

## The Pre-sidedress Soil Nitrate Test Project

Project sponsored by Oregon State University Dept. of Crop & Soil Science and the USDA-ACE Program  
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### What is the Pre-sidedress Soil Nitrate Test?

The Pre-sidedress Soil Nitrate Test (PSNT) is a new method of evaluating nitrogen fertilizer needs for field corn. The test was developed in the Eastern U.S. and its use is now being evaluated here in western Oregon.

### Why does the Pre-sidedress Soil Nitrate Test tell us more about nitrogen availability than early spring soil tests?

In early spring, a large percentage of the soil nitrogen pool is tied up in organic matter. As the ground warms up in late spring and early summer there is an increase in biological activity in the soil and nitrogen from the organic matter is converted into forms that are plant available. Soil tests made in the early spring, therefore, will not give an accurate prediction of the amount of nitrogen the soil might provide later in the growing season. The PSNT measures soil nitrate ( $\text{NO}_3^-$ -N) later in the season, after nitrogen has become plant available and just prior to the corn crop's period of greatest need.

### When is the best time to measure soil nitrate for corn grown for silage?

The corn plants begin their large uptake of nitrogen around the V5 growth stage, or when the plants are about 12" tall at the center of the whorl. The most efficient method of evaluating your soil nitrogen supply is to test the soil just prior to this period of rapid uptake (Figure 1). If the test shows nitrogen levels to be low, a sidedress fertilizer application can be made.

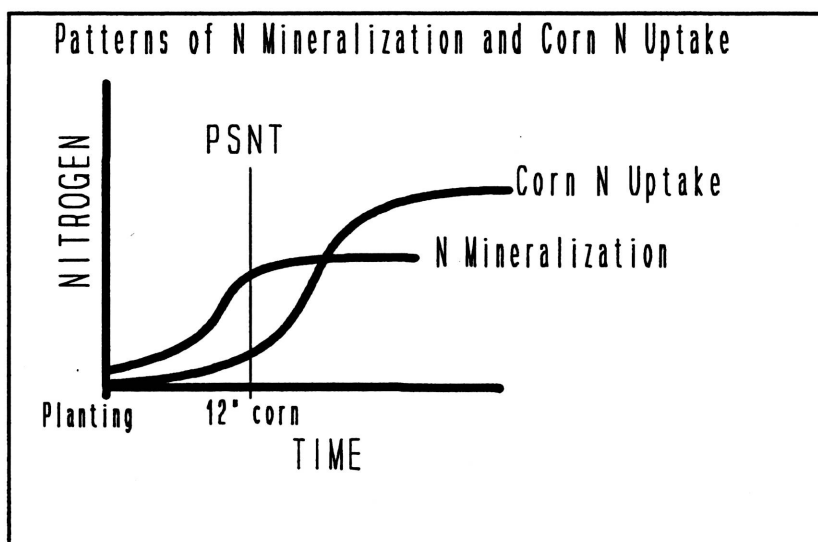


Figure 1: PSNT soil test is performed when corn is 12" tall. This is before rapid nitrogen uptake by corn and after some nitrogen mineralization has occurred.

## **How much nitrogen is enough?**

Results from the first year of the study indicate that a soil  $\text{NO}_3^-$  level of 23 ppm (about 90 lbs.  $\text{NO}_3^-$ -N/acre) when the corn is at the V5 growth stage is sufficient for maximum corn silage yields. This finding agrees with similar studies conducted in the Eastern U.S.

## **What if I apply more than the required amount of nitrogen?**

Excess nitrogen will not be used by the crop and will remain in the soil after harvest. During the winter, when the rains come, the nitrates may be washed from the soil into surface and ground waters. This poses a threat to both human and environmental health. It is also a waste of fertilizer dollars.

## **Who can benefit from using the Pre-sidedress Soil Nitrate Test?**

Any grower producing corn for feed could potentially benefit from using the PSNT. Growers who apply large amounts of manure to their fields are especially likely to benefit, as the manure is high in organic matter which will contribute nitrogen not well accounted for by most other soil test methods. The benefits will come in the form of reduced fertilizer inputs and reduced risk of nitrate contamination of the environment.

## **What about crops other than field corn?**

To date, field corn is the only crop for which the PSNT has been calibrated. Nutrient management for other crops can often be improved, however, by testing soil nutrient levels on a regular basis. Use published fertilizer recommendations as a guide and make adjustments based on what is observed in the field. If soil tests at the end of the growing season show high residual nutrient levels, it may be possible to reduce inputs the following season. Experiment by reducing inputs on a small part of a field and watch for a yield response. If yields from the plots with lower inputs are sufficient, it may be possible to reduce your fertilizer applications on a larger piece of ground the following year. It may be helpful to work with Extension or private consultants in evaluating changes you are considering.

# PSNT Method for Field Corn

- ▶ If needed, apply a minimum of starter N in spring
- ▶ Take soil samples when corn is 12" tall, or at least a week before planned sidedressing
- ▶ Sample soil to a depth of 12". Make a composite sample from 15-20 cores
- ▶ Have soil sample analyzed for  $\text{NO}_3\text{-N}$
- ▶ If soil  $\text{NO}_3\text{-N}$  levels are above 23ppm, no additional nitrogen fertilizer is needed. If soil  $\text{NO}_3\text{-N}$  levels are below 23ppm, apply sidedress nitrogen fertilizer.