INTERPRETATION OF SOIL TEST RESULTS

Soil tests provide homeowners and growers with guidelines for both efficient and environmentally sound use of fertilizers, lime and other soil amendments. Recommendations are based on University research and field studies. Our recommendations, however, are only as good as the sample you collect. Samples should be representative of the area being tested and should consist of a mixture of several subsamples obtained throughout the site. Poor sampling techniques may result in misleading recommendations. Soil test results will detect nutrient deficiencies, excesses or imbalances. They cannot, however, identify problems due to disease, insect pests, pesticides or poor cultural practices.

SOIL pH AND LIME RECOMMENDATIONS

Soil pH is a measurement of a soil’s acidity. The pH scale ranges from 1 to 14, with a pH of 7 being neutral. Values below 7 are considered acidic while those above indicate alkaline conditions. The pH of a soil not only affects the availability of necessary plant nutrients but also the solubility of potentially toxic elements such as aluminum and lead.

Most garden plants prefer a pH between 6.0 and 6.8. Notable exceptions include acid-loving blueberries and ericaceous plants like rhododendrons, azaleas and mountain laurel. These plants prefer a pH of 4.5 to 5.3. Varieties of potatoes without scab resistance are also grown at a lower pH (5.2 to 5.4) to inhibit the growth of this disease organism. The majority of Connecticut soils tend to be acidic with pH values ranging from 4.8 and 5.5 due to the geology and climate of the region.

Ground limestone is usually recommended to correct acid soil conditions. Recommendations for lime are based on the crop or plants being grown, soil pH, and soil texture and organic matter estimates. In general, the lower the pH and the greater the clay and organic matter content of the soil, the greater the amount of limestone required to raise the soil pH to a desired level.

Limestone recommendations are located on the computer printout directly below the crop listing. Unless the limestone is to be tilled in, apply no more than 50 lbs/1000 square feet (5 lbs/100 square feet) to the soil surface at one time. Reapply at one- to six-month intervals until the total recommended amount is administered. It will take several months for the pH to increase.

Occasionally, it is necessary to lower the pH of a soil. Sulfur is used to lower pH and, if your soil needs sulfur, a recommendation will be included with your results.

EXTRACTABLE NUTRIENTS—PHOSPHOROUS, POTASSIUM, CALCIUM AND MAGNESIUM

The nutrient ions, phosphorus, potassium, calcium and magnesium are extracted from the soil using a modified-Morgan solution. Results provide an estimation of the nutrients available to plants during the growing season and are expressed as pounds per acre. Values on the report are classified as below optimum, optimum and above optimum and reflect the levels found in your soil. The objective when developing a fertility program is to achieve and maintain levels in the optimum range.

PHOSPHORUS

Phosphorus (P) is essential for root development and the production of flowers and fruit. Native Connecticut soils are generally low in phosphorus and much of what is present is bound in both organic and inorganic forms not readily available to plants. Phosphorus is most available at a pH of near 6.5 and by moist, warm conditions. Soil tests provide an estimate of the amount of readily available phosphorus and recommendations are made accordingly.

POTASSIUM

Plants require large amounts of potassium (K), which is sometimes referred to as potash (K2O). It is critical for numerous plant functions and especially aids in hardiness and disease resistance. Potassium is released from rocks and soil minerals as they weather. Often the supply of potassium from the soil is limited and fertilization is required.

CALCIUM

A vital component of the cell.
manufacturing process, calcium (Ca) also improves the root uptake of other nutrients. Plant growing points are particularly sensitive to an insufficient calcium supply as evidenced by blossom end rot – those black sunken spots often discovered on the bottom of tomatoes and summer squash. Lack of moisture also contributes to this disorder. Soils that are properly limed generally contain adequate calcium because this nutrient is a major constituent of limestone.

MAGNESIUM
A key element in the development of chlorophyll, magnesium (Mg) also is crucial to seed formation. Like calcium, magnesium usually is supplied by liming materials. Dolomitic lime containing about 20% magnesium. Epsom salts (magnesium sulfate) may be recommended where calcium levels are adequate but soil magnesium is low.

NITROGEN
Part of all living cells, nitrogen (N) promotes green leafy growth. Lack of nitrogen commonly limits plant growth. Plants take up nitrogen in the form of nitrate (NO3) or ammonium (NH4) with the nitrate form preferred by many garden plants. Because nitrogen levels fluctuate widely depending on environmental conditions and can change even in shipping, this element is not routinely measured. Nitrogen recommendations are based on crop needs as determined by field studies combined with the presumption that little available nitrogen remains in the soil at the end of the growing season. Even if levels of all other nutrients are sufficient, you will most likely need to add nitrogen to your lawn or garden each year and fertilizer recommendations are made accordingly.

