AgriLIFE EXTENSION
Texas A&M System

E-437
01-07

Lawn Fertilization for Texas Warm-Season Grasses

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Many people choose to apply fertilizer to their lawns to help make the grass healthy and keep the yard looking green and lush. But one cause of pollution of Texas rivers, lakes and streams is fertilizer runoff. In addition to the environmental damage, fertilizer runoff also wastes much money, time and effort of home consumers.

You can have a green, healthy lawn yet greatly reduce the risk of waste, runoff and leaching, by applying fertilizer to your lawn according to need, at measured rates and at times that the grass can best use the applied nutrients. This environmentally sensitive approach is the first step to "measured" lawn care.

To fertilize your lawn effectively, economically and in an environmentally sound way, you need to know the answers to these questions:

- What if I don't fertilize?
- What type of grass do I have?
- What kind of lawn do I want?
- Do I need to fertilize?
- How much fertilizer to apply?
- How to select a good fertilizer?
- When and how often to fertilize?
- How to best apply fertilizer in measured amounts?
- What other factors should be considered in using fertilizer wisely on my lawn?

These basics will enable you to have a quality lawn and keep applied fertilizer in your lawn and out of groundwater and surface water supplies.

What if I don't fertilize?

To be healthy and green, a lawn must have an adequate supply of essential nutrients. Lawns can get nutrients from minerals and organic matter in the soil, from returned grass clippings and from added inorganic or organic fertilizer.

Without the proper nutrients, your lawn is likely to have more problems with diseases, insects and weeds, which increase the need for pesticide applications. The lawn will probably thin gradually, making it more likely for weeds to invade and the soil to erode. Thin lawns also allow more fertilizer runoff, and many people believe that poorly maintained lawns are not as attractive as those that are maintained well.

Proper and timely fertilization can be good for your lawn and the environment.

What type of grass do I have?

In Texas, the warm-season lawn grasses used are bermudagrass, buffalograss, centipedegrass, St. Augustinegrass and zoysiagrass.

What kind of lawn do I want?

To maintain a lawn that's right for you, it helps to decide how much time, money and effort you are willing to spend managing it. Two practices—fertilization and irrigation—determine to a good extent the amount of work and money required to take care of a lawn.

Broadly defined, lawn management levels can be

- **Low:** the minimum level of management required to maintain turf density and resist weed problems.
- **Moderate:** the amount of management required for enhanced appearance and quality.
- **High:** the amount of management needed for lawns that are highly visible or must withstand high traffic or use.

Lawns do not need to be dark green to be healthy. In fact, if your lawn has too much nitrogen, you will likely need to irrigate and mow it more often.

Do I need to fertilize?

The best way to determine whether your lawn requires additional plant nutrients is to have the soil tested. Soil tests determine the amount of nutrients that are available in the soil for plant use. The soil test also determines soil pH (whether the soil is acid or alkaline), which can affect soil nutrient availability.

Your soil test report will help you understand which nutrients your soil lacks and which are present in adequate amounts. The test results will include recommendations on the amounts of plant nutrients that would benefit your lawn. The soil test will not provide an annual recommendation for nitrogen application. Nitrogen is the nutrient used in the greatest amount by lawn grasses. This publication will guide you to apply measured amounts of nitrogen fertilizer.

Soil tests are easy and inexpensive. Forms and instructions are available through your county Extension office or on the Texas A&M Soil Testing Laboratory's Web site (http://soiltesting.tamu.edu).

How much fertilizer to apply?

Once you know what your soil lacks, you will need to figure out what kind and how much fertilizer to buy and apply. To do so, you need to know the size of your lawn. Many people do not know the size of their lawns when they visit the garden center to buy fertilizer and other lawn care products. This often leads to misapplication and inconsistent results. Lawn care products are often recommended in amounts to apply per 1,000 square feet of lawn area.

To calculate the size of your lawn, start by dividing the lawn into sections and measuring each section in feet (Fig.1). For square or rectangular sections, multiply the length times the width to determine its area in square feet. Then add up the section areas to arrive at the total size of the lawn.

The good news is that you'll need to accurately measure the lawn only once, and then you can use that calculation each time you visit the garden center. Knowing the size of your lawn and the results of your soil test will help you determine the correct amounts of fertilizer and pesticides to buy and apply. Your goal in applying any lawn care product should be to apply measured amounts to measured lawn areas.

