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Explanation of Soil Test Report

Report Number - All sample reports are filed by their report number. Be sure to refer to this number when contacting A & L about a report.

Laboratory Number - This number is assigned by A & L to each individual sample.

ppm (parts per million) - Results for major and minor elements are reported in ppm on an elemental basis. This unit of measurement is equivalent to pounds of nutrient per million pounds of soil. One acre of mineral soil 6 to 7 inches deep weighs about two million pounds. Therefore, to convert parts per million readings to pounds per acre, multiply by two.

Nutrient Level Ratings – Individual nutrient elements are rated with five levels: A **Very Low** or **Low** level means the soil is deficient and the addition of the element is beneficial for most plants. A **Medium** level means the addition of the element is beneficial to the plant 50% of the time. A **High** level means enough nutrient is in the soil and the addition of the element is not likely beneficial to the plant, however some addition is needed to maintain a good fertility. A **Very High** level means no additional nutrient is needed for most plants. It should be emphasized that at this level the plant can grow quite well and not suffer from toxicity.

Phosphorus - This test measures phosphorus that is readily available to plants. The optimum level will vary with plant, yield and soil types. 40 to 100 ppm is adequate for most lawn and garden plants. Certain specialty plants may need higher levels.

Potassium - This test measures the available potassium in a soil. The optimum level will vary with the plant, yield and soil type. A potassium level of 120 to 200 ppm is adequate for most plants. Higher levels are generally needed on soils high in clay and/or organic matter, versus soils that are sandy and low in organic matter.

Magnesium and Calcium - Calcium deficiencies are rare when the soil pH is adequate. Magnesium deficiencies are more common. Calcium will be in optimum range once lime is applied to adjust to the pH range appropriate for the plant. Apply dolomitic lime if the magnesium falls below 70ppm.

Sulfur - This test measures sulfate-sulfur. It is a readily available form preferred by plants. Optimum levels usually range from 20 to 30 ppm.

Micronutrients (Zinc, Manganese, Iron, Copper, Boron) – Turf grasses need very little amount of these micronutrients and soil can provide enough if the pH is below 7.0. For garden and flower plants, the adequate range for Zinc is 6 -10 ppm, Manganese is 20-40 ppm, Iron is 10-50 ppm, Copper is 0.4-5.0 ppm and Boron is 0.8-2.0 ppm.

Sodium - Sodium is a non-essential nutrient for most crops; its effect on the physical condition of a soil is of greater importance. Soils high in sodium may cause adverse physical and chemical conditions. Excessive levels of sodium can be reduced by leaching and/or through the application of calcium sulfate (Gypsum).

Soluble Salts - Excessive concentrations of various salts can develop in soils. This may be natural cause, the result of irrigation with high salt content water, excessive fertilization or contamination from chemicals or industrial waste. Above 1900 ppm is hazardous and need leaching.

Soil pH - This test measures active acidity or alkalinity. A pH of 7.0 is neutral. Values higher are alkaline while values lower are acid. A pH of 6.0 to 7.0 is the desired range for most plants grown in mineral soils. A pH of 5.0 to 5.5 is desired for organic soils (greater than 20% organic matter).

Acidity (H) – This represents the quantity of the acid. For a given type of soil the lower the pH, the higher amount of acidity exists and more lime is needed to neutralize it.

CEC (Cation Exchange Capacity) - CEC measures the soil's ability to hold elements with positive charges (cations) such as calcium, magnesium, potassium, sodium and hydrogen. The CEC of a soil will increase with the increasing amount of clay and organic matter. The normal value for loamy soil is 4-8.

Percent Base Saturation - This is the proportion of the CEC occupied by a given cation or a combination of cations referred to as bases. Based on Ideal Soil Concept, soil should have 85 to 90% base saturation, that is 65 -75% Ca, 10-15% Mg, 2.5-5.0% K, and 5-13% H. According to the newer and well-accepted concept called Sufficient Range, as long as there are sufficient amount of cations for plant to utilize, there is no yield response by varying ratios and only extreme ratio cause deficiency.

