

SOIL ANALYSES TERMS

Primary Nutrients

Nitrogen

Nitrogen is essential to plant growth and is usually available in two forms:

a) Nitrate-Nitrogen - D.I. (de-ionized) water extractable

This is a water soluble form of nitrogen which is most readily available to plants but is also vulnerable to leaching.

b) Ammonium Nitrogen - potassium chloride extractable

The ammonium nitrogen found in soil is usually derived from decomposing organic matter and is readily absorbed by plants.

Phosphorus

Phosphorus is essential to plant growth. The sodium bicarbonate method is used to measure the available phosphorus in calcareous soils. The weak Bray is the more appropriate method to measure available phosphorus in soils having a pH of less than 6.

Potassium - Ammonium acetate (exchangeable) and saturated paste (water soluble) extractable.

Potassium is essential to plant growth. Ample levels of exchangeable potassium do not always result in optimum plant uptake. The rate at which exchangeable potassium becomes available to plants is influenced by soil type, pH, temperature and moisture content. The soluble potassium found in a soil is readily available for plant uptake.

Secondary Nutrients

Calcium, Magnesium - Ammonium acetate (exchangeable) and saturated paste (water soluble) extractable.

These elements are essential to plant growth and also influence soil structure. See SAR.

Sodium - Ammonium acetate (exchangeable) and saturated paste (water soluble) extractable.

This element is not generally believed to be essential to plant growth. A high level of sodium in relation to calcium and magnesium will result in poor soil structure. See SAR.

Sulfate - Saturated paste (water soluble) extractable

Sulfur is an essential plant nutrient. Sulfate is a readily available form of sulfur in soil.

Micronutrients

Zinc, Manganese, Iron, Copper - DTPA extractable

These elements are essential to plant growth but are required in very small quantities.

Boron - Saturated paste (water soluble) extractable. A hot water extraction is used in the analysis of soils with very low levels of boron to determine deficiency potential.

Boron is an essential plant nutrient. Boron is required in very small quantities and can also be very toxic when present, even in slightly higher than needed levels.

Chloride - Saturated paste (water soluble) extractable

Chloride is essential to plant growth in quantities ranging from less than 150 ppm (0.015%) to over 1000ppm (0.1%), depending upon specific plant requirements. Actual chloride deficiencies are rare.

Cation Exchange Capacity (CEC)

The CEC is a measure of a soil's capacity to hold the positively charged ions of calcium, magnesium, potassium, sodium and hydrogen. The proper balance (ratio) of these elements has an important impact on soil structure and affects their availability for plant uptake.

Conversion Factors

* 1 acre foot of soil = 4,000,000 (approx lbs)

* PPM x 4 ~ lbs./acre ft

* Meq/l x eq. wt. = ppm

* $SO_4 \times 0.33 = S$

* $P \times 2.3 = P_2O_5$

* $K \times 1.2 = K_2O$

* $NO_3 \times 0.23 = N$



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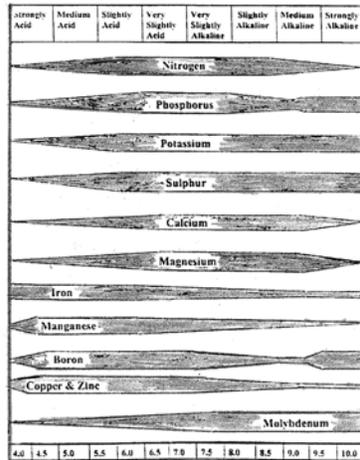
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Soil pH - Measured on a saturated (water soluble) paste

Soil pH is a measure of a soil's relative acidity or alkalinity. A pH of 5.8 to 8.2 is suitable for a wide range of crops. How soil pH affects availability of plant nutrients and activity of micro-nutrients is outlined in the following table:



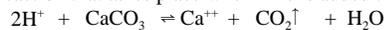
Other Analyses

Soil Salinity (ECe) - Measured on a saturated paste (water soluble) extract
Salinity is a measure of the total water soluble salt content of the soil.

SAR - Sodium Adsorption Ratio
A calculated ratio of soluble calcium and magnesium to sodium. This ratio is used to identify soil structural problems.

Limestone
This is a quantitative measure of the amount of calcium carbonate present in a soil. Many plants, especially perennials, are highly sensitive to low levels of limestone.

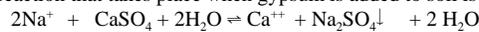
Lime Requirement
A quantitative measure made on soils with pH levels below 5.8. This determines the amount of limestone needed to adjust the soil pH to 6.5. The chemical reaction that takes place when lime is added to soil is as follows -:



Soil Moisture
This is a measurement of the amount of moisture present in a soil sample when received at the laboratory. The ample soil moisture % is in a range of ± 20% of ½ saturation.

Saturation %
The amount of water required to saturate 100 grams of soil. This value is approximately twice the field capacity of the soil. Soil saturation % serves as an approximation of soil texture and nutrient retention potential, in addition to its water holding capability

Gypsum Requirement
A measurement of the amount of pure (100%) gypsum needed to improve the rate of water infiltration into a soil. A gypsum requirement recommendation does not necessarily indicate a serious problem but indicates the amount required to maximize the water infiltration rate. The chemical reaction that takes place when gypsum is added to soil is as follows -:



Organic Matter
A quantitative measure of the organic content of a soil. Accurate measurement of low organic matter soils can be critical in the use of herbicides.