Pre-sidedress Soil Nitrate Test (PSNT)

The PSNT is an in-season N assessment tool for deciding whether additional N fertilizer is needed. This is a useful test for growers who split apply N or apply supplemental sidedress N to manured fields. Usually N fertilizer recommendations are based on pre-plant soil samples taken in the fall or in the early spring. However, most N uptake by corn occurs in midsummer from the 8-leaf stage to tassel (Figure 18). Mineralization of N from manure or other organic matter, N immobilization and nitrate leaching can significantly change soil N availability. By complementing preplant soil testing with PSNT, growers can better predict yield response from N fertilizer, saving unnecessary fertilizer costs.

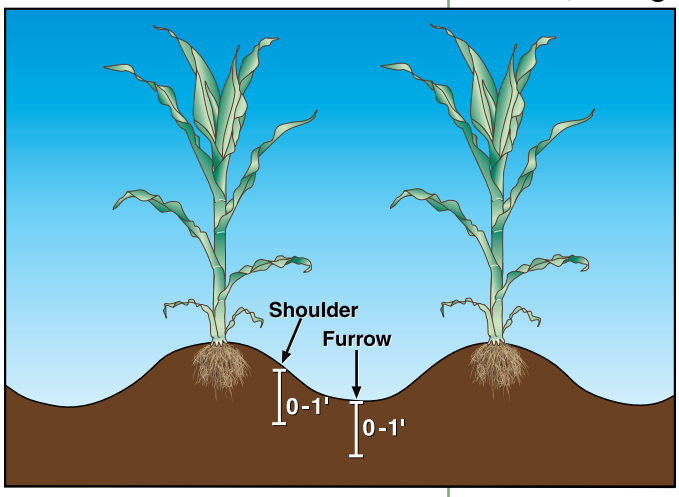

Figure 19. PSNT sampling position.

Colorado State University researchers found that when the top foot of soil contains at least **15 ppm NO_3-N** at the V6 growth stage, the probability of a yield increase to additional N is low under typical conditions. If the PSNT level is lower than 15 ppm NO_3-N, sidedress N should be applied. The PSNT shows only if soil N is adequate, but not how much is needed. Assess the yield potential and pre-plant soil nitrate levels to determine how much additional N is needed if the PSNT soil concentration is below 15 ppm.

PSNT guidelines:

- Sample field when corn is approximately 12 inches tall (V6 growth state).
- Collect a minimum of 15 to 20 random 12-inch soil core samples from an uniform area or a 40-acre field.
- Soil sample positions for the PSNT. Equal number sample should be taken from the furrow and the shoulder of the bed (about 4" from row, Figure 19).

Table 11. The yield response of corn to sidedress N application of 60 lbs/acre when PSNT was above or below the critical NO_3-N concentration at V6.

		Yield response from sidedress N	Prediction accuracy
Sampling Depth: 0 - 12"*	Observations	# of sites	%
Above critical level (15 ppm)	21	0	100
Below critical level (15 ppm)	35	19	54**
Total	56		71

*Based on equal sampling intensity from both furrow and shoulder positions
**Prediction accuracy was lower when PSNT was below critical level due to no yield response on 16 fertilized plots. Source: Spellman, et al 1996