Once you know what your soil needs and how big your lawn is, you can select a fertilizer that will give the grass the nutrients it requires and calculate the amount of that fertilizer to buy.

How to select a good fertilizer?

To grow properly, all plants need essential nutrients. Those that are typically needed in the greatest amounts are nitrogen, phosphorus and potassium. The best fertilizer for your lawn is one that contains the ratio of these three nutrients needed as indicated by your soil test results.

All fertilizer packages must list three numbers (such as 16-4-8). These numbers—known as the fertilizer analysis—represent the percentage by weight of nitrogen, phosphorus (expressed as available phosphoric acid, or $P_2 0_5$) and potassium (expressed as soluble potash, or $K_2 0$) in the fertilizer.

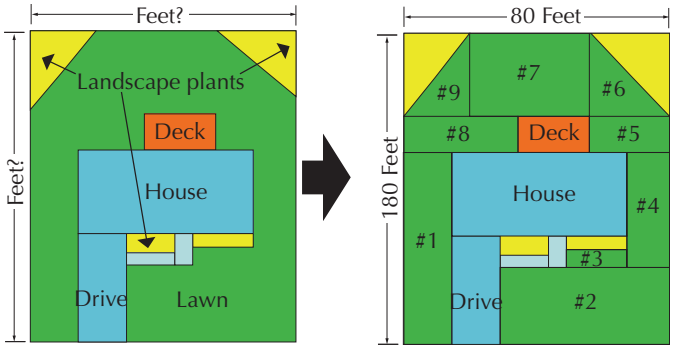

Figure 1. To calculate the size of your lawn, measure each section and add up the total number of square feet.

Many soils may already have enough phosphorus and potassium. If the soil test finds that your lawn does not need phosphorus and/or potassium, choose a fertilizer that provides only nitrogen. It is best not to apply phosphorus without the aid of a soil test. If you add phosphorus to a lawn that does not need it, the phosphorus levels will build up in the soil to a point that phosphorus could move off the lawn through runoff. This phosphorus may then enter surface waters, where it may lower water quality by contributing to algal blooms and decreased fish habitat.

To calculate the amount of each nutrient supplied in a bag of fertilizer, multiply the percentage in the analysis by the number of pounds in the bag:

Amount of nutrient in the bag = Percentage of that nutrient (from the analysis) x Number of pounds in the bag

For example: Let's calculate the amount of nitrogen, phosphorus and potassium in a 40-pound bag of 16-4-8 fertilizer:

Nitrogen (N): 16 percent (0.16) x 40 pounds of fertilizer = 6.4 pounds of nitrogen

Phosphorus (P): 4 percent (0.04) x 40 pounds = 1.6 pounds of phosphorus (as P_2O_5)

Potassium (K): 8 percent (0.08) x 40 pounds = 3.2 pounds of potassium (as K_2O)

The soil test results will include a recommendation on the number of pounds of each nutrient to apply per 1,000 square feet of lawn. Typical annual nitrogen program recommendations might suggest applying ½ to 1 pound of actual nitrogen per 1,000 square feet per application.

The number of pounds of fertilizer to be applied per 1,000 square feet of lawn depends on the fertilizer's nitrogen analysis and the desired nitrogen application rate per 1,000 square feet (Table 1).

Using Table 1, you can determine the amount of fertilizer to apply if your lawn needs ½, ¾ or 1 pound of nitrogen per 1,000 square feet by following these steps:

1. Check the fertilizer bag to find the analysis. The first number will be the nitrogen content.
2. In the first column of Table 1, find the nitrogen content that is in your fertilizer.
3. Select the application rate, ½, ¾ or 1 pound per 1,000 square feet.
4. Find the number of pounds of fertilizer product to buy for each 1,000 square feet of lawn in the second or third column opposite the nitrogen analysis in your fertilizer.

For more help, see the fertilizer calculator on the Web (http://aggieturf.tamu.edu/answers4you/turfcalculators.htm).

