

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.

The PSNT is not for fields...

- that had pre-plant / early post-plant broadcast fertilizer N applications (other than <40 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;
- that are first year corn after a grass sod with starter N. Only a few soils in the state (i.e. those with the highest yield potentials: Hamlin, Genesee, Hartland, Ross) would show a yield response to a moderate sidedress N rate after a grass sod;
- that are first year corn after modest amount of alfalfa with grass. No yield response is expected from sidedress N, so no need to PSNT.

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.

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 and that the field history is correct and 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. An adequate research base does not exist on fields with manure and/or sod history to quantify a shift from the average. This and other components of N dynamics are currently being researched through N rate field trials and soil testing avenues (contact Quirine Ketterings for details on the New York Aminosugar Project - <http://nmsp.css.cornell.edu/projects/aminosugartest.asp>) and modeling approaches (Jeff Melkonian and Harold van Es). Additional tools being tested in NY this year include the 2-step chlorophyll procedure developed by Doug Beegle at Penn State and the end-of-season nitrate stalk test.

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 2005 Cornell Guide (“Nitrogen Status of the Corn Crop” on page 56) 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 matters to correct for moisture differences.

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