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Fertilizing Home Lawns

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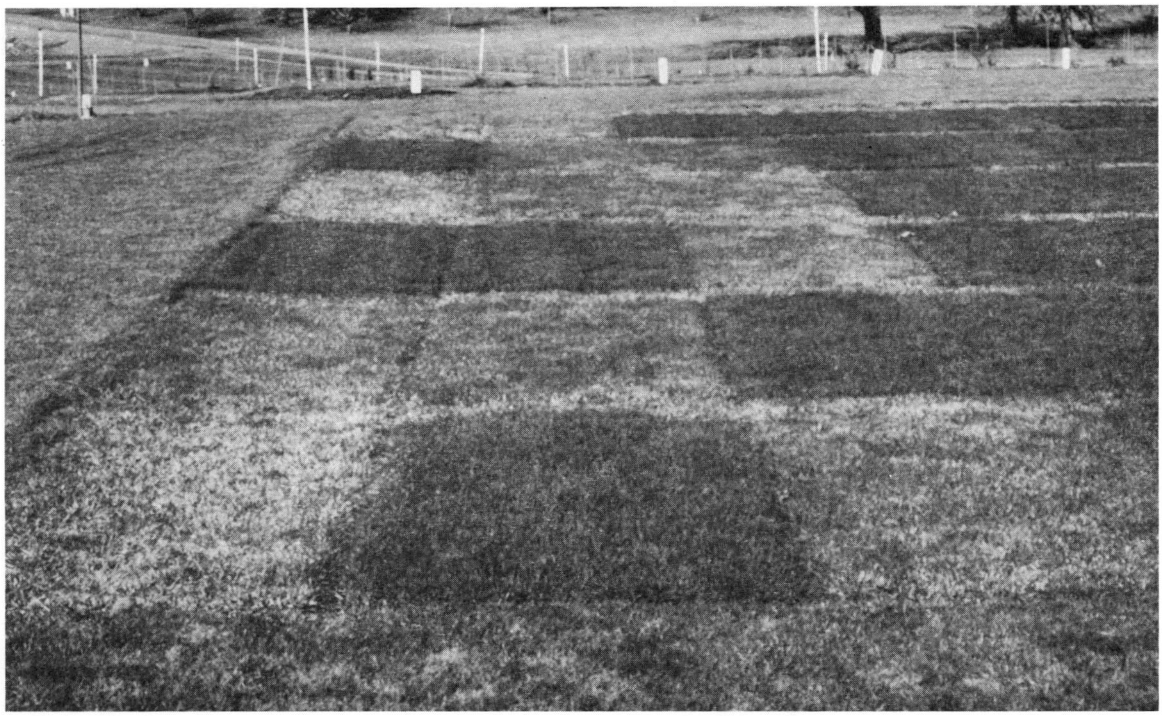

Regular nitrogen fertilization produces dense green turf (dark plots). Occasional fertilization yields turf as in the bottom right plot. Unfertilized turf (bottom left plot) is thin and has poor color.

Fertilizer can be a powerful tool for improving the appearance of lawns. Properly fertilized lawns will have few disease problems, will tolerate environmental stresses, and will recover quickly from wear or other injury. Fertilized lawns will also have the deep green color that sets good lawns apart from average ones.

Of the fertilizer elements necessary for growth, the ones most commonly applied are nitrogen, phosphorous, potassium, sulfur, calcium, magnesium, and iron. You should apply these elements as part of a balanced fertility program based on soil characteristics, soil-test information, plant requirements, maintenance practices, and your expectations for turf quality.

Fertilizing lawns

The best fertilization programs combine proper rates of application and appropriate timing. The goal is to produce dense green turf without promoting excess growth. You can use figures 1 and 2 as rough guides for optimum fertilization of lawns.

