



Lawn Fertilization in Kentucky

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Introduction

To maintain a quality lawn, you should apply fertilizer every year. Fertilization helps maintain turf uniformity, a good green color, and reduces weed problems. These positive effects can be lost, however, if fertilizer is applied improperly or at the wrong time.

Test—Don't Guess!

How do you determine what fertilizer your lawn needs? The best way is to have the soil tested. You can collect samples any time during the year. Contact your local Extension agent for information on how to take the sample and submit it for analysis. (The Extension office is listed in the phone book under your county.) With the soil analysis, your Extension agent can make a good recommendation about how much lime, phosphate, and potash your lawn needs. Test your soil every three or four years to make sure its fertility is being maintained.



Use a soil probe, knife, hoe, or small shovel to collect a random soil sample. Fill the box and then complete the information sheet at your local Extension office.

Although the soil test measures several important elements, it does not measure nitrogen. Turf growth is highly dependent on nitrogen fertilization, but applying nitrogen at the wrong time or in heavy amounts may severely damage your lawn. A general recommendation is to apply 1 pound actual nitrogen per 1,000 square feet for each application (Table 1).

The recommended rates of nutrients can be applied with a fertilizer containing only nitrogen (e.g., urea 45-0-0), only phosphate (e.g., triple superphosphate 0-46-0), or only potash (e.g., muriate of potash 0-0-60). Or, you can use a complete fertilizer such as 10-10-10, 17-17-17, 10-20-10, etc. You may start with a complete fertilizer, but once you reach a high level of phosphate and potash in the soil, you may not need to add more phosphate and potash for several years. When phosphate and potash are not needed, a single nutrient nitrogen fertilizer may be the best choice.

The examples listed in Table 1 show many fertilizers that can be used to maintain turf. Because the fertilizer analysis tag indicates only the percent of plant food, you must calculate the pounds of plant food in a bag. For example, a 50-pound bag of 10-6-4 contains:

- 5 pounds ($50 \times 0.10 = 5$) of actual nitrogen (N).
- 3 pounds ($50 \times 0.06 = 3$) of phosphate (P_2O_5).
- 2 pounds ($50 \times 0.04 = 2$) of potash (K_2O).

The rest of the material in the bag [$50 - (5+3+2) = 40$ (i.e., 40 pounds)] is called the carrier.

Another example: to apply 1 pound N per 1,000 square feet, you would need to apply 10 pounds ($10 \times 0.10 = 1$) of the 10-6-4 fertilizer per 1,000 square feet. Ten pounds of 10-6-4 per 1,000 square feet would also supply 0.6 pounds of P_2O_5 (phosphate) and 0.4 pounds of K_2O (potash).

Table 1. Examples of fertilizers and rates needed. (Rates shown would provide 1 pound nitrogen per 1,000 square feet of lawn.)

Type of Fertilizer	Pounds Product Needed/1,000 sq ft
Farm Fertilizer	
Ammonium Nitrate (34-0-0)	3
Urea (46-0-0)	2.2
10-10-10	10
5-10-10	20
Specialty Fertilizer	
24-4-4	4.5
16-6-8	6
27-4-9	3.5
20-5-10	5
32-4-8	3

Note: Specialty fertilizers, represented here by hypothetical analysis, generally contain high nitrogen and low phosphate. They also contain a portion of slow-release nitrogen.

Buying the "Right" Fertilizer

Once you know what nutrients your lawn needs, how do you know which fertilizer to buy? The analysis on the fertilizer bag tells you the percent nitrogen (N), phosphate (P_2O_5) and potash (K_2O) in the fertilizer. Figure 1.

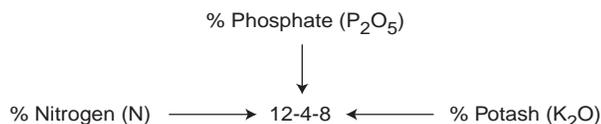


Figure 1. How to read the fertilizer analysis.

Which Grasses Are You Fertilizing?

