



Soil Testing 101

// What is soil testing?

Soil testing is one of the many tools farmers use to improve plant growth, yield potential and use the most economical rate of plant nutrients. Soil sampling must be conducted properly to obtain quality soil test results. Each sample should be representative of the entire field or specified sampling unit. Soil testing in combination with plant tissue testing and field yield data help growers to make nutrient management decisions throughout the growing season.

// What does a soil test consist of?

Soil testing should include an analysis for macronutrients and secondary nutrients [nitrogen (N), phosphorus (P), potassium (K), sulfur (S), calcium (Ca), and magnesium (Mg)], micronutrients [copper (Cu), iron (Fe), manganese (Mn), zinc (Zn), boron (B), chloride (Cl), nickel (Ni), and molybdenum (Mo)], soil pH, buffer pH, organic matter, and cation exchange capacity. Due to variability in soils, lab analysis methods, and reporting, regional guidelines may exist. A local agronomist or extension specialist can provide information specific to your area.

// How are soil tests interpreted?

The results from a soil test list the type of test conducted, the concentration of specific parameters (such as P), an interpretation value (low, optimum, and high), and recommendations for amendment management or nutrient application. When reviewing the lab results, it is crucial to know what extraction method was used. Labs may report results in parts per million (ppm) or lb/acre.

To convert ppm to lb/acre, multiply ppm by 2
(lb/acre = ppm x 2).

To convert lb/acre to ppm, divide lb/acre by 2
(ppm = lb/acre ÷ 2).

// Which steps determine the value of a good soil sample?

Timing, sampling depth, and tillage system are important to consider while taking soil samples. The value of a soil sample depends on three main steps: 1) collecting consistent soil samples from year to year, 2) proper analysis of lab results, and 3) following through on lab recommendations.

// How deep should you sample?

Samples must be taken at the proper depth during the same time frame every year, ideally after harvest and before the ground freezes. Sample depth can vary by test but is usually 0 to 6 inches or 6 to 12 inches. In no-till or reduced-tillage systems, nutrients can become stratified. In this case, a separate analysis is needed on the upper 2 inches of the soil cores. If dry soil conditions prohibit taking soil cores to the appropriate depth, wait to sample until soil conditions improve.

// When and how frequently should soil testing be performed?

Fall is the best time for soil testing, and it is recommended every 4 years or less. If there are concerns about your soil fertility, or you experienced very low crop yields, then soil testing should be performed annually to help identify the problem.

References:

- Dinkins, C.P. and Jones, C. 2013. Interpretation of soil test results for agriculture. Montana State University Extension. MontGuide. Publication no. MT200702AG. <http://landresources.montana.edu/soilfertility/documents/PDF/pub/InterpSoilTestMT200702AG.pdf>.
- Espinoza, L., Slaton, N., and Mozaffari, M. Understanding the numbers of your soil test reports. FSA2118-PD-1-12RV. Agriculture and Natural Resources. University of Agriculture Research and Extension. University of Arkansas System. <https://www.uaex.edu/publications/PDF/FSA-2118.pdf>.
- Mallarino, A.P. and Sawyer, J.E. 2013. Interpretation of soil test results. PM 1310, Iowa State University Extension and Outreach. <https://store.extension.iastate.edu/product/Interpretation-of-Soil-Test-Results>.

Web sources verified 11/9/19

Legal Statements

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