Example: To calculate the amount of fertilizer products needed to apply 1 pound of actual nitrogen in a 16-4-8 fertilizer:

1. The first number on the bag indicates that it contains 16 percent nitrogen.
2. Divide the amount of nitrogen you want to add (1 pound of nitrogen, or less, in most cases) by the percentage of nitrogen in the fertilizer (16 percent in this case) to calculate the number of pounds of applied nitrogen per 1,000 square feet:

Table 1. Amount of fertilizer to apply for various nitrogen analyses at rates of ½ to 1 pound of nitrogen per 1,000 square feet of lawn.

	Amount of fertilizer needed to apply nitrogen per 1,000 sq ft		
Fertilizer bag reads[1]	½ lb N rate	¾ lb N rate	1 lb N rate
6-?-?	8.3 lb	12.5	16.6 lb
8-?-?	6.2 lb	9.4	12.5 lb
9-?-?	5.5 lb	8.3	11.1 lb
15-?-?	3.3 lb	5.0	6.6 lb
20-?-?	2.5 lb	3.7	5.0 lb
21-?-?	2.4 lb	3.6	4.8 lb
29-?-?	1.7 lb	2.5	3.4 lb

[1] To determine the amount of phosphorus and potassium, you will need to have your soil tested.

1 ÷ 0.16 = 6.25 pounds of a 16 percent fertilizer product to apply 1 pound of nitrogen per 1,000 square feet

To use a rate of ½ pound per 1,000 square feet, divide 0.5 by 0.16, which equals about 3.1 pounds of fertilizer.

3. Multiply the area of your lawn (in square feet) by the number of pounds of fertilizer needed per 1,000 square feet.

Example: For a 5,500-square-foot lawn, (5,500 ÷ 1,000 square feet or 5.5 units of 1,000 square feet), multiplying 5.5 by 6.2 pounds gives you 34.1 pounds. Round that number to 34 pounds of fertilizer to apply 1 pound of nitrogen per 1,000 square feet to your lawn.

When and how often to fertilize?

The best time to fertilize depends on the type of grass in your lawn, the appearance (color, density, uniformity) you want for your lawn, and the region where you live.

Some grass species do well with only low to moderate amounts of applied nitrogen. Other grass species, such as the hybrid bermudagrasses, often require moderate to high levels for acceptable quality. See Table 2 for recommended nitrogen levels for each grass species.

Texas lawns usually need a low rate of nitrogen applied once in the spring and, if needed, once again in the fall no later than 6 weeks before the expected first frost. It's best to split the fertilizer into two smaller applications rather than make one heavy application.

If your lawn management level is moderate or high, you will probably need to make additional nitrogen applications each year. Table 3 lists the recommendations for the number and timing of nitrogen applications for different lawn management levels.

It is best to fertilize grass when it is actively growing and able to take up the fertilizer. The growing season is usually the period between the last spring frost date (Fig. 2) and first autumn frost date (Fig. 3). Longer growing seasons may need more nitrogen fertilizer each year to sustain lawn quality.

The average length of the growing season in Texas varies by climatic region:

- 5½ months in the Panhandle
- 6⅓ months in the West
- 6½ months in the Northeast
- 7¾ months in Central
- 8 months in the Southeast
- 10 months in the Valley

Spring fertilizer: For warm-season grasses, the first nitrogen fertilizer application should be made after the grass has greened up and has required mowing two or three times. This indicates that the grass is actively growing and can readily use applied nitrogen. Mowing weeds doesn't count! The application will likely be about 6 weeks after the expected date of the last spring frost (Table 4).

Table 2. Annual nitrogen recommendations for Texas warm-season lawns based on management level and grass type.

	Lawn management level		
	Low	Moderate	High
Warm-season grass	*lb nitrogen applied per 1,000 sq ft per year*		
Bermudagrass (common)	2	2-3	4-5
Bermudagrass (hybrid)	2	3-4	5-6
Buffalograss	0-1	2	NR*
Centipedegrass	0-1	1-2	NR*
St. Augustinegrass (sun)	2	2-3	3-4
St. Augustinegrass (shade)	1	1-2	NR*
Zoysiagrass	1-2	2-3	3-4

*NR = not recommended

Table 3. Timing and number of nitrogen applications for various lawn management levels.

