

Interpreting Your Soil Test Results

Testing of your soil is important but being able to interpret the results can be confusing. Hopefully, these guidelines can help.

- **Soil pH**

The pH value of a soil is its measure of acidity or alkalinity and is a primary factor in plant growth. It is probably considered the number one test when considering soil fertility. When maintained, the nutrients (Ca, Mg, K, Na, as well as others) for the plant are at a maximum availability, the harmful elements are often at a reduced availability, and its beneficial organisms are most active. Numbers less than 7 indicate acidity while numbers higher than 7 indicate alkalinity. Plants thrive best in different soil pH ranges. For example; azaleas and blueberries prefer acid soils while vegetables and most ornamentals prefer slightly acidic soils. A pH range from 5.5 to 7.5 is considered optimum for a wide variety of plants. However, this is in general, not the rule. Many plants will tolerate or even thrive at pH values outside of their range. To increase the soil pH, the common practice is to apply lime. Ground agricultural limestone is most frequently used. To decrease the soil pH, two materials are commonly used: aluminum sulfate and sulfur.

- **Lime Test Index (also known as Buffer pH)**

Basically, this is the soil's capacity to resist pH change after lime has been added. One soil may require significantly more limestone than another to raise its pH due to this index. For example, a fine-textured clay soil may have a much higher buffering capacity than that of a sand or loam with the same pH.

- **Cation Exchange Capacity (CEC) and Percent Base Saturation**

CEC is an important measure of the soil's ability to retain nutrients. The higher the CEC, the greater the soil's capacity is to store nutrients and to prevent their loss by leaching. Theoretically, soils with higher CEC may require less frequent fertilization. Organic matter such as compost and green manure are usually recommended to improve low-CEC soils. This organic matter can increase the CEC as well as improve the water-holding capacity of soils.

Base Saturation expresses the quantity of Calcium (Ca), Magnesium (Mg) and Potassium (K) as a percentage of the total CEC. These ratios to one another affects the plants ability to absorb them in proportion and quantity required for optimal growth. Before adding lime, consider the ratio of Ca to Mg. If it is less than 1:1, use a lime that is low in Mg. If the ratio is 10:1, use dolomitic lime which is high in Mg. The Mg to K ratio should be 2:1 or greater.

- **Phosphorus**

Phosphorous (P), deficiencies of this nutrient can lead to impaired vegetable growth, weak roots, fruit and seed of poor quality and low yield. An overabundance of phosphorus can leach out to rivers, streams and lakes. This causes loss of oxygen due to excessive algae blooms and ultimately to loss of aquatic life. Warm, moist well-aerated soils at about pH 6.5 optimize the release of organic and inorganic P. Plants require large quantities of P, but the levels that are available to the plant roots at any one time are quite low. Your soil test attempts to assess the soil's ability to supply P from bound forms during the growing season.

- **Calcium**

Calcium (Ca) is useful in root system and leaf development and is combined with other elements to form cell walls. Properly limed soils with constant and adequate moisture will normally supply sufficient calcium to plants. High humidity and poor drainage will hinder calcium uptake.

- **Magnesium**
Magnesium (Mg) is the central atom of the chlorophyll molecule which makes it absolutely necessary for photosynthesis. It also plays a role in phosphate metabolism, plant respiration and enzyme systems. If liming is not needed, Epsom salt (magnesium sulfate) may be incorporated at a rate of 5-10 lbs/1000 square feet.
- **Potassium**
Potassium (K) is used in great amounts by plants. K promotes disease resistance and increased size and quality of fruits.
- **Sodium**
Sodium (Na) Salt accumulations are typically at the soil surface. Excess salt can be attributed to over-irrigation and use of de-icing salts from roads, driveways and sidewalks. Typically, salt content should not exceed 16lbs/acre.

We hope this information is helpful to you and thank you for doing your part to reduce nutrient loaded runoff pollution.

From everyone at the Water Quality Control Laboratory, we want you to know that “Our Goal is Your Water Quality”.

Sincerely,



Suzanne Britt
Laboratory Supervisor

Informational Websites and Sources:

OSU Extension	extension.osu.edu/
Ohioline	ohioline.osu.edu
VegNet	ag.ohio-state.edu/~vegnet
Floriculture Newsletter	ag.ohio-state.edu/~flori
Plant Pathology	ag.ohio-state.edu/~plantdoc
Diagnostic Clinic	ag.ohio-state.edu/~plantdoc/cweppdc
Ohio Master Gardener Program	mastergardener.osu.edu
HCS in Virtual Perspective	hcs.osu.edu
WebGarden	webgarden.osu.edu
PlantFacts Database	plantfacts.osu.edu
Plant Dictionary	hcs.osu.edu/plants
Buckeye Yard and Garden	bygl.osu.edu
Buckeye Gardener Videos	hcs.osu.edu/movies