

Soil Fertility Testing

“Don’t Guess, Soil Test”

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A basic soil test can tell you important things about your soil that you cannot tell just by looking at it or feeling it. Before you add amendments to your soil it is best to know exactly what you have, so you know what you should add to it. Soil tests are inexpensive and highly informative. Creating proper soil conditions before you plant will increase your plants success and avoid costly problems in the future.

What is a soil test?

A soil test is a process by which elements are chemically removed from the soil and measured for their “plant availability” within the soil sample. Typically, tests measure **macronutrients** (nutrients needed in higher amounts such as phosphorus, potassium, calcium, magnesium, and sulfur), **micronutrients** (aka: trace elements such as iron, manganese, zinc, copper, or boron). Boron, lead, & aluminum can be toxic to plants and humans at high levels. Tests are also given to determine soil pH; whether soil is acidic, alkaline, or neutral. Additional testing can be done to determine the percent of organic material.

Why should I have my soil tested? “One soil test is worth a thousand opinions”

Plants produce their own energy using water, air, and sunlight but require fertile soil in order to obtain essential nutrients. Healthy plants are less susceptible to disease, environmental stress, and insect pressure. For a small investment upfront, you will know what your soil is deficient in and can add amendments for a complete and balanced soil.

What is required for a soil test?

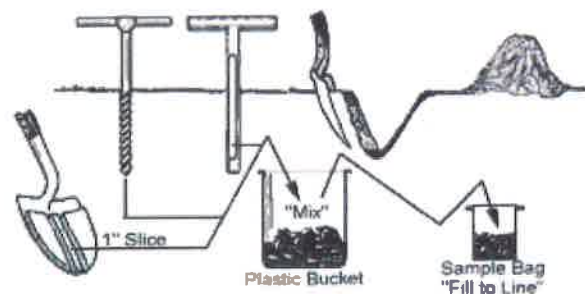
Clean, well-mixed soil samples from each soil plot. Individual samples are placed in a container and shipped to the lab. Depending on which lab is used, additional forms may need to be completed and turned in with the soil samples.

How do I obtain a soil sample?

Remove the first inch of soil before collecting your sample. Use a clean trowel, shovel, or soil probe to obtain several samples from the same area and depth. Don’t use brass, bronze, or galvanized tools as this will contaminate your sample. Take samples from a depth of 4”-6”. Mix the samples from the same area in a bucket to make a composite sample. The composite sample should be ½ to 1 pint of soil. Don’t mix soil from the front yard with soil from the back yard. Place each composite sample in a separate, labeled container. If the lab you use does not offer containers, plastic Ziploc type bags can be used.



Example of soil sample areas
Don't mix sample areas.



Mix samples to create composite sample.

What should I request?

Minimally, you should request N-P-K + minors and soil pH results and recommended treatments. Most labs include nitrogen (N), phosphorus (P), and potassium (K) as well as other minor trace elements. Usually, organic content and soil type can be tested for a little extra.



A lab soil test is more accurate and precise

Recommended sources for analysis:

- University of Mass@Amherst <https://soiltest.umass.edu/>
- Sunland Analytical <http://sunland-analytical.com/>
- A & L Laboratory <http://www.allabs.com/>
- Spectrum Analytic <http://www.spectrumanalytic.com/>
- North Carolina Department of Agriculture & Consumer Services <http://www.ncagr.gov/agronomi/sthome.htm>
- Penn State, Agricultural Analytical Services Lab <http://agsci.psu.edu/aasl/soil-testing>

Your plants potential growth and yield is only as good as the “most limiting factor”.

What can I learn from the results?

You can know more than anyone else about **your** soil. This will guide you to add the right amendments to your soil for optimal chemical conditions, which is an important step towards plant health. The amount of each element in your soil will be listed along with the normal ranges expected for that element. This allows for easy comparison. Not only will you see what your soil is deficient in, but you may find that you have excess amounts of an element that you don't want.

What do I do now?

You need to act, to add what is missing, but remember that this is only one segment of total plant health. Read and develop a regime for irrigation, mulching, aeration, cleaning, monitoring, and pruning. Over watering, under watering, poor pruning, over fertilization (or fertilizing in the wrong season), incorrect or poorly timed pesticide, herbicide, and fungicide applications may result in trees that hardly grow, pose more of a hazard, and become more of a liability than an asset costing time and money. By providing the nutrients the plant needs now you will increase the growth and yield of your trees. A healthy tree is less susceptible to diseases, pests, and structural failure.

Permeability and water retention of various soil types.

Soil Texture	Permeability (aeration and drainage)	Water Retention
Sand	high	low
Loam	medium	medium
Silt	low	high
Clay	low	high

If your soil is:	add:
Clay/silt	course sand, peat moss, vermiculite
Loam	Perfect mix of clay, silt, and sand. No need to add any amendments
sand	clay rich soil, compost,

Various amendments to improve soil structure and fertility

- Lime:** raises the pH of acid soil and helps loosen clay soil.
 - Wood chips:** made from various hardwood trees. May improve soil structure.
 - Sand, course:** May improve drainage in clay soil.
 - Compost:** excellent conditioner.
 - Leaf mold:** decomposed leaves that add nutrients and structure to soil.
 - Peat Moss:** Conditioner that adds aeration to the soil. It also lowers soil pH. Always mix in soil.
 - Clay rich soil:** improves the water holding properties
 - Sulfur:** lowers soil pH of alkaline soil.
 - Aged manure:** increases N-P-K
- Soil pH impacts the availability of nutrients.**
Ideal pH is 6.5 – 7.5

Strong acid	Medium acid	Slightly acid	Very slightly acid	Neutral	Very slightly alkaline	Slightly alkaline	Medium alkaline	Strongly alkaline
4 - 5.5	5.5 - 6	6 - 6.5	6.5 - 7	7	7 - 7.5	7.5 - 8	8 - 8.5	8.5 - 10