In the figures, solid lines indicate typical times for necessary fertilizer applications, dashed lines indicate times for optional applications. Remember

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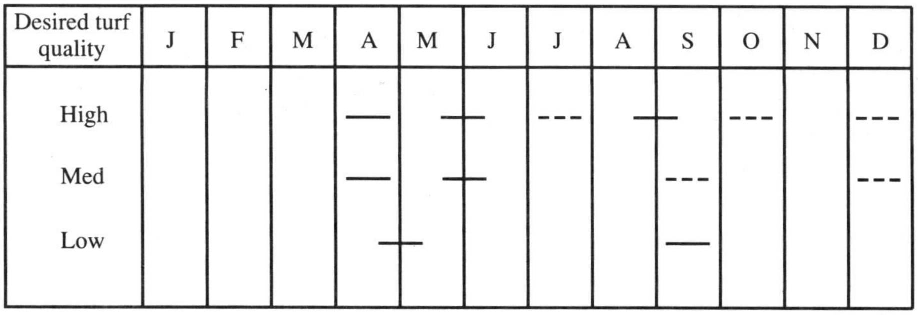

Figure 1.—Fertilizer calendar for western Oregon. Assume each application is 1 lb available N/1,000 ft^2, except for late fall-winter applications (which may be as high as 2 lb available N/1,000 ft^2). December applications will result in greener grass in winter and early spring. Growth will occur, so mowing may be needed throughout winter. If winter color is not important, make your final application in October.

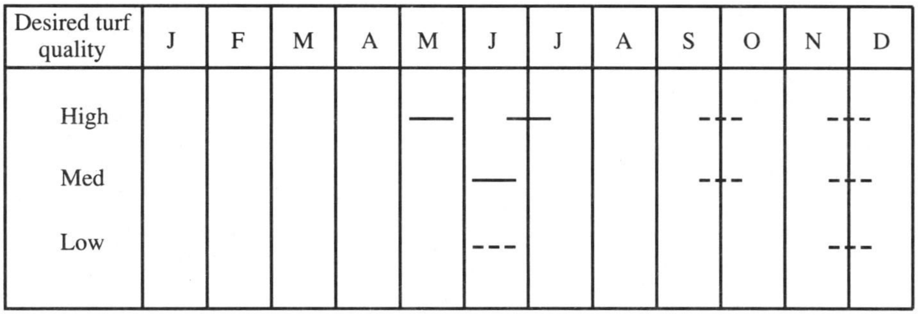

Figure 2.—Fertilizer calendar for central and eastern Oregon. Assume each application is 1 lb of available N per 1,000 ft^2, except for late fall applications (2 lb available N per 1,000 ft^2). November-December fertilization is very useful for early spring green up without stimulating excess growth. Spring fertilizer applications can often be delayed until after the spring flush of growth occurs.

that these calendars are only rough guides; they're not appropriate in all areas under all conditions.

Let the grass "tell you" when to fertilize based on its appearance. If your lawn is yellow and thin, it needs fertilizer. If it's thick and green, additional fertilizer will only stimulate more growth and increase the need for mowing.

Wait as long as possible between applications, but don't wait until the turf loses color and thins out. If you keep records of your lawn's performance, and adjust your fertilization program as needed, you'll soon come up with the best timing and frequency for your site.

What about soil tests?

Soil tests for lawn areas are useful for detecting problems such as extremely high or low soil pH. They can also point out excess or deficient levels of important elements. Correlations between soil-test values and turf performance aren't as well defined as we'd like them to be. The following sections point out the role of various elements in lawn fertilization and the value of soil tests for each element.

Nitrogen (N)

Nitrogen is the most important nutrient in most fertilization programs. When you apply it at proper rates, nitrogen will stimulate vertical growth, improve turf density, and make the grass a darker green. By stimulating growth, nitrogen will reduce the severity of diseases such as red thread and rust.

Of the commonly used turf grasses, Kentucky bluegrass and perennial ryegrass have the highest nitrogen requirements; tall fescue is intermediate; and the fine fescues and bentgrasses persist well at low levels of nitrogen.

Soil tests for nitrogen are available, but they're seldom used. Nitrogen levels in soil fluctuate rapidly, which makes interpretation for fertilizer recommendations difficult.

For top-quality lawns, plan on adding 6 or more pounds of available nitrogen per 1,000 ft^2 per year. Medium-quality turf can be achieved with 3 to 4 pounds of available nitrogen per 1,000 ft^2 per year. The proper rates, frequency, and timing of nitrogen fertilizer depends on the material you use, and this is explained below in "Selecting and Using fertilizers," page 3.

