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A&L Analytical Laboratories, Inc.

2790 Whitten Rd. Memphis, TN 38133 (901) 213-2400 Fax (901) 213-2440
www.allabs.com

Pre-Sidedress Nitrate Test Guidelines for Corn in the Southeast US

INTRODUCTION

The pre-sidedress nitrate test (PSNT) is a useful tool for making short-term and long-term nitrogen management decisions. In the short-term, nitrate-nitrogen levels are used to determine the amount of additional nitrogen fertilizer to be applied at sidedress. In the long-term, timely analyses can be used to adjust the amount of nitrogen fertilizer applied according to a field's inherent fertility and average yield. Growers whose fields often test high due to manure applications, organic matter mineralization, or nutrient retention can reduce nitrogen applications by 10-15% of the recommended nitrogen rate. Growers whose fields often test low should consider split applications instead of a total application at-plant. Sidedressing will reduce the possibility of losing nitrogen fertilizer by heavy rainfall and consequently assure that the majority of nitrogen applied is present during the corn's highest period of demand (V4+).

SAMPLING

Always sample 0-12 inches deep. Sample when corn is between 6 - 12 inches tall (V2-V3 stage). Remove debris from the surface of each area sampled. If the probe can only sample 6 inches, sample the same hole twice. Sample the top 0-6 inches then the bottom 7-12 inches. Collect no less than 20 representative samples from random locations of an area no greater than 10 acres. Sample poorly drained areas separately. Mix the soil thoroughly and provide the laboratory with no less than a pint of soil. Results are only as good as the sample taken. Soil should be sent to the laboratory immediately after sampling.



INTERPRETATION OF RESULTS

The following four tables have been developed for Tennessee, northern Alabama and Virginia soils. **This test is most suitable for growers utilizing manure as a nitrogen source. The PSNT is NOT accurate where the nitrogen application has been banded, poorly drained soils, or on sandy soils with poor nutrient retention, typical of areas in the coastal plains of the southeastern US.**

| Table 1. Tennessee Soil NO₃-N Interpretation Guidelines for Fields Yielding 125 to 175 Bu/Acre or 15 to 25 Tons Silage/Acre. | | |
|--|-----------------------------|---|
| NO₃-N ppm | Soil Test Rating | Possibility of a yield response with additional nitrogen |
| < 17 | Low | High |
| 17-24 | Medium | 50% |
| 25 + | High | Low |

| Table 2. Tennessee Soil NO₃-N Interpretation Guidelines for Fields Yielding More Than 175 Bu/Acre or More Than 25 Tons Silage/Acre. | | |
|---|-----------------------------|---|
| NO₃-N ppm | Soil Test Rating | Possibility of a yield response with additional nitrogen |
| < 35 | Low | High |
| 35-46 | Medium | 50% |
| 47 + | High | Low |



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Table 3. Recommended Rates of Nitrogen to Sidedress (Lbs/Acre) in Tennessee and Northern Alabama.

| NO ₃ -N ppm | Maximum Yield Potential Grain/Silage | | | |
|---------------------------|---|-----------------------|-----------------------|----------------------|
| | 125 bu/ 15 tons | 150 bu/ 16-18 tons | 175 bu/ 19-25 tons | 175+ bu/ 25+ tons |
| <10 | 60-120 | 75-150 | 90-180 | 120-180 |
| 10-16 | 40-60 | 50-75 | 60-90 | 90-120 |
| 17-24* | 0-40 | 0-50 | 0-60 | 60-90 |
| 25-34 | 0 | 0 | 0 | 40-60 |
| 35-46** | 0 | 0 | 0 | 0-40 |
| 47+ | 0 | 0 | 0 | 0 |

* Medium soil test for fields with yield potentials of 125-175 bu grain/acre or 15-25 tons of silage/acre.
** Medium soil test for fields with yield potentials of +175 bu grain/acre or +25 tons of silage/acre.

Table 4. Interpretation Guidelines for Soil NO₃-N Results in Virginia.

| NO ₃ -N ppm | Interpretation |
|---------------------------|---|
| < 11 | Apply full rate of sidedress N to meet the realistic yield goal. |
| 11-20 | Use specific field history, knowledge of organic N amendments, and management practices to decide how much sidedressed nitrogen fertilizer to apply. Normal sidedressed applications may possibly be reduced by 25-50%. |
| 20 + | No sidedressed nitrogen is needed. |

Prepared by: Dr. Oscar F. Ruiz Jr. May 2009
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References

Savoy Jr., H. J. 1999. Use of Soil Tests for Nitrate-Nitrogen in the South. Southern Regional Fact Sheet. SERA-IEG-6.
<http://www.clemson.edu/agrvlb/sera6/publications1.htm>