SOIL NITROGEN TESTS

Introduction

Management of Nitrogen (N) in farming systems is of importance in both achieving sustainable production and maintaining our environment. Whether fertiliser Nitrogen is applied or growers are attempting to use a "biological" approach without additions of synthetic N, soil testing may be useful in quantifying nitrogen potentially available for growing plants.

Hill Laboratories have invested significantly in NIRS instrumentation and the associated calibration to allow fast turnaround-time for several soil tests. The *Organic Soil Profile* measuring nitrogen and organic matter, with ratios, has been created to provide additional information on the biological activity in the soil.

Soil Nitrogen Tests Available

- **Potentially Available Nitrogen (AN) [also known as Anaerobic Mineralisable Nitrogen—AMN]**

  This test is a measure of Nitrogen mineralised under specific laboratory conditions (anaerobic incubation at 40ºC for 7 days). The actual amounts of nitrogen that will be mineralised in the field will depend on factors such as soil temperature and moisture. *The results are reported as kg/ha assuming a 150mm sample depth for potentially available-N (AN), or ug/g for anaerobic mineralisable-N (AMN).*

  N.B. This test is measuring any free ammonium-N **and** the readily mineralisable N fraction. Some laboratories subtract the free ammonium-N from the mineralisable fraction but this step is omitted at Hill Laboratories, as the value is usually very low and would incur a higher test cost. Note this test name was previously reported as "Available N" but method remains unchanged.

- **Total Nitrogen (tN)**

  This test measures the total Nitrogen in the soil by way of the Dumas combustion method. This measure includes Nitrogen that is unavailable to the plant but is useful in determination of Carbon: Nitrogen ratios.

- **Organic Soil Profile (OrgSP)**

  The objective of creating the *Organic Soil Profile* is to quantify some aspects of soil quality that may be influenced by management practices. Ratios are included as these are useful as indicators of the rate of biological activity in the soil at the time of sampling.

  The tests in the profile are: **Organic Matter (from Total C), Total Nitrogen (TN), Potentially Available Nitrogen (AN & AMN) and ratios C/N and AMN/TN**.

- **Mineral Nitrogen Profile (MinN)**

  Also referred to as "Deep Soil Mineral N", this profile includes the mineral Nitrogen fractions of nitrate-N and ammonium-N measured on **freshly collected soil**. It represents the Nitrogen available to plants at the time of sampling and does not include any measure of potentially mineralisable Nitrogen. It is frequently used for cropping soils at a range of sampling depths and incorporated into models to estimate Nitrogen fertiliser requirements for the growing crop. **Samples must be kept cold to prevent mineralisation occurring in the sample while in transit to the laboratory, unless they can be received at the laboratory within 4 hours of collection.** A Dry Matter (soil moisture) test is also measured as the Mineral N values are reported on a dry-weight basis.

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Hill Laboratories now uses Near Infra-Red Spectroscopy (*NIRS*) for some soil nitrogen and carbon measurements, allowing faster turn-around time. The method text page of the soil test report describes which method has been used for the analysed sample. The conventional test method can be requested via quote.

Further explanatory information is available to help with interpretation of these tests in **Technical Notes "Soil Quality Tests", "Understanding Soil Nitrogen Tests" and "Analysis of Soils Using Near Infra-Red Spectroscopy (*NIRS*)".**

All tests are available as either individual tests or in conjunction with other profiles. Visit the website www.hill-laboratories.com or contact the laboratory for guidance on how to request these tests or to ask about pricing information.