What is Wisconsin's preplant soil profile nitrate test?

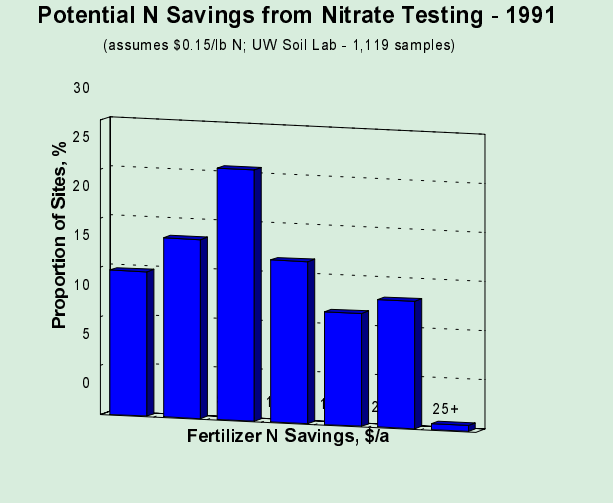
■ A tool for measuring nitrate "carry-over"

The test is a tool which can help you improve the efficiency of your nitrogen (N) fertilizer applications to corn. The preplant soil nitrate test measures the amount of nitrate-N in the crop root zone that "carried over" from the previous growing season. Residual nitrate that is present in the spring is available to crops for the subsequent growing season.

Why should I test soil for nitrate?

■ Economic benefits

Wisconsin research has shown that in years of average or below average rainfall, significant amounts of nitrate can remain in the soil to be utilized by crops in the following growing season. By accurately measuring residual nitrate, your N fertilizer recommendations can be fine-tuned to the specific conditions existing in your fields. Crediting residual N can save you money by reducing your fertilizer costs.



■ Groundwater protection

Another very important benefit of improved N management is groundwater protection from nitrate contamination. Use of the soil nitrate test to credit residual nitrate can help prevent N applications in excess of crop needs. This reduces the risk of nitrate leaching (a downward movement caused by soil water flow) to groundwater.

Where can I have my soil samples analyzed?

■ UW and private soil testing labs

Your samples can be analyzed and N fertilizer recommendations prepared for you by University of Wisconsin soil testing labs in Madison and Marshfield and by other private soil testing labs. Names and locations of commercial labs performing these tests in your area, as well as more specific sampling instructions and forms, are available from your county Extension office.

Soil & Plant Analysis Lab.
8452 Mineral Point Rd.
Verona, WI 53593
phone: (608) 262-4364

Soil & Forage Analysis Lab.
2611 East 29th St.
Marshfield, WI 54449
phone: (715) 387-2523

Where can I get more information?

- **county extension office**
- **soil testing labs**
- **fertilizer dealers**
- **crop consultants**

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NPM University of Wisconsin-Extension Nutrient and Pest Management Program

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A3512 - Wisconsin's Preplant Soil Nitrate Test R-5-95-3M

A3512

Wisconsin's ***Preplant Soil Nitrate Test***

Information for Wisconsin corn growers on measuring carry-over nitrogen.

Where and when should I use the preplant soil nitrate test?

■ Medium or finer textured soils

■ Following normal or below normal precipitation

Soil texture and precipitation amounts determine how much nitrate will be removed or remain in the soil until the next growing season. Generally, nitrate is more likely to accumulate in your fields if they are of a silt loam or finer texture. Nitrate-N carry-over is not likely on sandy soils. The potential for nitrate carry-over is greater in years with normal or below normal precipitation during the previous growing season and over-winter period.

Relative effects of soil and precipitation on N carry-over.

Soil	Precipitation		
	Below normal	Normal	Above normal
	- - N carry-over potential - -		
sandy	low	low	low
loam	high	medium	low
silt loam, heavier	high	high	low

Also, in years when the amount of N applied was greater than the crop's need or if pest problems or climatic conditions limited crop uptake of N, soil nitrate carry-over is likely.

■ Years of corn following corn in the rotation

The preplant soil nitrate test is most useful in years when corn follows corn in your rotation. If corn follows a forage legume (alfalfa), the test is not needed. However, do take the standard N credit for the previous legume crop.

When should I collect soil samples for the preplant soil nitrate test?

■ Early spring

Soil samples for the preplant soil nitrate test should be collected in the spring after the frost has left your fields and before preplant applications of N fertilizer. To allow sufficient time for sample analysis and development of your N fertilizer recommendations, take soil samples at least 2 weeks before you plan to apply N fertilizer.

How should I collect my soil samples?

■ 1 foot increments to a depth of 2 feet

Your samples should be a composite of at least 15 soil cores taken randomly from uniform soil areas no larger than 20 acres. Separate samples should be taken from areas of your fields with soil or management practice differences. Preplant soil nitrate soil samples need to be collected in 1 foot increments to a depth of 2 feet. Each sample should be placed in a clean bucket (or other container) marked for the appropriate depth. When you have collected enough samples for an area, thoroughly mix the soil from each depth and collect a 1 cup (8 oz.) subsample. This sample should be sent to a soil testing lab for analysis.

■ Air dry or freeze samples

The composite samples must not be stored or sent to the lab in moist condition. The nitrate content of moist samples will change prior to analysis and lead to inaccurate N recommendations. If samples can't be taken to the soil testing lab within 1 day after collection, they should be air-dried (by spreading on clean paper for 24 to 48 hours) as soon as possible. Another option is to freeze your samples immediately after collection and then either transport them to the testing lab while still frozen or air-dry the samples before shipment.

Is any background information required?

■ Field management and crop history

Yes, to provide an accurate N recommendation, the soil testing lab needs to know if you applied manure to your sampled fields or if the previous crop was a legume. This information is needed to ensure that the amount of N supplied by the manure or legume can be properly determined. Soil sampling for the preplant soil nitrate test occurs too early in the growing season to measure the N released from manure and previous legumes (as well as soil organic matter). By providing background information on your fields, standard N credits for the manure or previous legume can be deducted from your N fertilizer recommendations.

■ Soil name

In addition to field management descriptions, the name of the predominant soil and its organic matter content within the sampled area is needed. All the necessary information required for the preplant soil nitrate test is requested on a soil test form which is available from your county extension office.

How are my N fertilizer recommendations adjusted for residual soil nitrate?

■ For soils testing 0 to 200 lb N/a:

Optimum N Rec. = Std. N Rec. - (Soil test N - 50 lb N)

(Note: A min. of 50 lb N/a is recommended)

■ For soils testing over 200 lb N/a:

Optimum N Rec. = 0

Fertilizer recommendations adjusted for residual nitrate are shown below for two soils with initial N recommendations of 160 lb N/a. The diagram shows that optimum N fertilizer rates decrease as soil nitrate test values increase. For soil nitrate values of 50 lb N/a or less, no adjustment in N recommendations is made. To correct nitrate test values for background soil nitrate content, a 50 lb N/a deduction is taken from the initial test result. If soils contain between 50 and 150 lb N/a, the N recommendation is reduced according to the adjusted soil test value. A minimum of 50 lb N/a is recommended for test levels of 150 to 200 lb N/a. For soils testing greater than 200 lb N/a, no additional N is recommended.