VEGETABLE GARDENERS
If your results state that both the phosphorus and potassium levels are above optimum only a nitrogen recommendation will be provided. For each pound of nitrogen recommended you may use your choice of 8.3 lbs of bloodmeal (12-0-0), 17 lbs of cottonseed meal (6-2.5-1.7), 3.25 lbs of high nitrogen lawn fertilizer (32-3-5) or 2.2 lbs of urea (46-0-0) per 1000 square feet.

SOLUBLE SALTS
Soluble salts are measured by special request for an additional fee. Salt levels may be elevated in areas close to roads where salt compounds are used for deicing or where excessive fertilizer has been applied. High soluble salt levels can cause severe water stress and nutrient imbalances in plants. As measured by this lab, values for mineral soils less than 0.4 mmho/cm are low, values between 0.4 and 0.8 are slightly saline and may cause some injury to salt sensitive plants. Values between 0.81 and 1.2 are moderately saline and will restrict the growth of many plants, while those above 1.2 are considered high and likely to cause damage. Soluble salt levels can be reduced by repeated, thorough irrigation.

ORGANICmatter
Organic matter values are considered low if less than 4%, medium from 4% to 8%, and high if above 8%. We visually estimate the organic matter of your soil. Medium levels are desirable for optimal plant growth. Benefits of organic matter in the soil include improved water and nutrient holding capabilities; better soil structure which enhances root growth and increases aeration; a more hospitable environment for soil organisms; and a reserve of plant nutrients. Soils high in organic matter are easier to dig and don’t have to be watered or fertilized as often. Sources of organic matter include peat moss, compost, leaf mold, manure, mushroom soil and mycelium.

TEXTURE
The term “texture” refers to the relative proportions of the variously sized mineral soil particles – namely sand, silt and clay. We estimate the texture of your soil by feel. While coarse-textured sandy soils may have good aeration and drainage, they have limited ability to retain water and nutrients. Fine-textured silts and clays are best from the standpoint of nutrient retention but may hold too much moisture and drain poorly. Soils designated as high in organic matter contain such a high proportion of organic matter that the size of the mineral soil fraction can not be determined by our method of hand-texturing. Loams which contain from 7% to 27% clay, 28% to 50% silt and less than 52% sand are usually considered ideal garden soils. Attempting to alter a soil’s texture is difficult and not generally recommended. The best way to improve soil is through the addition of organic matter.

MICRONUTRIENTS AND ALUMINUM
Soil test reports indicate the amount of several extractable micronutrients in parts per million (ppm). Micronutrients are elements that are required by plants in very small amounts. Their availability often correlates well with soil pH and organic matter levels. If these two factors are in a desirable range for the crop being grown,
micronutrient deficiencies or excesses seldom occur. The levels of the micronutrients, boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) are compared with typical soil background levels for diagnostic purpose. Recommendations for micronutrient additions to soil are not made because adjusting the soil pH and/or soil organic matter levels usually rectifies any micronutrient problems that may exist.

Aluminum is a common constituent of New England soils. It is not an essential plant nutrient and may cause injury to sensitive plant species like lettuce and beets. High levels of aluminum in the soil can also interfere with plant uptake of phosphorus. As the soil pH decrease, the solubility of aluminum increases. Soil test results often indicate elevated aluminum increases. Soil test results often indicate elevated aluminum levels in soil with pH levels below 5.0. Liming soils to an acceptable level for the crop being grown will reduce the amount of aluminum available to plants. Acid loving plants like rhododendrons, blueberries, and azaleas have high tolerance to soil aluminum levels. Aluminum is also responsible for the blue color of hydrangeas because of its effect on pigment formation, which is why the blue flowering hydrangeas are grown at low soil pH levels.

LEADS
Lead is a natural occurring element in soils and typically is present in soils in the range of 5 to 100 ppm total lead. Only when total lead levels exceed 400 ppm does the Environmental Protection Agency (EPA) list is as an element of concern. Soil test results indicate our estimation of total lead. A correlation has been developed between our routine soil testing methodology and more rigorous EPA testing. If the lead levels are elevated, you will receive appropriate information about potential problems with elevated lead levels and gardening practices to minimize exposure to lead.