OKLAHOMA COOPERATIVE EXTENSION SERVICE

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Understanding Your Soil Test Report

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Soil test evaluates the nutrient supplying capacity of the soil, and it can be an important management tool in developing an efficient soil fertility program. The first part of the report shows some general information about the sample. The second part lists all test results. The last part tells you if lime or any fertilizers are needed and how much. You may need to consult your extension agent or crop consultant to figure out what materials to purchase and when to put them out.

Soil pH: Soil pH is a measure of soil acidity or alkalinity. A pH of 6.9 or less is acidic. Soils with a pH of 7.0 are neutral; values higher than 7.0 are alkaline. Under normal conditions, most plants grow well when soil pH is in the range of 6.0 to 7.0. An application of lime should be considered for most non-legume crops when soil pH is 5.5 or less. Legumes usually grow best when the pH is 6.0 or higher (Table 1).

Buffer Index (BI): The buffer index is a value used for determining the amount of lime to apply on acid soils with a pH of less than 6.5. The lower the BI, the higher the lime requirement. The amount of lime recommended is in tons ECCE (Effective Calcium Carbonate Equivalent), which is the pure calcium carbonate ground fine enough to be 100% effective. Most ag-lime materials are not exactly 100% ECCE, but the rate of ag-lime to apply can be determined from the following formula:

Tons of lime/A = Tons ECCE lime required ÷ %ECCE of the lime purchased

The amount of lime recommended is intended to raise soil pH to 6.5, but the pH doesn't have to be this high to grow crops. Table 1 lists soil pH values at which lime should be applied for major crops grown in Oklahoma. When liming for continuous wheat, it is only necessary to raise the pH to slightly above 5.5 because higher pH may favor some root rot diseases.

Table 1. Lime is recommended when the soil pH is less than required for the crop.

Legume Crops	**Minimum pH**
Cowpeas, crimson clover, mungbeans, vetch	5.4
Peanuts, soybeans	5.7
Alsike, red, and white (ladino) clovers, arrowleaf clover	5.9
Alfalfa, sweet clover	6.1
Non-legume Crops	**Minimum pH**
Bluestem, fescue, native hay, weeping lovegrass	4.4
Corn, oats, orchardgrass, ryegrass, sorghum, sudangrass, winter wheat, Jose Tall Wheatgrass	5.4
Bermudagrass, cotton, small grain for grazing	5.6
Lawn, garden	5.9
Barley	6.1

Nitrate Nitrogen (NO_3-N) is water soluble and readily available for plant uptake. This test shows the amount of NO_3-N present in the soil and it will be subtracted from the total N needed for the yield goal. The type of crop and yield goal need to be provided to the lab in order to obtain N recommendation. The N recommended is the total amount needed for the entire growing season. Sometimes split application can

improve N use efficiency.

Phosphorus (P): This method determines phosphorus availability index in the soil. A level of 65 is desired for all crops, which is considered 100% sufficient. A soil test with 40% sufficiency means 40% of plant phosphorus needs will be supplied by the soil. The remainder must be provided by adding fertilizer. If no phosphorus is added, the yield will only be 40% of the potential yield.

Potassium (K): Like phosphorus, potassium soil test estimates K availability in the soil and the test indicates a certain percent sufficiency. The optimum level will vary with crop, soil type and other soil related factors, but a soil test K of 250 is considered adequate for all crops except for alfalfa. Alfalfa requires 350 to have adequate K.

Calcium (Ca) and Magnesium (Mg): These two elements and potassium are referred to as exchangeable cations and are found on the cation exchange complex. Oklahoma research has found that Ca and Mg additions can increase yields when individual tests are low.

Sulfur (S): The sulfur soil test measures the amount of available sulfate-sulfur (SO_4-S). The amount found in the soil test can be subtracted from crop requirements based upon a yield goal similar to the approach used for nitrogen. Unlike nitrogen, most soils contain adequate available sulfur for most crops. Additionally, annual contributions from rainfall are generally high enough to meet the needs of a 60-bushel wheat crop.

Zinc (Zn), Iron (Fe), and Boron (B): Availability of these trace or micronutrient elements can be estimated from soil tests. Trace element deficiencies occur only on certain soils and with certain crops. Knowledge of crop needs and soil deficiencies will help determine when trace element tests need to be run.

Organic Matter (OM) measures the humic substances in the soil. Soils with higher OM are generally more productive.

Table 2. General Classification of Certain Nutrients on the Soil Test Report

	NO_3-N	P	K	Ca	Mg	Zn	Fe	B	OM
	lbs/acre	Test Index		lbs/acre		ppm			%
Very Low	<5	<10	<75	<150		<0.3	<1.5		<0.5
Low	5-25	10-20	75-150	150-450		0.3-0.8	1.5-3.0	<0.25	0.5-1.5
Medium	25-50	20-65	150-250	450-750		0.8-2.0	3.0-4.5	0.25-0.5	1.5-3.0
High	50-100	65-120	250-350	>750	>100	>2.0	>4.5	>0.5	>3.0
Very High	>100	>120	>350						

Fertilizer rates should be reduced or fertilizing program should be examined if any nutrient is in the very high category.

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