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Fertilizing Lawns In Southern Idaho

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Turf grasses require adequate levels of plant nutrients throughout the growing season to maintain healthy vigorous growth. Thus fertilizer management is one of many turf management practices along with proper grass selection, correct mowing height and timing, irrigation management, disease and insect control, weed management, thatch removal and soil aeration that are essential for establishing and maintaining a beautiful lawn.

Soil Sampling and Testing

Soil tests can provide valuable information about the availability of plant nutrients for plant growth. You should test the soil before establishing new lawns and again every 4 to 7 years after the lawn is established. Take the soil samples before you apply current season applications of fertilizer or soil amendments.

Follow these guidelines to obtain a representative soil sample from your yard:

Depth of Sample — When establishing a lawn, sample soil to a depth of 6 inches. For existing lawns, sample to a depth of 4 inches.

Equipment — Collect the soil sample in a clean stainless steel or plastic container such as a pail or bucket. You can use a small spade, garden trowel or soil sampling probe (½ to ¾ inches in diameter) to sample the soil before the grass is established. The soil sampling probe works best when sampling established turf. Be sure that the sampling equipment is not contaminated with fertilizer materials.

Number of cores — Randomly collect and mix 15 to 20 cores from a relatively uniform area to be fertilized. Do not mix these sample cores with sample cores from non-representative areas (i.e. flower beds, vegetable garden, etc.). Avoid unusual areas (areas where compost may have been piled, areas with drainage problems, areas where trash may have been burned, areas where fertilizer may have been spilled, etc.). Sample these areas separately so that they can be properly treated.

Use a zig-zag pattern when taking the soil samples (Fig. 1). Combine the sample cores from the sampled areas to make a composite sample. Hand mix the soil thoroughly in the container.

Ordering the soil test — Place approximately 2 cups of the mixed soil in a soil sample bag. Be sure to include your name, date and sampling location on the soil sample bag. Complete the information sheet required by the soil testing laboratory, and forward the sample and information sheet to the soil testing laboratory.

Request the soil testing laboratory to analyze the sample for nitrate-nitrogen (NO_3-N), phosphorus (P), potassium (K), sulfur (S), soil pH and electrical conductivity (EC). Both pH and EC are normally provided in the laboratory's routine analysis. The EC measures the quantity of salts present in the soil. The soil pH provides helpful baseline information in managing the lawn.

Fertilizer Rates Based On Soil Test Information

Fertilizer guidelines are given in actual amounts of N, P, K and S. Fertilizer rates are expressed in pounds of nutrient per 1,000 square feet (ft^2).

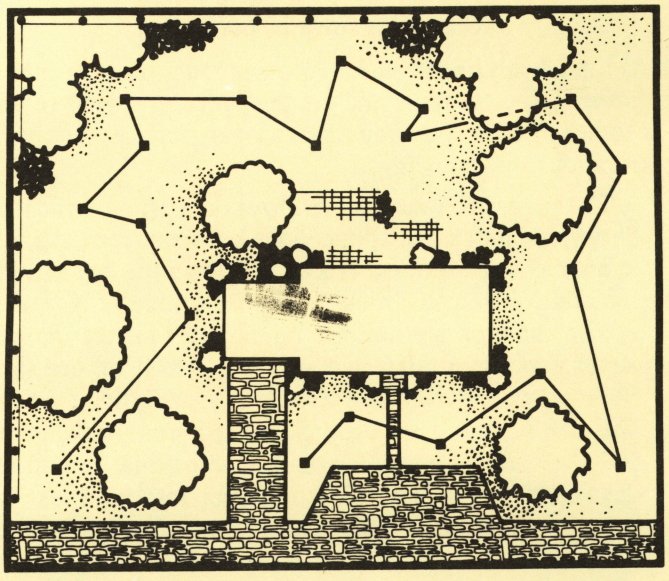

Fig. 1. Collect samples from 15 to 20 locations, following a zig-zag pattern. Stay away from unusual areas, yard edges and tree canopies. (■ = spots where samples are collected.)