Management level	Timing and number of nitrogen applications
Low	Apply nitrogen during the spring and/or late growing season. This program works where 1 or 2 applications are adequate.
Moderate	In addition to the low-level program applications, make 1 additional supplemental summer application to enhance turf density and overall quality.
High	In addition to the low-level program applications, make 2 to 3 supplemental summer applications to enhance quality as needed.

After the lawn has been maintained on an appropriate annual nitrogen fertilizer program, the lawn should be healthy enough to recover from winter and maintain grass growth through several mowings.

Fall fertilizer: Applying nitrogen the fall increases the density of the lawn, helps it resist winter weeds, and improves fall color and spring recovery. For this application, use soluble, readily available nitrogen sources.

If you apply modest nitrogen rates (1 pound or less per 1,000 square feet), you will benefit the lawn and reduce the potential for nitrogen carryover and leaching during the winter. For the dates by which to make your last fertilizer application, see Table 5.

Summer fertilizer? Newly established or previously neglected lawns can benefit from fertilizer applications in late spring and summer. If you want to apply additional nitrogen, space the applications at least 45 to 60 days apart.

Slow-release nitrogen sources are particularly suited for summer fertilizer applications. Check the fertilizer bag to see if it contains slow-release nitrogen. Slow-release sources prevent surges of lush growth and the need for more frequent mowing. They can also be used in the spring.

What if I do not have a soil test?

If you have not had a soil test, apply a fertilizer that is four to six parts nitrogen, one part phosphorus and two to four parts potassium. A 16-4-8 fertilizer analysis would fall within this range with a 4-1-2 ratio of these nutrients.

To accurately determine your lawn's nutrient needs for future fertilizer application, have the soil tested by a soil testing laboratory as soon as possible. The soil test recommendations will suggest application rates for nutrients that are lacking in the soil. These rates will likely be in pounds of phosphate (P_2O_5) or potash (K_2O) per 1,000 square feet of lawn.

When these nutrients are needed (as indicated by soil test), select a fertilizer ratio that includes these nutrients so that they can be applied at appropriate rates (pounds per 1,000 square feet) when you make your normal nitrogen fertilizer applications in the low, moderate or high annual programs.

For example: applying 1 pound of nitrogen per 1,000 square feet from a 16-4-8 fertilizer will also apply ¼ pound of phosphate and ½ pound of potash per 1,000 square feet at the same time. If more phosphorus or potash is recommended by soil test, you may need a fertilizer with higher amounts of phosphate and/or potash until the recommended needs are applied. If no phosphate (P_2O_5) or potash (K_2O) is recommended according to the soil test, apply a nitrogen-only fertilizer.

How to best apply fertilizer in measured amounts?

Because nitrogen fertilizer will green up a lawn, you need to apply it uniformly, or the lawn will be streaked with different shades of green turf. It is best

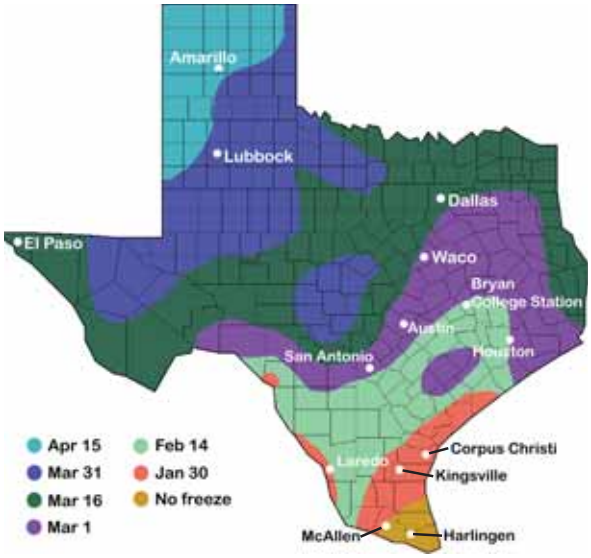

Figure 2. Average dates for the last spring frost.

