THE UNIVERSITY OF VERMONT EXTENSION MASTER GARDENER

How to Take a Soil Sample

Introduction

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 and Environmental Testing Lab must represent the entire area for which you like results. Avoid unusual areas such as those where fertilizer, excessive compost, or lime has spilled. It is best to take samples before you add supplements like fertilizer, lime, and compost. Only use 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 gardening and fertilizing history. For practical purposes, it should be an area you expect to fertilize as a unit. This means that you should take separate samples for annual mixed vegetables, perennial gardens, and your lawn for example. If you have a problem on part of a lawn or garden, 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 a plastic bag about 1/2 full (approximately 1 cup) with the mixed sample. If submitting multiple samples, include one check for the total amount of samples being tested.

Questions?

Please visit the UVM Agricultural and Environmental Testing Lab's website at https://go.uvm.edu/soiltest for forms and further information. If you have questions about soil sampling or your soil test, please contact the Lab at 802-656-3030 or AgTesting@uvm.edu. Trained volunteers at the UVM Extension Master Gardener Helpline are able to answer questions you have about your soil test results at go.uvm.edu/gardeninghelp. We are open 24/7/365 for online questions and on Thursday mornings for phone inquiries during the season at 802-656-5421.

The original publication is available at: https://www.uvm.edu/sites/default/files/Department-of-Plant-and-Soil-Science/AGTesting/How_to_Take_a_Soil_Sample.pdf ; this version has been slightly modified for the home horticulture audience. It is provided by the UVM Extension Community Horticulture Program, home to the Extension Master Gardener and Vermont Master Composter programs. See: www.uvm.edu/extension/mastergardener. 08.2023

Below are excerpts from "Interpreting Your UVM Soil Test Results" by Vern Grubinger at: https://www.uvm.edu/sites/default/files/Department-of-Plant-and-Soil-Science/AGTesting/InterpretingSoilTests.pdf.

Interpreting Your UVM Soil Test Results

When you receive your soil test results, you should receive a copy or link to the publication "Interpreting Your UVM Soil Test Results" (see URL above). The following are some highlights from this publication.

Soil tests measure the level of plant nutrients, soil pH, and organic matter content. The results are used to estimate whether soil amendments should be added to optimize crop growth and yield. Because there can be a lot of variability across a field or garden, soil samples submitted to the lab should be made up of subsamples taken from at least a dozen locations in the area being tested, taken evenly down to 6 to 10 inches deep, where most crop roots grow.

Testing starts with the extraction of available nutrients from the soil sample, to simulate what may become available to plants over the growing season. Labs use different extraction methods so do not compare results from tests that don't use the same methods. UVM's tests use the modified Morgan's extract.

Soil test recommendations are estimates, based on test results, of how much of each nutrient needs to be added, if any, to get a good (average) yield of a specific crop. The test will provide you with nutrient levels at the time the test was taken. Often, we see high or excessive levels of Phosphorus (P), Potassium (K), and Magnesium (Mg) in home garden and grounds tests. In those cases, you do not need to apply these nutrients. The full publication will provide additional guidance or you can contact the UVM Extension Master Gardener Helpline at go.uvm.edu/gardeninghelp for recommendations.

Results Include the Following Analyses

Soil pH affects the availability of nutrients. A soil pH of 6.5 to 6.8 is ideal for most vegetable and berry crops, and most crops will still grow pretty well with a soil pH of 6 to 7.5. Outside that range, yields are likely to drop.

Soil Organic Matter (SOM) is made up of carbon-containing materials in various stages of decomposition, including compost, manure, leaves, roots, and microbes. Native SOM content of most garden soils is usually less than 6% and typically in the 2 to 4% range. Sandier soils are low in SOM while clay soils are relatively high. Note: **Nitrogen (N)** is needed in relatively large quantities by plants, but it is not measured by standard soil tests because its availability changes depending on soil temperature and moisture, and thus, microbial activity. However, some N will be supplied from SOM as it breaks down.

Phosphorus (P) is relatively immobile in soil, and even when applied as a fertilizer, tends to get tied up chemically rather quickly, binding with iron and aluminum in the soil. Phosphorus availability decreases when soil pH is not in the optimal range, and also under cool, wet conditions. Because plants take up less P than N or K, when fertilizers containing all 3 nutrients are applied repeatedly, P tends to build up in the soil. Applying P when soil test levels are above optimum can contribute to pollution as soil moves from gardens or fields via erosion into surface waters such as brooks, lakes, rivers and streams.

Potassium (K) is absorbed in large amounts by plants, and is moderately prone to leaching, so K fertilization is often needed to maintain optimum yields.

Calcium is typically adequate for crop growth so long as soil pH has been optimized and plants have a good supply of soil moisture. **Magnesium** like Ca, is ordinarily supplied by liming.

Micronutrients (like Iron, Manganese, Boron, Copper, Zinc, Aluminum, etc.) are essential to plants but are required in very small amounts. Deficiencies are not common but may be more likely in sandier soils with low organic matter and/or high pH.

Cation Exchange Capacity (CEC) is a measure of soil's ability to act as a "sponge" to hold and supply positively-charged nutrients, or cations.

Be sure to read the full version of "Interpreting Your UVM Soil Test Results" by Vern Grubinger.