

Pre Sidedress Nitrogen Test (PSNT) Refresher

With the PSNT season upon us, here are a few things to keep in mind about the test. The PSNT can be used to test if sidedress N fertilizer is needed on fields with a history of manure and/or sods. It attempts to 1) gauge the pool of potentially mineralizable organic N in the soil and 2) link that pool with a likelihood of a yield response from additional N fertilizer at sidedressing time.

Where to use...

- Corn fields, 2 years or more after a sod where the manure rate is uncertain.
- Where calculations indicate not enough manure was applied to meet the expected N needs of the crop.
- Cases where N mineralization rates are expected to be higher than average.

When not to use...

- Corn fields that had pre-plant / early post-plant broadcast fertilizer N applications (other than <30 lbs starter N/acre in the band). Any nitrate from broadcast fertilizer that's picked up by the PSNT could overestimate the true N mineralization potential;
- First year corn regardless of legume percentage in the sod or timing of sod kill (spring or fall after soil temperatures at 4 inch depth is approach 45°F). Our New York field trials show no yield response from sidedress N (see project results and farmer stories on N savings for corn at <http://nmsp.css.cornell.edu/projects/Nitrogenforcorn.asp>), so skip those fields for PSNT and N sidedressing.

How to sample...

- When corn is 6-12 inches tall.
- Between rows (i.e. not in the starter band).
- Not too close to a rain event that could have resulted in nitrate leaching (wait for 2-3 days after significant rainfall).
- Sample down to 12 inches.
- Dry sample immediately and send to the lab.

If using a Cardymeter...

- Use fresh reagent.
- Frequently re-calibrate with the Cardymeter's standard solutions.
- Calibrate by sending a duplicate sample to a lab periodically during the PSNT season.
- See also: <http://nmsp.css.cornell.edu/publications/factsheets/factsheet3.pdf>.

PSNT results...

PSNT (ppm of nitrate-N)	Probability of an economic yield response from additional N	N Guideline
≥ 25	Low	No additional N needed
21 – 24	About 10%	If you expect a yield response based on experience with the field, consider sidedressing 25-50 lbs N/acre
<21	High	Apply sidedress N according to the Cornell N Guidelines for corn*

* The N Guidelines for corn as well as the NYS Corn N Calculator can be downloaded from the Nutrient Management Spear Program (http://nmsp.css.cornell.edu/nutrient_guidelines).

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The PSNT guidelines for those fields in the ≥ 25 ppm and the 21–24 ppm ranges are straightforward. For fields with < 21 ppm (assuming a good sample was taken), the N guideline for the PSNT falls into one of two camps:

- 1) If you took a PSNT on a field that you expected to require some sidedress N (i.e. the pre-season N recommendation called for additional N), then make sure the original N management plan for the field is still relevant and, if so, put that plan for sidedress N into action.
- 2) If you took a PSNT on a field that you expected to not require sidedress N (e.g. it received enough manure), make sure the field actually received the planned manure application, that the field history is correct, and then run it through the NYS Corn N Calculator. If the revised guideline still doesn't call for additional N, despite being < 21 ppm, organic-N mineralization rates and/or N losses were likely significantly different than average.

The PSNT is particularly useful when there is uncertainty as to whether enough manure was actually applied to meet expected corn N requirements. PSNT users and anyone else attempting to adjust N applications to corn, should, over the course of a few years, carefully compare test results with fertilizer and manure inputs AND crop performance to develop the skills and local experience to best use this test. Consider the following for this year to begin to build your experience bank.

If you decide to sidedress:

- Leave untreated check strips on fields:
 - that received enough manure to satisfy N needs based on NYS Corn N Guidelines, yet have PSNT results < 21 ppm;
 - second year corn fields that received some manure;
 - first year corn fields following a good grass or grass/legume sod (if in the habit of sidedressing these based on PSNT).
- At harvest, visit the strips to judge if the extra N was needed.
- Evaluate visually: If the leaves are green to the bottom of the plant, it is likely that TOO MUCH N was applied. As plants mature, the lower leaves become useless and so a plant will recycle N from there for other uses. Many users will be very uneasy with this, but yield is not suppressed when about 3 leaves or so from the ground up are YELLOW at harvest time. See the 2007 Cornell Guide (“Nitrogen Status of the Corn Crop” on page 51-53) for more discussion on this.
- Check the yield: harvest and weigh at least two rows over a 17.5 foot length (1/1000th of an acre with 30 inch rows) of representative areas in each treatment and run dry matter to correct for moisture differences.

Please contact Quirine Ketterings (gmk2@cornell.edu or 607-255-3061) or Karl Czymmek (kjc12@cornell.edu or 607-255-4890) with any questions, discussions, or interest in on-going N for corn research.