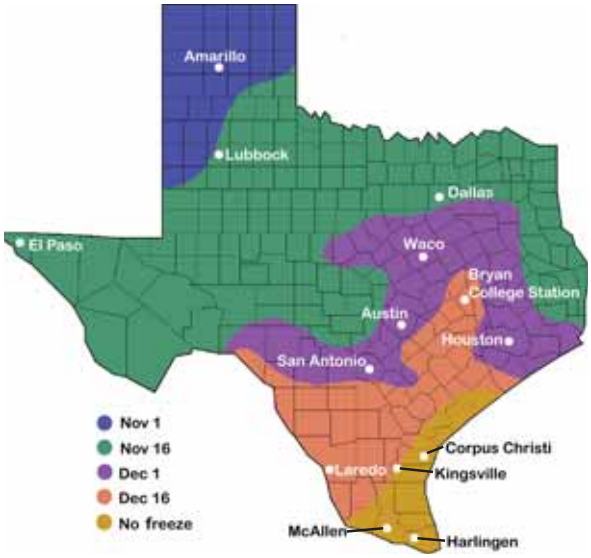

Figure 3. Average dates for the first autumn frost.

to apply fertilizer with a drop-type or rotary spreader because even trained professionals have difficulty in properly applying nitrogen fertilizers by hand.

There are two types of spreaders: drop-type and rotary. Drop-type spreaders are easier to maneuver around trees and shrubs than are rotary spreaders. Rotary spreaders usually give better distribution on sharp turns because they tend to cover a broader swath and fan the fertilizer out at the edges of the swath.

When using drop-type spreaders, be sure to overlap the wheel tracks because all of the fertilizer will be distributed between the wheels.

To minimize streaking, apply half the fertilizer in one direction and the other half in a perpendicular direction until you are experienced with using a spreader.

Avoid applying any fertilizer to areas without grass—such as driveways, roads or bare soil—because it is then prone to run off into drainage systems and then to surface and groundwater.

Here are other spreader tips:

- Don't fill the spreader with fertilizer while on the lawn—spills can burn the grass.
- Always be moving when you open the spreader gate to apply fertilizer.
- Always close the spreader gate when making sharp turns to avoid applying more fertilizer to the inside than to the outer part of the turn.

Practical tip: It is often easier to apply fertilizer uniformly if the nitrogen content of the fertilizer is near or less than 20 percent. If the fertilizer is 20 percent nitrogen, you need to spread 5 pounds of fertilizer product over 1,000 square feet to apply 1 pound of actual nitrogen. If you wish to apply only ½ pound of nitrogen, that reduces the fertilizer applied to 2½ pounds per 1,000 square feet. This is difficult to spread uniformly.

Fertilizers with lower nitrogen analyses allow for a better distribution of fertilizer, especially at rates of less than 1 pound of nitrogen per 1,000 square feet. Products with high nitrogen analyses do not allow for as much "margin of error" in application.

Follow these steps to apply measured amounts of fertilizer—an alternative way to spread fertilizer:

1. Measure each section of your lawn in square feet. You need to do this only once. This step is necessary to apply "measured amounts" of fertilizer to a known lawn area.
2. Calculate the amount of the selected fertilizer product you wish to apply per 1,000 square feet. Refer to Table 2.
3. Weigh out only the amount of fertilizer needed for a section of lawn. Example: A 9-?-? fertilizer would need 11 pounds of fertilizer to apply 1 pound of actual nitrogen per 1,000 square feet. If the yard measures 2,000 square feet, it would need 22 pounds of 9-?-? fertilizer placed in the spreader.

Table 4. Recommended spring timing for nitrogen fertilizer for Texas cities within the same spring frost zones (Figure 2).

City	Average last spring frost date[1]	First nitrogen application[2]
Harlingen, McAllen	No freeze	March 1
Corpus Christi, Laredo	Jan. 30	March 15
Houston, Victoria	Feb. 14	April 1
Austin, San Antonio, Waco	March 1	April 15
Abilene, Dallas, El Paso	March 16	May 1
Lubbock, Midlan	March 31	May 15
Amarillo	April 15	June 1

[1] These dates are averages across large areas of Texas. Frost dates may differ for some locations. The dates of the last spring frost is about the time warm-season lawn grasses start to green up.

[2] Nitrogen fertilizer is delayed until the grass is actively growing with the onset of warmer temperatures.

Table 5. Recommended cut-off dates for late-season nitrogen fertilizer for Texas cities within the same autumn frost zones (Figure 3).

