenced by environmental conditions because they are a direct result of soil biological activity. When weather conditions in spring are cold, the rate of mineralization is low and result of a PSNT may not be accurate. Also, in dry seasons, PSNT may not be accurate since movement of N to the active root zone is limited.

How to Collect Samples:

The PSNT soil sample should be collected from 0 – 12 inches deep and represent areas of the field that have similar soil properties and past management histories.

- Make a composite of 25-30 soil cores from each sample area by thoroughly mixing all the soil in a bucket before the subsample for analysis is removed. The large number of cores is important due to non-uniformity of manure application.
- Take the soil cores from the center of planting rows.
- Immediately after samples are taken, air dry the samples by spreading them out in a thin layer of non-absorbent paper.
- Include with soil sample field identification, your name, address, phone number, together with testing fee. Send up to one cup of dried soil placed in a zip lock bag to:

Soil Testing Lab
West Experiment Station
University of Massachusetts
Amherst, MA 01003
(ph. 413-545-2311).



Interpreting your PSNT Results:

Depending upon the PSNT level, a farmer receives an estimate of the likelihood of seeing a response to additional nitrogen fertilizer, but will not receive an actual nitrogen recommendation from soil lab. Results of the lab analysis are usually reported in parts per million (ppm) nitrate-N. However, pounds of actual nitrogen per acre can be estimated by multiplying ppm nitrate-N in the top 12 inches of soil by 4. PSNT values of 25 ppm or higher are unlikely to benefit from additional nitrogen fertilizer and the higher the value the less likely the need for supplemental nitrogen. The problem arises when PSNT values are less than 25 ppm. PSNT values below this level may or may not respond to additional nitrogen fertilizer, but the stock recommendation would be that they do require more nitrogen. The following table can be used to determine N fertilizer requirement for various PSNT values in Massachusetts:

| Sidedress N fertilizer recommendations for silage corn based on PSNT and the field yield potential* | | | | |
|--|--|------------|------------|------------|
| Soil NO₃-N test level | Corn silage yield goal in tons/acre | | | |
| ppm | 17 | 21 | 25 | 28 |
| Sidedress N recommendation (lbs N/acre) | | | | |
| 0 - 10 | 100 | 130 | 160 | 180 |
| 11 - 15 | 75 | 100 | 125 | 145 |
| 16 - 20 | 50 | 75 | 100 | 120 |
| 21 - 25 | 25 | 50 | 75 | 90 |
| 25⁺ | 0 | 0 | 0 | 0 |

* Based on field data from Massachusetts, Connecticut, Pennsylvania, and Vermont

For more information visit www.umass.edu/cdl

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