Nitrogen

Nitrogen (N) is essential for providing a pleasant, healthy-looking green color in lawns. Most N fertilizer sources are satisfactory. Organic fertilizer materials, such as animal and plant by-products, sewage sludge and manures, work best in the summer months after the soil has warmed. Organic materials release plant nutrients slowly under ideal conditions and very slowly under cool soil conditions. Quick release inorganic fertilizer-N sources, such as ammonium nitrate, urea and ammonium sulfate, give better results in early spring and late fall.

Fertilizer-N in excess of 1 pound N/1,000 ft² per application may burn the foliage or produce over-succulent grass with thin cell walls. The grass will be less resistant to diseases and more susceptible to cold and drought injury. These conditions will favor the invasion of weeds. Excessively high rates of inorganic N will kill grass. Nitrogen should be broadcast uniformly on dry turf and watered in. Never apply to wet turf as fertilizer leaf-burn injury may occur.

When establishing a lawn — Check the soil test results for nitrate nitrogen (NO_3-N). If the test indicates less than 5 ppm NO_3-N in the 0- to 6-inch soil sample, apply 0.5 pound N/1,000 ft². If the soil test indicates 5 ppm or more NO_3-N in the sample, no additional N is needed to establish the new lawn.

For existing lawns:

Normal lawns = 2 to 4 pounds N per season

Southern Idaho bluegrass lawns should receive 2 to 4 pounds of N/1,000 ft² per year. If fine-leaf fescue grasses are the dominant variety in the lawn, an application of 2 to 3 pounds N/1,000 ft² is sufficient per year. Overfertilization of fine-leaf fescues with N will weaken the stand. Nitrogen may be applied alone or as part of a complete fertilizer.

Intensively managed turf =
6 to 10 pounds N per season

Intensively managed turfgrasses, such as golf putting greens, sports fields and some specialty lawns, require higher rates of N during the season and more frequent irrigations and mowings.

The suggested rate of N fertilizer on existing turf should be divided into equal applications between April and September. Avoid applications of N during the hot summer months. When using a quick-release source of N fertilizer (i.e. ammonium sulfate, ammonium nitrate or urea) never apply more than 1 pound N/1,000 ft² at one time. Slow-release N fertilizers such as isobutylidene diurea (IBDU), sulfur-coated urea (SCU) and urea formaldehyde (UF) release N over a longer period of time (around 90 days) and can be applied at a higher rate with less frequent applications. For quality lawns apply 1 pound N/1,000 ft² in the fall after last mowing and before the soil freezes. When N is applied in the fall, avoid early spring applications (before mid-April). This practice will encourage better root growth and plant vigor.

Phosphorus

Phosphorus (P) will not move appreciably with irrigation water and will not cause leaf burning or plant injury. P fertilizer applications may, therefore, be made at one time. Be careful not to apply more than 1 pound N with the phosphorus per 1,000 ft² on existing lawns at one time when using formulated turf fertilizer mixes. Table 1 shows levels of P to apply from soil test information.

For best results when establishing new lawns, incorporate P into the top 4 to 6 inches of the soil before planting. Table 3 lists fertilizer materials that contain P.

Potassium

When establishing new lawns, apply K by broadcast and incorporate it into the top 4 to 6 inches of the soil.

On existing lawns, potassium (K) applications should not exceed 1 pound K_2O/1,000 ft². Applications greater than 1 pound may cause leaf and root damage. When soil test level indicates more than 1 pound K_2O/1,000 ft² is needed, K should be equally divided and applied every 3 to 5 weeks. At least one irrigation should be applied between K applications. Apply K-containing fertilizer only to dry turf and water it in to prevent foliar burning. When applying a fertilizer mixture containing both N and K, the combined N+K_2O should not exceed 1.5 pounds/1,000 ft².

Table 2 shows levels of K_2O to apply from soil test information. Table 3 lists some K-containing fertilizer materials.

Sulfur

Sulfur (S) is essential for developing and maintaining an attractive deep green color in lawns. Rapidly growing, intensively managed lawns have a high demand for S. Fortunately, most surface irrigation water in Snake River canals contains sufficient S for lawn growth, so additional S is not generally required.