City	Average first autumn frost date[1]	Apply nitrogen by this date[2]
Harlingen, McAllen, Corpus Christi	No freeze	November 1
College Station, Laredo, Victoria	December 16	November 1
Austin, Houston, San Antonio, Waco	December 1	October 15
Abilene, Dallas, El Paso, Lubbock, Midland	November 16	October 1
Amarillo	November 1	September 15

[1] These are averages across large areas of Texas. Frost dates may differ for some locations.

[2] The final late-season nitrogen application should be applied no later than 6 weeks before the expected autumn frost date.

The only tools you need to weigh the fertilizer in "measured amounts" are a bathroom scale and a large bucket.

4. Cut back the spreader setting to the smallest opening that still enables a good distribution pattern from your spreader.
5. Apply the measured amount of fertilizer by using the spreader to apply it at right angles, repeating until the measured amount of fertilizer is gone. Although this may take three or four passes, it is easy to do and applies the fertilizer uniformly, in "measured amounts."

Other factors to consider in using fertilizer wisely

Keep these guidelines in mind when fertilizing:

- Lower nitrogen rates are appropriate not only for low-maintenance lawns, but also for lawns in environmentally sensitive sites.
- Do not apply fertilizer to sidewalks, driveways or curbs. If the fertilizer gets on hard surfaces, sweep—don't hose—it back into the grass. This will prevent runoff.
- To avoid runoff, do not fertilize before a rain.
- Irrigate fertilizer applications with a normal irrigation cycle so the nutrients enter the soil to prevent runoff.
- Have your soil tested every 2 to 3 years.

Other considerations include watersheds and nutrient management, soil type, age of the lawn, shade, recycling of grass clippings, fertilizer burn, traffic or pest injury, micronutrients and liquid fertilizer products.

Watersheds and nutrient management: At-risk watersheds are areas that are especially vulnerable to water quality problems. In these areas, special care must be taken to manage nutrients so that you reduce the loss of phosphorus (from runoff) and nitrogen (from runoff and leaching into the groundwater) from landscapes.

In Texas, at-risk areas include karst landscapes (formed on limestone rock with porous rock channels that enhance subsurface water flow), areas with sharply sloping soil features, soils with shallow depths to water tables, or highly leachable (porous) soils.

Nutrient management implies appropriate stewardship of our environment and is part of the "best management practice" philosophy in agriculture and residential and commercial landscapes.

Soil type: Sandy soils have the potential to leach more nitrogen than do silt loam, clay loam or clay soils. Heavy clay soils do not readily leach nutrients. If your soil is sandy:

- Make smaller, more frequent nitrogen applications when using quickly available sources of nitrogen.
- Use a slow-release nitrogen source or apply light rates (½ pound of nitrogen or less per 1,000 square feet).

These practices will greatly reduce possible problems with nitrogen-enriched water in nearby streams and lakes.

Age of the lawn: Lawns that are newly established or that lack density or ground cover will benefit from properly timed applications of nitrogen until the ground cover and density have reached a desirable level. New lawns will likely require a bit more nitrogen fertilizer the first year or so after planting. Mature, well-established lawns require less nitrogen than do recently planted lawns.

Shade: Grasses growing in heavily shaded areas require only ½ to ⅔ as much nitrogen as grasses growing in full sun. Shade also affects the timing of nitrogen applications.

Because grass plants in moderate to heavy shade can best use nitrogen when sunlight can reach the grass leaves, it's best to apply fertilizer to a shade-tolerant, warm-season grass such as St. Augustinegrass in early and late season only.

Recycling grass clippings: When you recycle clippings using a mulching mower, you return significant amounts of nitrogen, phosphorus and potassium to the lawn. Recycling clippings enables you to apply less fertilizer to keep your grass healthy.

Recycling turfgrass clippings contributes very little to thatch, provides nutrients and organic matter, and it is an environmentally friendly method of clipping disposal. If you must remove the grass clippings, you may need to apply higher rates of fertilizer.

Fertilizer burn: "Foliar burn" is the brownish discoloration that can occur on grass blades as a result of contact with soluble fertilizer. The fertilizer salts can draw moisture out of leaves and roots, leaving behind a browned-off appearance. This is more of a problem when ammonium sulphate or urea is used.

