Correcting Deficiencies or Excesses

Correcting Deficiencies or Excesses

Based on the soil test, applications of limestone, fertilizer, compost, or manure are often suggested. The proper time for application is also stated. Organic amendments are suggested when requested.

Liming materials are used to raise the pH of the soil. Dolomitic limestone is the most common form of liming material sold in Connecticut. It contains both calcium and magnesium. Quality limestone is finely ground to permit rapid release in the soil. Finely-ground limestone may be pelletized for use in rotary spreaders.

The principal plant nutrients in fertilizers are nitrogen (N), phosphorus (P), and potassium (K). Connecticut law requires that the formula on the container be expressed as the percent of nitrogen (N), phosphoric acid (P_2O_5), and potash (K_2O). It is always in this order: thus a 5-10-5 fertilizer contains 5 pounds of N, 10 pounds of P_2O_5, and 5 pounds of K_2O in each 100 pounds of fertilizer.

If manure is applied, less commercial fertilizer may be required. Cow manure is low in nutrients and has a typical analysis of 0.5-0.25-0.5. About 10 tons per acre (1 cubic yard per 1000 square feet) may be applied. Fresh chicken manure contains more nitrogen than cow manure, particularly in the ammonia form. If the plants to be grown are sensitive to ammonia, fresh manure should be aged, composted or worked into the soil well in advance of planting.

Other nitrogenous wastes such as municipal and industrial composts may be used. Application rates for composts are generally based on their nitrogen content, which is similar to animal manures.

Soil Testing Telephone Numbers

Soil Testing Telephone Numbers

New Haven
(203) 974-8512

Windsor
(860) 683-4977

CAES

The Connecticut Agricultural Experiment Station

Putting Science to Work for Society since 1875

Soil Testing

History of the Morgan Soil Test

Sampling the Soil

Tests Performed

Correcting Deficiencies or Excesses

The Connecticut Agricultural Experiment Station

New Haven and Windsor

portal.ct.gov/CAES

portal.ct.gov/CAES/Soil Office/Soil Office/Soil Testing Offices Instructions

History of the Morgan Soil Test, Tests Performed

History of the Morgan Soil Test

Dr. M.F. Morgan of this Station added immeasurably to our knowledge of the relationships between plants and soils. In 1933, he devised a soil test that could estimate deficiencies or excesses of plant nutrients. Called the "Morgan Soil Test," it became the world's first widely accepted method for quickly estimating soil fertility.

Today, soil testing extends our knowledge of Connecticut soils and helps farmers, gardeners, homeowners, and landscapers improve soil fertility in an environmentally responsible manner.

Tests Performed

Soil samples are tested for texture, organic matter, pH, nitrate nitrogen, ammonium nitrogen, phosphorus, potassium, calcium, and magnesium. Except for pH and texture, all results are expressed as high, medium, and low. A nutrient is classified as excessive when it is likely to damage plants. If necessary, we can perform tests for salts, percent organic matter, and particle size.

Texture and Organic Matter: Texture and organic matter influences the amount of water and nutrients a soil can hold. Sands, loamy sands, and sandy loams low in organic matter require more frequent watering and fertilizing than the same soils high in organic matter or fine sandy loams, loams and silt loams. Silty clay loams and clay loams drain poorly. Some of the best soils for crop production are high in both sand and organic matter. These soils usually require annual additions of compost or other organic materials.

pH: Soil pH affects the availability of plant nutrients. Most plants grow best at a soil pH between 6.0 and 7.0. A small number of plants such as azalea, rhododendron, and blueberry prefer a soil pH between 4.5 and 5.5. If a pH adjustment is needed, limestone, sulfur, or aluminum sulfate will be suggested.

Nitrate and Ammonium Nitrogen tests indicate nitrogen immediately available to plants, but do not indicate the nitrogen that may later be liberated from the soil. Proper interpretation of these results are essential. Nitrogen favors leaf growth and imparts a deep green color to plant foliage. Excessive ammonium nitrogen can damage plants and is often an indication of over fertilization. Very high nitrate nitrogen levels may increase the risk of nitrate contamination of surface and groundwater.

Phosphorus binds strongly in soil and is often unavailable to plants. Deficiencies in phosphorus may cause poor root, fruit or vegetable growth and purpling of the older leaves. Excessive phosphorus can move to rivers, ponds and lakes and promote the growth of algae and weeds.

Potassium is supplied by the clay, organic matter, and fertilizer. Sufficient potassium improves flowering, disease resistance, cold hardiness, and drought survival. Potassium leaches readily from soil and therefore may need yearly supplements.

Calcium deficiencies are usually corrected by the application of limestone. This also neutralizes soil acidity. When the pH is correct and the calcium level is low, the addition of gypsum (calcium sulfate) may be suggested.

Magnesium tests identify soils where dolomitic limestone or epsom salts (magnesium sulfate) are likely to be beneficial. A low magnesium level is usually associated with acidic soil.

Other Elements. Plants require small amounts of other elements including iron, copper, zinc, sulfur, and boron. These micro nutrients are affected by soil acidity and their availability can usually be inferred from the pH test. Sulfur is rarely deficient. Boron deficiency is usually encountered only where soils have a pH over 7.0.

Overfertilization, saltwater, or road salt are often sources of salt. Salts usually leach quickly from adequately drained soil.

Sampling the Soil

Sampling the Soil

1. With a trowel, shovel, or auger, take thin slices or borings of soil from many places in the area to be sampled. Sample to a depth of 5 to 6 inches in gardens; 3 to 5 inches in lawns or pastures.

2. Mix the soil thoroughly and place one pint of the mixture in a sealed plastic bag. Print your name, address and what you want to grow on a label and attach it to the outside of the bag. If any plant problems have occurred briefly describe them. State if you would like organic plant care suggestions.

3. If soils, fertilizer treatments, lime additions have been different, sample each area separately. Do not combine soil samples from different areas.

4. If the sample is very wet, let it dry before you submit it.

5. For more information and soil submission form (not required) on the internet go to portal.ct.gov/CAES/Soil Office/Soil Office/Soil Testing Offices Instructions.

Deliver or mail soil samples to:

Soil Tests
The Connecticut Agricultural Experiment Station
123 Huntington Street
New Haven, CT 06511

or

153 Cook Hill Road
P.O. Box 248
Windsor, CT 06095 - 0248