Table 1. Phosphorus (P) fertilizer guide for existing lawns and establishment of new lawns.

	Pounds of P_2O_5 to apply per 1,000 ft²	
Soil test P level Sodium bicarbonate method	Existing lawn 0 to 4 inches sample depth	New lawn 0 to 6 inches sample depth
0 to 5 ppm	3.0	4.0
6 to 10 ppm	2.0	3.0
11 to 15 ppm	1.0	2.0
over 15 ppm	0.0	0.0

Table 2. Potassium fertilizer guide for existing lawns and establishment of new lawns.

	Pounds of K_2O to apply per 1,000 ft²	
Soil test K level Sodium bicarbonate method	Existing lawn 0 to 4 inches sample depth	New lawn 0 to 6 inches sample depth
0 to 75 ppm	3.0	4.0
76 to 125 ppm	2.0	3.0
125 to 175 ppm	1.0	1.5
over 175 ppm	0.0	0.0

Sulfur may be required on lawns with sandy to gravelly type soils or when the S content of the irrigation water is low (i.e. mountain streams and some well water). Sulfur can be applied with other fertilizer if you select an S-containing fertilizer material. An application of 0.5 to 1 pound S/1,000 ft² per growing season is sufficient. Refer to Table 3 for some sulfur-containing fertilizer materials.

Using Formulated Lawn Fertilizers

Most lawn fertilizers sold are mixtures of fertilizer materials. Fertilizers containing the three major nutrients (N, P, and K,) are referred to as complete fertilizers. By law, manufacturers are required to list major nutrients on the fertilizer bag in the percentage form of N-P_2O_5-K_2O. A fertilizer bag containing a 20-30-5 fertilizer has 20 percent nitrogen (N), 30 percent phosphorus oxide (P_2O_5) and 5 percent potassium oxide (K_2O). If secondary and micronutrients are present in the mix it will also list these in percentages. For example, ammonium sulfate may be listed as 21-0-0-24S. This fertilizer would contain 21 percent N, 0 percent P_2O_5, 0 percent K_2O and 24 percent S.

Fertilizer recommendations for lawns are normally expressed as pounds of N, P_2O_5 and K_2O per 1,000 ft². Here is how to calculate the amount of fertilizer material needed to obtain the recommended application of a given nutrient:

$$\text{Pounds fertilizer material to apply per 1,000 ft}^2 = \frac{(\text{lb nutrient desired/1,000ft}^2) \times (100)}{\text{Nutrient analysis of fertilizer material}}$$

For example, if the soil test results call for the addition of 1 pound P_2O_5/1,000 ft² and the fertilizer material used contains 12 percent P_2O_5 (i.e. 24-12-12 analysis), how much fertilizer material must be applied per 1,000 ft² to apply the recommended rate of P_2O_5?

$$\text{Pounds fertilizer material to apply per 1,000 ft}^2 = \frac{(1 \text{ lb } P_2O_5/1{,}000 \text{ sq ft}) \times (100)}{12}$$

$$= \frac{1 \times 100}{12} = 8.3 \text{ lb of 24-12-12/1,000 ft}^2$$

In addition to supplying 1 pound P_2O_5, these 8.3 pounds of the 24-12-12 fertilizer mix will also supply 2 pounds N and 1 pound K_2O/1,000 ft². Because of the amounts of N and K to be applied, you should divide the fertilizer in half and make two applications of 4.25 pounds each.

Other Considerations

Lime Applications

Lawns will rarely respond to liming if the soil pH is greater than 5.1. Lime is only used on very acid soils, when it is necessary to raise the soil pH to a more desirable level (pH 5.6 to 7.0) which promotes growth and enhances plant nutrient availability. Overliming or applications of lime when not needed can tie up nutrients and cause nutrient deficiences. Generally, soils in southern Idaho contain enough lime, so liming is not required. Turfgrass grown on areas constructed from sand or synthetic materials (golf greens, sports fields or specialty lawns) may require occasional liming.