Phosphorous (P)

Phosphorous is an important element for proper fertilization of turf, but it's not required in large quantities. Soil test levels below 20 ppm in either eastern or western Oregon indicate phosphorous is low and should be applied. You can easily achieve this by applying a fertilizer containing nitrogen, phosphorous, and potassium formulated for turf.

Above 20 ppm, supplemental phosphorous applications are not necessary, but they won't damage turf. Healthy turf rarely responds visually to phosphorous fertilization. One pound of phosphorous per 1,000 ft^2 per year (as P_2O_5) is generally adequate for most turf.

Potassium (K)

Potassium is an important element for healthy turf, and it's necessary in relatively large amounts. Soil potassium levels below 250 ppm K indicate a need for potassium fertilization.

Based on this standard, many lawns in eastern Oregon don't appear to need potassium fertilization. In western Oregon, soil potassium is often low, indicating potassium should be applied regularly in balance with nitrogen and phosphorous.

Although it causes no response in color or growth, potassium appears to enhance plant hardiness to heat and cold. It reduces drought-induced wilting, stimulates rooting, and increases wear tolerance. The best ratio of nitrogen to potassium (as K_2O) appears to be on the order of 6 to 4.

Sulfur (S)

Sulfur is an important fertilizer element, particularly on bentgrass lawns. Long-term research at Washington State University shows that bentgrass turf receiving 2.5 to 3.5 pounds of sulfur per 1,000 ft^2 per year has less take-all and fusarium patch diseases, and less encroachment by annual bluegrass than turf receiving less sulfur.

At the present time, we don't know how the prolonged use of sulfur fertilizer will affect other commonly planted turf grasses. Many commonly used turf fertilizers contain sulfur, so you can often meet nutritional needs as part of a regular fertilizer program.

pH, calcium (Ca), magnesium (Mg)

Soil pH is important to turfgrasses as it influences availability of many of the elements needed for proper growth. Calcium and magnesium are the principal elements that influence soil pH. As components of limestone, they help raise the pH of acid soils and indirectly improve turf fertility.

Turfgrasses will persist over a wide range of soil pH's, but most have an optimum range, as noted in table 1. If your soil test pH value falls below the optimum range for the grasses in your lawn, a lime application will help raise the pH. Raising the soil pH in turf is difficult because lime can't be mixed into the soil.

As a general rule, don't exceed 50 pounds of lime per 1,000 ft^2 per application and 100 pounds of lime per 1,000 ft^2 per year on established turf. During a single year, split your multiple applications between spring and fall to avoid lime accumulation at the soil surface.

Table 1.—Optimum soil pH ranges for commonly grown turfgrasses

Grass	pH range
Bentgrass	5.0 - 6.0
Perennial ryegrass	5.5 - 6.5
Fine fescues	5.5 - 6.5
Tall fescue	5.5 - 6.5
Annual bluegrass	5.5 - 6.5
Kentucky bluegrass	6.0 - 7.0

Don't apply nitrogen fertilizers that contain ammonium sulfate or urea immediately after liming—loss of nitrogen to the atmosphere may occur.

Soil test values for calcium and magnesium can help you determine whether to apply agricultural limestone or dolomite limestone. If magnesium levels are below 1.5 meq/100 grams of soil, apply dolomite (it contains both calcium and magnesium).

If magnesium levels are adequate, you can use agricultural lime. Coastal counties are usually the only areas in Oregon where deficiencies of magnesium are found.

Iron (Fe)

In technical terms, iron is a *micronutrient* because it is required only in very small amounts. Iron deficiency in turf grasses is not widespread, but it may occur in eastern Oregon where soil pH's are above 7.0. Even where deficiencies don't occur, iron is a common supplement in fertilizers because it provides a rapid, though short-lived, greening response.

Selecting and using fertilizers

Nitrogen fertilizers may be categorized by the rate of nitrogen release or by availability. Water-soluble fertilizers are sources of quickly available nitrogen. Available nitrogen is readily taken up by turf, which then turns green and grows.

Nitrogen in these fertilizers has a limited residual period, so you need to make applications relatively often at low rates, to maintain a steady supply of nitrogen to the turf. Water-soluble fertilizers have saltlike characteristics and can cause desiccation injury or "burning" by drawing water out of leaf tissue.

