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Understanding Your Soil Test Report

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UNDERSTANDING YOUR SOIL TEST REPORT

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Regular soil testing helps develop and maintain more productive soils for farming, gardening, and landscaping. The purpose of this guide is to help you understand and interpret the results from a Utah State University soil test report. Additional Utah State University Extension bulletins are available which address solutions to specific soil problems and offer guidance on fertilizer selection and use. See "Where to obtain additional information" at the end of this guide.

GENERAL INFORMATION

A soil test report (Figure 1) lists the date the sample was received and when analyses were completed, as well as the lab number assigned to your sample. Use this number when contacting the lab with questions about your report. The sample identification is the name you assigned to your sample. The crop to be grown (or garden or lawn) is also listed, as well as any comments you provided on the information form submitted with your sample. The

Soil Test Report
and
Fertilizer Recommendation

USU Analytical Labs
Utah State University
Logan, Utah 84322-4830
(435) 797-2217
(435) 797-2117 (FAX)

Date Received: 4/20/98
Date Completed: 4/24/98

Name: Homeowner
Address:

Logan UT 84321 County: Cache

Lab Number: 98011000
Identification: Garden
Crop to be Grown: Garden

Grower's Comments: Mixed vegetable garden.
Acres in Field:

Soil Test Results			Interpretations	Recommendations
Texture		Silt Loam		
Lime		++	Normal	
pH		7.7	Normal	
Salinity - ECe	mmhos/cm	0.4	Normal	
Phosphorus - P	ppm	78	Excessive	0 lbs P2O5/1000 sq ft
Potassium - K	ppm	> 400	More than Adequate	0 lbs K2O/1000 sq ft
Nitrate-Nitrogen - N	ppm	1.5		2-4 lbs N/1000 sq ft*
Zinc - Zn	ppm	1.2	Adequate	0 oz Zinc/1000 sq ft
Iron - Fe	ppm	7.9	Adequate	
Copper - Cu	ppm	0.4	Adequate	
Manganese - Mn	ppm	1.8	Adequate	
Sulfate-Sulfur - S	ppm	13.0	Adequate	0 lbs Sulfur/1000 sq ft
SAR				
Organic Matter		3.2		

Notes
*See Garden Guide.
Phosphorus level high - do not add additional phosphorus fertilizer or manure.

Figure 1. An example of a comprehensive soil test report from the Utah State University Analytical Laboratory.

bulk of the report is composed of the results of tests you specified, test interpretations, and recommendations.

TEXTURE

Texture refers to the texture class of the soil. Sandy soils (sand, loamy sand, sandy loam) have lower water and nutrient holding capacities, whereas high clay soils (clay, silty clay, clay loam, silty clay loam) tend to be poorly drained and are subject to compaction. Additions of organic matter will increase the ability of sandy soils to hold water and nutrients, and the ability of high clay soils to drain water and resist compaction.

LIME

Lime indicates the presence or absence of carbonates in soil. A "0" indicates no lime is present. A "+" indicates some lime (a trace amount up to approximately 3%) is present, while a "++" indicates the soil has a large amount of lime (usually >3%). The majority of Utah soils naturally contain lime and do not require lime additions.

pH

pH indicates the acidity or alkalinity of soil. A pH of 7 is neutral. pH values less than 7 are acidic and values greater than 7 are alkaline. Utah soils tend to be moderately alkaline (pH range 7.5 - 8.5). Most plants grow well in soils with pH values between 6.0 and 8.0. Trace element (e.g., iron) deficiencies can occur in soils with pH values greater than 8.0, and with some sensitive plants (e.g., berries, grapes, silver maple, pin oak) in soils with pH values greater than 7.5.

SALINITY - (ELECTRICAL CONDUCTIVITY, EC_e)

Salinity indicates the amount of soluble salt in soil. High salinity levels inhibit seed germination and plant growth. Different plants have different salt tolerance levels. Generally, if EC_e = 0 to 2, salinity effects are mostly negligible; if EC_e = 2 to 4, salinity may affect sensitive plants; if EC_e = 4 to 8, yields of many plants are restricted; if EC_e = 8 to 16, only tolerant plants will grow; if EC_e is above 16, only a few, very tolerant plants will grow.