Caution: Only apply lime when soil test results indicate a soil pH value of less than 5.1. Consult your County Extension Agricultural Agent for the rate of lime needed.

Table 3. Fertilizer material required to supply 1 pound of plant nutrient.

	Fertilizer* analysis				Lb of material needed to supply 1 lb of plant nutrient			
	Total nitrogen N	Available phosphate P_2O_5	Water soluble potash K_2O	Combined sulfur S	N	P_2O_5	K_2O	S
	(%)	(%)	(%)	(%)	(lb)	(lb)	(lb)	(lb)
Fertilizer materials								
Ammonium nitrate	34	-	-	-	3	-	-	-
Ammonium sulfate	21	-	-	24	4.8	-	-	4.1
Urea	46	-	-	-	2.2	-	-	-
Urea formaldehyde	38	-	-	-	2.6	-	-	-
Urea ammonium nitrate solution	32	-	-	-	3.1	-	-	-
Sulfur coated urea (SCU)	31-36	-	-	21	3	-	-	4.8
Isobutylidene diurea (IBDU)	31	-	-	-	3.2	-	-	-
Monoammonium phosphate	11	48-55	-	-	9.1	2	-	-
Diammonium phosphate	16-18	46-48	-	-	5.8	2.1	-	-
Single super-phosphate	-	18-20	-	12	-	5	-	8.3
Triple super-phosphate	-	45-46	-	1	-	2.2	-	100
Potassium chloride	-	-	60-62	-	-	-	1.7	-
Potassium sulfate	-	-	50-53	18	-	-	2	-
Sulfate of potash magnesia	-	-	22	22	-	-	4.5	4.5
Complete fertilizers								
12- 6- 6	12	6	6	0	8.3	16.6	16.6	-
24-12-12	24	12	12	0	4.2	8.3	8.3	-
22- 4- 4-12S	22	4	4	12	4.5	25.0	25.0	8.3
14-24-14- 4S	14	24	14	4	7.1	4.2	7.1	25.0
16- 6- 8-18S	16	6	8	18	6.3	16.7	12.5	5.5
32- 4- 8-12S	32	4	8	12	3.1	25.0	12.5	8.3

*Fertilizer analysis is defined by law to be listed on the fertilizer bag.

Gypsum Applications

Soils high in exchangeable calcium (Ca), which includes nearly all soils in southern Idaho, are friable and easily tilled and usually will permit water to penetrate readily. Gypsum applications to these soils will not enhance friability or appreciably affect soil tilth.

At times, gypsum is incorrectly recommended as an acid to lower soil pH. Gypsum is not an acid-forming material. It will not alter the soil pH unless the soil pH is greater than 8.3, which usually means the soil is high in exchangeable sodium. Typical nutritional application rates of 1 to 2 pounds gypsum/1,000 ft^2 on established lawns will not affect soil pH.

Excess Salts

Excess soil salts affect grass growth by reducing the amount of water the grass plants can take from the soil. Excessive salt levels in the soil can be linked to poor germination and stand establishment in new lawns and poor or no grass growth in established lawns. High salt levels are often associated with one or more of the following: high water tables, inadequate drainage, use of irrigation water high in salts, high sodium levels in the soil and excessive application rates of inorganic or organic fertilizer materials.

Electrical conductivity (EC) is a measure of the salt content of a soil. When the soil test indicates an EC reading greater than 4.0 mmohs/cm, improved drainage and extra irrigation or over-irrigation may be needed. Soils high in exchangeable sodium require specific reclamation procedures. For additional information, see University of Idaho Extension Bulletin 703, *Salt- and Sodium-Affected Soils.*

Micronutrients

Micronutrients, with the exception of iron (Fe), are not generally needed for lawns in southern Idaho. Iron deficiency symptoms — chlorosis or the yellowing of new growth — are common in lawns in southern Idaho. Iron deficiencies can be corrected by applying a one-half percent solution of ferrous sulfate as a foliar spray or using a chelated iron at recommended label rate. Applications may need to be repeated if yellowing reoccurs. Broadcast applications of iron-sulfur fertilizer materials have been successful on some lawns.

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