Organic Matter - Organic matter is expressed in percent. It measures the amount of decomposed plant and animal residues in a soil. Soil color is closely related to the amount of organic matter. A darker color is usually associated with high organic matter. Dark -colored soils often test above 3.5% organic matter. Organic matter can improve soil physical properties and enhance plant growth. High number is good but 3 -5% is sufficient.

General Instructions for Lime and Fertilizer Application.

Important! Read this section before apply lime or fertilizer

Lime neutralizes soil acidity and contributes many benefits to the soil environment. Chemically, there are two types of lime: 1) Calcite limestone contains calcium carbonate only, and 2) Dolomite limestone contains both calcium and magnesium. Use dolomitic lime if the magnesium level is rated medium or lower. Physically, there are powdered and pelletized limes. Both are equally effective. The lime application should keep soil pH within the desired range for 1 to 2 years on sandy soils and for 2 to 3 years on silt and/or clay soils. You do n't need to lime ever year.

Lime is insoluble in water thus move very slowly downward in the soil. For best result, broadcast lime over the surface, incorporate and mix it 4 to 8 inches into the soil. For place where mixing is not possible or may cause damage to the plants, apply the recommended lime over the surface prior to rainfall or irrigation. If not incorporate into the soil, do not surface apply more than 50 lbs/1000 ft² per application. If the suggested rate is higher, apply up to 50 lbs every 6 months intervals until the total suggested amount is fulfilled. Lime can be applies anytime of the year unless ground is frozen or covered with snow.

Fertilizer is recommended in lbs per1000 ft² of the nutrient elements (not products) . The three major nutrient elements are Nitrogen (N), Phosphate (P₂O₅) and Potash (K₂O).. To convert the recommended nutrients on the report to the actual amount of fertilizer, use the following steps.

1. The numbers on the fertilizer bag represent the percentage of three major nutrients, N, P₂O₅, and K₂O contained in the product. All fertilizer grades are identified by the same label sequence (%N - %P₂O₅ - %K₂O). For example, 20 lbs of 5-10-15 contain 1 lb of N (20 X 5%), 2 lbs of P₂O₅ (20 X 10%) and 3 lbs of K₂O (20 X 15%). The desired nutrients can also be obtained from single -nutrient products such as Urea (46% N) and Ammonium Nitrate (33% N) for Nitrogen, Muriate of Potash (60% K₂O) for Potassium, and Triple-Super-Phosphate (46% P₂O₅) for Phosphorus.
2. Based on the above principals, you can calculate the amount of the product needed from the recommended nutrients. You can use single - nutrient products and with this method you would not fall short or waste any single nutrient that is required. The draw back is you have to apply each product separately as they are not easily mixed. To use a pre -mixed product, find the ratio of the product as close as to the ratio of the recommended nutrients as possible and calculate the amount based on the percentage of nitrogen. For example if the recommendation is 3 lbs/1000 ft² N, 6 lbs/1000 ft² P₂O₅ and 6 lbs/1000 ft² of K₂O which has a ratio of 1:2:2, the product of 5 -10-10 is the perfect choice and the amount of this product needed is 60 lbs/1000 ft² since 60 X 5% = 3 lbs of N. For minor nutrients such as zinc, copper and iron, check the percentage on the bag, then calculates the same way.

Fertilizer can be applies anytime when plants are growing or some may get lost and cause pollution.

For a new lawn, it is best to apply fertilizer by bro adcasting evenly over the surface, incorporate and mix it 4 to 8 inches into the soil. If incorporated, lime and fertilizer can be applied at the same time. For garden plants, apply fertilizer near the plant row (banding) or trees can improve efficiency but with caution as it may cause injury. Nutrients like phosphate and manganese are always better utilized when apply near the plant, others may be applied near the plant with less amount. Boron can be applied only through broadcasting.