A soil pH greater than 8.2 together with moderate to high salinity (EC_e> 2 to 4) indicates a problem with excess sodium. This can be verified by determining the sodium adsorption ratio (SAR) of soil (described below).

PHOSPHORUS-P

The phosphorus soil test result is in units of parts per million (or ppm), which is equivalent to pounds of available phosphorus per million pounds of soil. The soil test value is a measure of the amount of phosphorus available to plants during the growing season. A very low or low phosphorus test value indicates that additional phosphorus must be applied to prevent a deficiency. An adequate to high soil test value indicates that sufficient phosphorus is available to grow the plants you identified. Very high or excessive amounts of phosphorus indicate excessive fertilizer or manure application, and may lead to nutrient imbalances in plants.

POTASSIUM-K

The potassium soil test value is a measure of the amount of potassium available to plants during the growing season. A very low or low potassium test value indicates that additional potassium must be applied to prevent a deficiency. An adequate or higher soil test value indicates that sufficient potassium will be available for growing the plants you identified.

NITRATE-NITROGEN-N

The amount of plant-available nitrogen (N) is indicated by the nitrate-nitrogen value in the upper two or more feet of soil, normally the sum of 0 to 12 inch and 12 to 24 inch sample depths. The upper two feet of soil are used because nitrate-N is mobile and will move through soil with irrigation water or rainfall. Nitrogen recommendations depend on the nitrate-nitrogen soil test value, the crop to be grown (or lawn or garden), yield, and site history (last crop grown, residue removal, and previous applications of nitrogen and manure). If a nitrate-nitrogen test was not requested, nitrogen recommendations will be based on the crop to be grown, yield, and site history.

ZINC-ZN

Zinc is occasionally deficient in Utah soils, especially where topsoil has been removed during construction and land leveling activities. Plants such as corn, potatoes, onions, and beans are most susceptible to zinc deficiency. A low or marginal soil test zinc value indicates a need for zinc fertilization at rates indicated on your report.

IRON-FE

Iron deficiency is a common problem with landscape plants in Utah. Iron sensitive trees, shrubs, and fruits growing in soils testing below 5 ppm iron may benefit from iron fertilization.

COPPER-CU, AND MANGANESE-MN

Copper and manganese deficiencies are rarely observed in Utah. When indicated, copper and manganese applications should initially be made on a trial basis to determine if there is a response before treating large areas.

SULFATE-SULFUR-S

Sulfur deficiency is most likely to occur in higher elevation areas where irrigation waters are relatively clean. A low or marginal sulfur test indicates a need for sulfur fertilization at rates recommended on your report.

SODIUM ADSORPTION RATIO-SAR

The SAR is the ratio of sodium (Na) to calcium (Ca) plus magnesium (Mg) in the soil solution. A high SAR causes poor water infiltration and plant growth. Soils with a SAR greater than 10 to 15 are classified as sodic and will likely require the addition of gypsum (calcium sulfate) or other amendments (such as elemental sulfur and/or organic matter) at high rates to displace sodium and improve water infiltration. Contact your County Extension Agent for assistance in treating soils with a high SAR.

ORGANIC MATTER-O.M.

Organic matter provides nutrients such as nitrogen and sulfur for plant growth while improving soil tilth (physical condition). Generally, higher levels of organic matter are desirable. Soil organic matter content also influences the effectiveness and application rate of certain herbicides. Follow the instructions on your herbicide label or contact your County Extension Agent for assistance.

RECOMMENDATIONS

Nutrient recommendations are expressed in pounds per acre for agricultural soil samples, or pounds per 1000 square feet for turf, landscape, and garden soil samples. These

recommendations are used as the basis for calculating the application rates of fertilizers you select to meet the nutrient needs.

WHERE TO OBTAIN ADDITIONAL INFORMATION

The Utah State University Analytical Laboratory has information on soil, plant, feed, and water analysis. Other Utah State University Extension bulletins are also available on a wide range of topics. For information and assistance in obtaining these guides, contact your County Extension Agent, the Utah State University Analytical Laboratory (Utah State University, Logan, Utah 84322-4830; 435-797-2217), or the Utah State University Extension Internet web site: **http://www.ext.usu.edu**

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