To avoid foliar burn, apply fertilizer at reasonable rates when the lawn is dry. It is also good practice to water-in the fertilizer with a normal irrigation cycle soon after the application.

Traffic or pest injury: Where heavy traffic or use is anticipated, make additional applications of properly timed and measured amounts of nitrogen to help the lawn recover from wear or pest damage.

Micronutrients: Soil tests can determine whether your soil needs additional micronutrients. Home lawns seldom lack micronutrients.

St. Augustinegrass lawns in high-pH soils sometimes are deficient in iron and may benefit from applications of iron sulfate or iron chelate to prevent severe iron chlorosis (yellowing). When applied as needed, this addition results in a healthier lawn and short-term green-up for a few weeks. Because iron products can stain sidewalks and driveways, sweep them off promptly after application.

Liquid fertilizer products: Garden centers typically stock fertilizer products that come in 1-quart containers that are meant to fit on the end of the hose and are applied using the hose-end-sprayer method. The fertilizer contained in such products is based upon a percentage of the nutrient by weight, just as in granular fertilizers.

These products, even though they are made up of readily available nitrogen sources, are a more expensive way to fertilize than their granular counterparts. Take care: Liquid fertilizers are much more likely to "burn" lawns, especially in the summer, when applied at rates above ½ to ¾ pounds of actual nitrogen per 1,000 square feet.

However, liquid fertilizers can come in handy for small areas and light rates. When applying liquid fertilizer from a hose-end sprayer, know the amount of lawn you will cover and first practice with an equal amount of water to apply it uniformly.

The nitrogen makeup in lawn fertilizers affects how much it costs you to apply the proper amount of nitrogen to your lawn as well as how you should use the fertilizer. To calculate the amount of fertilizer in a product solution, you need to know how much the volume of that liquid weighs. Water weighs 8.34 pounds per gallon. Adding soluble fertilizer nutrients to water will make it heavier.

If you had a 1-quart container that weighed 3 pounds and its fertilizer analysis was 10-?-?, that would mean that 10 percent of the weight would be nitrogen and equal 3/10 of a pound of actual nitrogen. To apply 1 pound of nitrogen per 1,000 square feet of lawn, you would need to use 3 quarts of that fertilizer for each 1,000 square feet of your lawn.

The type of nitrogen affects cost and use of a fertilizer

You also need to look for the type of nitrogen in the fertilizer. There are two categories of nitrogen sources: quickly available and slowly available. The source of nitrogen influences how quickly the nitrogen can be used by the turf and how the grass responds to it.

Quickly available materials are water-soluble and can be readily used by the plant, resulting in faster green-up. They are also susceptible to leaching and have a relatively short period of response of 4 to 6 weeks. Quickly available sources include urea, ammonium sulfate and ammonium phosphates. These sources are typically less expensive forms of nitrogen, and this will be reflected in fertilizer costs at the garden center

Slowly available nitrogen sources release their nitrogen over extended periods and are applied less often and at somewhat higher rates than are the quickly available nitrogen sources. Slowly available sources are less susceptible to leaching and are preferred on sandy soils, which tend to leach. They are also preferred in environmentally sensitive areas, such as in some parts of Central Texas, where shallow soils overlay fractured limestone leading to the aquifer.

A fertilizer that contains a slow-release nitrogen source will list it on the label. Slowly available sources include urea formaldehyde (UF), UF-based products (methylene urea), sulfur-coated urea polymer-coated urea (SCU) and isobutylidene diurea (IBDU).

These sources are usually the more expensive forms of nitrogen. As such, they are included as only 20 to 35 percent of the nitrogen in some fertilizer products, to have the benefit of the slow-release component without driving up the cost of the product too much in relation to the less expensive quickly available nitrogen fertilizers.

If slow-release sources are in a fertilizer, they will be listed on the label. It is rare to find mostly slow-release nitrogen fertilizers in home consumer product lines because the cost would be much higher than other products. Hence, the cost would be beyond what the home consumer will pay, especially the uninformed consumer who is unable to properly compare fertilizer products for value and use.

Natural organics (fish meal, dried blood, animal manures) and activated sewage sludge are sometimes referred to as slow-release fertilizers. However, when the soil is warm, these products are broken down quickly.

