The University of Vermont EXTENSION

Extension Master Gardener

How to Take a Soil Sample

The reliability of a soil test is only as good as the sample you submit. The small amount of soil in the sample bag you send to the Agricultural Testing Lab must represent the entire area to be fertilized. Avoid unusual areas such as those where fertilizer or lime has spilled. Take samples before lime, fertilizer, or manure are added. Use only clean equipment for collecting soil samples.

Where to sample

The area to be sampled should be as uniform as possible in terms of soil type and cropping and fertilizing history. For practical purposes it should be an area you expect to fertilize as a unit. This means separate samples for annual mixed vegetables and a strawberry patch, for golf green and fairway, and for different major crops in a commercial nursery or vegetable operation. If you have a problem on part of a lawn, garden, or commercial production field, you may wish to determine if soil fertility is the cause by taking one sample to represent the "good" and the other to represent the "poor" area.

Take a good sample

Collect a number of cores or slices by walking in a zig-zag pattern over the area. Mix cores thoroughly in a clean pail for a composite lab sample. The greater the number of collected cores mixed together, the better the sample will represent the average condition of the sampled area. Consider 10 cores as the minimum for home gardens and lawns up to 10,000 square feet in size. Larger areas should be represented by at least 15 to 20 samples. Choose one of the following tools:

Soil Probe or Auger

– A soil probe or auger, available from mail order catalogs and garden or farm supply outlets, is the best tool for sampling. An auger will be needed if the soil is very stony or gravelly. Simply push the probe (or push and turn the auger) into the soil to the desired depth, lift up to remove the core, and place it in the clean pail. Sampling depth should be 4 to 6 inches deep for lawns, turf, or other perennial sod, or tillage depth (usually 6-10 inches) for annually tilled crops.

Garden Trowel or Shovel

– If a soil probe or auger is not available, collect your sample by pushing the blade of a garden trowel, shovel, or spade into the soil to the desired depth. Cut out a triangular wedge of soil and set it aside (to be replaced after sampling). Now slide your blade into the soil again taking a thin (half inch) slice from one side of the hole. With a knife, trim the slice to about a 1-inch strip of soil down the center of the spade – top to bottom. Save this "core" as part of your composite lab sample.

Mix the sample and fill the sample bag

Make sure that all the cores are thoroughly mixed together. Your soil test mailer contains a plastic bag intended for one lab sample. Fill plastic bag about 1/2 full (approximately 1 cup) with the mixed sample. If submitting multiple samples, include one check for total being tested.

How do I get a soil test kit? You are welcome to download and print the appropriate form from the lab website @ http://www.uvm.edu/pss/ag_testing/ and use whatever clean plastic bag you have for the soil (do not send in glass bottles), **or** you may email or call in your request. **Contact info. is:**

Agricultural and Environmental Testing Lab
University of Vermont, Plant & Soil Science Dept.
Room 262 Jeffords Hall
Burlington, VT 05405-1737
phone: 802-656-3030
FAX: 656-4656
email: agtesting@uvm.edu - web site: http://www.uvm.edu/pss/ag_testing/

This information provided by
UVM Extension Master Gardener
802-656-5421
www.uvm.edu/mastergardener

OVER →

Interpretation of UVM Soil Test Results

Test Level

LOW: A low test result indicates a need for substantial addition of fertilizer, compost, or manure to raise soil test levels. There is a high probability of yield increase with amendment. The recommendation for a low testing soil is designed to gradually build up the nutrient level to optimum. Low pH indicates a need for lime, unless you are growing acid-loving plants such as blueberries or azaleas.

MEDIUM: A medium test result suggests that a moderate amount of added fertilizer, compost, or manure is needed for best results. Nutrient levels are lower than optimum for most types of plants.

OPTIMUM: This is the most desirable soil test range for both economic and environmental reasons. There is a low probability of crop response to added nutrients. But, in order to maintain soil tests in this range for successive years, a portion of crop removal needs to be replaced, so small additions of fertilizer, compost, or manure may be necessary to maintain these levels or for demanding crops. Small amounts of phosphorus in the plant row may be helpful in early spring plantings (starter fertilizer).

HIGH or EXCESSIVE: Soil test levels are higher than needed for optimum growth or yield. Excess nutrients are a potential source for environmental problems such as accelerated algal growth in ponds and lakes. Occasionally there will be plant growth problems due to nutrient imbalance. There is a very low probability of crop response to additional nutrients, except for potassium-demanding crops. A low rate of starter fertilizer may be needed.

Analysis Descriptions

pH is a measure of soil acidity, with lower numbers being more acid. Most garden and horticultural plants grow well between pH 6.0 and 7.2, although acid-loving plants such as azalea or blueberry prefer a lower pH. Soil pH tends to naturally decrease over time. Application of ground limestone (calcium carbonate) or wood ash will raise pH; elemental sulfur (S) can be used to lower it. If magnesium (Mg) is low, high-magnesium (or "dolomitic") limestone should be used. For field crops other than alfalfa, liming to pH 6.2 is recommended. If you plan to grow alfalfa as part of a rotation, you should lime to pH 6.8.

Nitrogen (N) recommendations are based on general N needs of various plants, derived from field research on field crops. We do not routinely test for soil nitrogen, except at certain times of the cropping season (such as the spring PSNT test), because N availability changes rapidly depending on time of year, temperature, moisture, and microbial activity.

Available phosphorus (P or phosphate) reflects the amount of P that can be easily utilized for plant growth. Phosphorus is readily tied up in soils, especially acid soils and those with pH above 7.0. Because plants are not efficient at taking up P when soils are cold, placing P near the roots where it's needed can be beneficial to early season plant growth. Excessive P can contribute to accelerated algal growth in ponds and lakes.

Potassium (K or potash), Magnesium (Mg), and Calcium (Ca) are all plant nutrients that exist in the soil as positively charged ions or "cations." Potassium is frequently deficient in non-clay soils and, therefore, is a common ingredient in mixed fertilizers. Most soils that are limed to the proper pH provide adequate calcium. Magnesium can be low in sandy soils but often quite high in "heavier," clay soils.

Effective CEC (Cation Exchange Capacity) is based on the soil test quantities of Ca, Mg, and K. CEC reflects the ability of soil to "hold" these cations. A normal range is from below 5 in sandy soils low in organic matter to over 20 in clayey soils or those high in organic matter. Base Saturation % describes the proportions of the CEC that are occupied by Ca, Mg, and K ions. No CEC estimate is given for acid soils (pH<5.5).

Aluminum may also occupy part of the CEC; it is not a plant nutrient but contributes to soil acidity, and is used in estimating both lime and phosphorus needs.