To avoid foliar burn, irrigate turf thoroughly after applying water-soluble fertilizers. Common water-soluble nitrogen fertilizers include ammonium sulfate, ammonium nitrate, and urea.

Slow-release nitrogen fertilizers have relatively low water solubilities. They release nitrogen slowly over a longer period of time than soluble fertilizers. Because of their low solubility, these fertilizers have a low burn potential and may give a poor initial color and growth response. They're generally more expensive than soluble fertilizers.

Common slow-release nitrogen fertilizers include ureaformaldehyde (UF), isobutylidenediurea (IBDU), sulfur-coated urea (SCU), and natural organic, protein-based sources such as activated sewage sludge and leather tankage.

Natural organic sources and UF release nitrogen as microorganisms in the soil break them down. Since microbes are more active in warm weather, these products work well in summer months and poorly in winter.

IBDU depends primarily on water to release nitrogen and is less affected by soil temperatures. It releases nitrogen slowly and is effective at all times of the year.

SCU depends largely on water for nitrogen release. It also releases nitrogen faster at higher temperatures. Common SCU materials release nitrogen slightly faster than other slow-release sources.

Commercial fertilizers often combine soluble and slow-release nitrogen sources to give good initial and residual response, low burn potential, and intermediate cost. Complete fertilizers containing N, P_2O_5, and K_2O in ratios approximating 3-1-2 to 6-1-4 are best for balanced turf fertility.

Many commercial fertilizers are high in nitrogen, medium in phosphorous, and low in potassium. When using these materials in western Oregon, it's desirable to supplement with K fertilizers since soil levels are often low. The most common potassium fertilizers include potassium chloride (muriate of potash) and potassium sulfate.

The application rate of fertilizers will vary because of the analysis of specific products, their proportion of soluble and insoluble nitrogen, the present and desired turf quality, and whether or not clippings are returned during mowing.

Minimum rates generally range from .5 to 1 pound of available nitrogen per 1,000 ft^2 of turf per application. Below .5 pound of available N, initial and residual response is poor. Above 1 pound of available N, the chance of foliar burn and excessive growth increases.

Application rates for weak, thin lawns and lawns fertilized in late fall-early winter may be made at rates up to 2 pounds available N/1,000 ft^2. Table 2 shows how to estimate the amount of product to apply based on N analysis and desired rate of application.

When you determine how much available N is being applied, it's important to consider the percentage of soluble and slow-release N in the product.

If you wish to apply 1 pound of available N/1,000 ft^2, using a fertilizer containing 10% N (all in soluble form), you must apply 10 pounds of product per 1,000 ft^2.

To apply 1 pound available N/1,000 ft^2, using a fertilizer containing 10% N (half in soluble form, half in slow-release form), you must apply 20 pounds of product per 1,000 ft^2.

Table 2.—Pounds of product per 1,000 ft^2 needed to apply varying amounts of N to turf

% N in fertilizer	Desired lb N/1,000 ft^2 of turf: 1	1.5	2
10	10.0	15.0	20.0
15	6.8	10.2	13.6
20	5.0	7.5	10.0
25	4.0	6.0	8.0
30	3.4	5.1	6.8
35	2.9	4.3	5.7
40	2.5	3.8	5.0
45	2.2	3.3	4.4

Maintenance practices, especially mowing, affect fertilizer response and residual. If you routinely remove clippings, your lawn will require significantly more nitrogen fertilizer than it would if you return clippings. Up to 50% of applied nitrogen may be removed in clippings during the first two mowings after fertilizing.

Regular mowing with mulching rotary lawnmowers or rear-throw reel lawnmowers will maximize fertilizer residual on lawns. Irrigation or rain after fertilization will ensure rapid turf response and reduce the potential for foliar burn. Excess irrigation on a regular basis may cause nitrogen loss through leaching.

Leaching losses are generally greatest in sandy soils. Lawns with thick thatch layers may show poor initial and residual response to slow-release fertilizers such as activated sewage sludge and ureaformaldehyde. Thatch environment is not conducive to microbial breakdown of these materials.

This publication replaces Extension Circular 967, *Fertilizing Home Lawns,* and Fertilizer Guide 47, *Turf Grass (Oregon).* Trade-name products are mentioned as illustrations only. This does not mean that the OSU Extension Service either endorses these products or intends to discriminate against products not mentioned.

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