Technical Laboratories

Agricultural Testing

Plant Tuff Fertilizer		Soil Testing	Plant Testing
CCE	pH of Mineral soils	Buffer pH	Total Silicon
Gradation	Soluble Silicon	pH of Mineral Soils	Nutrient Scan
Loss on Ignition	TAL	Organic Matter	TAL (Metals)
Mercury Scan	Unit Weight	Mehlich 3	Moisture
Moisture	XRF	Silicon (Acetic)	Protein
Nutrient Scan		TAL (Metals)	

WHAT DOES IT MEAN?

Buffer pH – Buffer pH is a lab generated result that is used in order to develop lime recommendations. The buffer pH result is compared to the original pH; if the difference between the two values is large, the pH of the soil is easily changed and a low rate of lime application will be sufficient. A smaller change in value indicates more liming material will be needed to reach the desired pH for crop growth.

CCE – Calcium Carbonate Equivalent is a means of comparing the pH neutralizing ability of liming materials based on their equivalence to pure calcium carbonate which has a CCE of 100. The test utilizes the measurement of an acid addition to the material in order to reach a set end point. The test does not actually measure calcium carbonate content. Due to the addition of hydrochloric acid interferences with the results can also occur when significant iron contents are involved.

Mehlich – The Mehlich III method is used as a multi element soil extraction procedure to estimate the amount of soil nutrients available to the plant during its growing season. Mehlich can provide information about the availability of K, Ca, Na, Mg, Fe, Mn, Cu, Zn, B, S, and P. CEC refers to the "reserve" acidity a soil contains. The cation results combined with the pH are used to determine the Cation Exchange Capacity. Cation Exchange Capacity (CEC) is the capacity of a soil to hold exchangeable cations and is difficult to alter. CEC influences the soil's ability to hold essential nutrients and provides a buffer against soil acidification. Soils with a high CEC have a greater capacity to contain or create sources of acidity. Higher CEC's correlate to lower buffered pH values.

Moisture – Moisture levels of a soil indicate the potential storage capacity of soil and the ability for the soil to "feed" the plant. In plants, the moisture content may provide insight into a plants ability to circulate nutrients through transpiration or if water deficiency may have occurred, resulting in wilting.

Nutrient Scan – Nutrient Scan analysis is used as a source of information on plant nutrient status. The information may be used as a tool to determine potential nutrient management decisions. Nutrient

Revision Date: 03/28/2016

Scan analysis may highlight existing nutrient problems, predict potential nutrient problems that may affect the crop, and helps to monitor crop nutrient status for optimal crop production.

Organic Matter – Organic Matter consists of plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by soil organisms. Organic matter is considered to be critical for soil function and its quality and is directly correlated to soil fertility. The effects of organic matter on soil include improvements related to soil structure, water retention, soil biodiversity, buffering capacity, and cycling and storage of plant nutrients. In general, soil organic matter is typically 1-6% for upland soils. Acidic soils can prevent the breakdown of organic matter, resulting in accumulation and thus tying up the nutrients, preventing them from reaching the plant.

pH of Mineral Soils – Soil pH is an indicator of how soil will react, indicating acidity or alkalinity of the soil. 14 of the 17 essential plant nutrients are obtained from the soil; most of these minerals and nutrients are more available in the presence of acidic soils (<7) versus neutral or alkaline soils. Soils with pH in the range of approximately 6 to 7 promotes the most ready availability of plant nutrients. Acidic soils can be caused by a number of influences, but often they become acidic due to rainfall, fertilizer use, plant root activity, and weathering of soil.

Protein – Dumas and Total Kjeldahl Nitrogen (TKN) are used for nitrogen and protein analysis of plants. Levy Technical Labs subcontracts this testing to a third party laboratory.

Silicon (Soil) – An Acetic Acid Method is used to determine the amount of available silicon in soil analysis. This method was originally developed in Brazil and has been adopted in the Northeastern United States. The method has been further refined by LSU to improve its accuracy and repeatability. Silicon in soil has been shown to suppress plant disease, decrease injury from insect pests, and improve crop tolerance to environmental stress.

Silicon (Fertilizer) – While it is typically agreed that mono-silicic acid is the form of soluble silicon that is taken up by plants, the method for determination varies around the world. In the United States the current methodology requires that a Sodium Carbonate / Ammonium Nitrate digestion be used for fertilizer analysis. Our current analysis utilizes the Sodium Carbonate / Ammonium Nitrate digestion by microwave with analysis by ICP.

Silicon (Plant) – Total Silicon is used to determine the level of silicon for plant analysis. Total Silicon can be determined by sodium hydroxide (KOH) or Hydrofluoric (HF) acid digestion in conjunction with other standard acids. HF is the preferred acid to use for siliceous materials as it is the only acid that can provide a complete and total digestion of the Silicon element.

TAL (Metals) – Metals analysis is used to determine if any metals are being absorbed into plant materials.

References:

http://www.esf.edu/pubprog/brochure/soilph/soilph.htm

https://en.wikipedia.org/wiki/Soil_organic_matter

http://www.spectrumanalytic.com/support/library/ff/Soil_ph_Management.htm

http://www.uark.edu/depts/soiltest/Methods/MEHLICH%203_1to7_.htm