Beware: Texas fertilizer labeling rules allow fertilizers to be labeled and marketed as slow-release fertilizers even if only 15 percent of their total nitrogen content is from a slow-release source. This can be misleading if you do not look closely at the fertilizer label to evaluate the product's nitrogen availability.

For UF-based fertilizers, the portion of the nitrogen that is slowly available is listed on the fertilizer bag as water insoluble nitrogen (WIN). You can calculate the amount of nitrogen in that fertilizer that is slowly available by dividing the WIN percentage by the nitrogen analysis number.

(WIN percentage ÷ Nitrogen analysis) x 100 = Percentage of nitrogen that is slowly available

Example 1: You have a bag of 20-10-10 fertilizer with 5 percent WIN. Using the formula above:

(5 ÷ 20) x 100 = 25%

Of the nitrogen in the bag, 25 percent, or one-fourth, is in the slowly available form.

Example 2: Assume that your fertilizer label provides the following information:

Guaranteed analysis

Total nitrogen 16%
5.6% water insoluble nitrogen (WIN)
Available phosphoric acid (P_2O_5) 4%
Soluble potash (K_2O).....8%

(5.6 ÷ 16) x 100 = 35%

Of the total nitrogen in that fertilizer, 35 percent is WIN, or slowly available, and 65 percent is in a readily available form.

If the fertilizer label does not list any WIN or other slowly available sources, assume that the nitrogen is all water soluble or quickly available.

Understand that:

- Slow-release nitrogen sources cost more than do readily available nitrogen sources.
- Home consumer products typically range from being all readily available to containing only up to ⅓ of the nitrogen as slow release to keep costs down.
- Slow-release nitrogen sources are commonly mixed with other types of nitrogen fertilizers. Read the fertilizer label to learn what is actually in the packaged product.
- Sulfur-coated urea and polymer-coated urea fertilizers can vary in how they are formulated to release nitrogen.
- It is always a good idea to note the content of any fertilizer nitrogen source in the product and evaluate whether the product performs to your expectations. If something works, it is likely you will want to buy it again next year.
- Fertilizer products are typically made so the consumer sees the grass green-up soon after application.
- For slow-release fertilizers to work effectively, the slow-release nitrogen component should be at least 50 percent of the total nitrogen.
- An additional advantage of using nitrogen fertilizers with 100 percent of their nitrogen as slowly available nitrogen sources is that they can be applied somewhat at higher rates, which reduces the total number of times the fertilizer must be applied.

If the fertilizer contains sulfur-coated urea, polymer-coated urea or other slow-release sources, include that portion as being similar to water-insoluble nitrogen when determining the amount of nitrogen that is slowly available.

Statements on a fertilizer bag such as "contains 50% organic fertilizer" do not mean the fertilizer is 50 percent slowly available. The only reliable way to determine the portion of fertilizer nitrogen that is slowly available is to calculate WIN as noted above or determining the amount of another slowly available nitrogen source in the fertilizer.

Summary

Proper and timely fertilization can be good for your lawn and the environment. There is less chance for nutrient runoff and soil erosion to surface waters from a healthy stand of grass than from bare soil or thin grass. Healthy lawns will have fewer disease, insect and weed problems, reducing the need for pesticide applications. Well-maintained lawns look appealing and are more wear tolerant.

After having your soil tested and choosing the appropriate fertilizer for your lawn, you should then determine the amount and frequency of fertilization needed. This will be influenced by the quality desired, the source of nitrogen, type of soil, type of turfgrass, length of growing season, traffic, shade and whether clippings are recycled. Evaluate your lawn situation based on these factors and how each affects the amount and frequency of nitrogen application. Then choose the amount and frequency that best suits your site.

Other publications on lawn care

The Texas AgriLife Extension Bookstore (http://AgriLifebookstore.org/) also offers these publications on lawn care:

Publication Number	Title
E-159	*Chemicals for Plant Disease Control at Home*
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E-356S	*Lawn Maintenance Safety* (Spanish)
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L-5331	*Sprayer Calibration for Turfgrass*
L-5330	*Spreader Calibration for Turfgrass*
L-5170	*Take-All Root Rot of Turfgrass*
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Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Edward G. Smith, Director, Texas AgriLife Extension Service, Texas A&M System.
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