Nitrogen fertilizer should not be applied at the same time for all grasses. Fall and early winter nitrogen fertilization is best for fescues, Kentucky bluegrass, and ryegrass because they grow best during cool weather. The turf develops a better root system, becomes very dense, and has much better late fall and early spring color if nitrogen is applied in the fall.

During mild winters, good color may be maintained all winter following a fall application of nitrogen. By eliminating or minimizing spring fertilization you:

- Prevent the heavy flush of growth that occurs with spring fertilization.
- Reduce frequency of mowing during spring.
- Develop a better root system.
- Reduce disease.
- Develop a more heat-tolerant, weed-free turf.

If for some reason you are not able to apply nitrogen in the fall, an application during the following early spring will improve greenup. Even if some fall nitrogen was applied, applying a half-rate of nitrogen in late May or early June in years with heavy spring rainfall may help improve color.

If color is not a major concern, don't fertilize, because crabgrass and other summer annuals respond to the nitrogen much more than do bluegrass and fescue. If you increase nitrogen fertilization of cool-season grasses in spring and summer, the need for irrigation, thatch control, and chemicals for weed control also increases. A lush summer lawn may not be worth these potential problems.

Late spring-early summer is the best time to fertilize bermudagrass and zoysiagrass, since they are warm-season grasses and perform best during hot summer months.

Farm vs. Specialty Fertilizers

Lawns can be fertilized with specialty turf fertilizers (normally available at local garden centers) or with farm fertilizers. The main advantages to the specialty fertilizers are:

- Normally good nutrient ratios for turf.
- Uniformity of particle size.
- Low burn potential.
- Calibration and application rate information printed on the bag.

Most farm fertilizers do not have these advantages, but farm fertilizers are usually three to five times less expensive.

Farm fertilizers such as ammonium nitrate and 10-10-10 must be used with caution. Because of their burn potential, you should not apply them during extremely hot weather or when moisture is on the grass leaves. Farm fertilizers will seldom, if ever, burn a turf if applied during the fall and early winter as this publication suggests and if applied at the proper rate.

The biggest problem with these fertilizers, however, is that you must calculate the correct amount to apply and calibrate the spreader to obtain the appropriate coverage.

Depending on the type of spreader you use, it is sometimes difficult to limit fertilizer to no more than 2.2 to 3 pounds evenly spread over a 1,000-square-foot area. Without experience you may think that only a little fertilizer is being applied and be tempted to apply more. Be careful! Applying more than one-and-a-half to two times the recommended rate will greatly increase the burn potential and cause an excessive flush of growth.

Fertilizers calling for 10 pounds per 1,000 square feet, such as 10-10-10, are easier to see in the grass. However, the resulting burn when you apply more than 15 pounds per 1,000 square feet is even more serious with these mixed fertilizers because of the potassium salts they include.

Most specialty brands of fertilizer also contain some slow-release nitrogen (shown on the bag as "water-insoluble nitrogen" or "coated nitrogen"). Usually the amount of this slow-release nitrogen is less than one-third of the total amount of nitrogen in the bag. Slow-release nitrogen makes application safer, but such a small amount doesn't provide noticeable availability of nitrogen over the long term. Most of these specialty fertilizers can be timed and measured exactly the same as you would a farm fertilizer. The same is true with specialty "organic" fertilizers, most of which have a low percentage of nitrogen or are fortified with urea, a quick-release source of nitrogen.

Most specialty fertilizers contain enough phosphate and potash to maintain the level needed by the turf. Therefore, if the soil test indicates that levels of phosphate and potash are sufficient, continual use of these specialty fertilizers will adequately supply phosphate and potash for many, many years. If clippings are recycled and not removed, almost no additional phosphate and potash will ever be needed.

Frequency of Nitrogen Fertilization

How often you apply nitrogen depends upon the level of overall maintenance. Low and medium maintenance levels are best for general lawns that get little or no summer irrigation. High and very high maintenance levels usually require some irrigation, high mowing frequency, and often more pest control. Effect of various maintenance levels is shown in Table 2.

Table 2. Effect of maintenance level on nitrogen application to lawns.

Maintenance Level	Number of Applications Per Year	When to Apply to Cool-Season Grasses (Ky bluegrass, tall fescue, fine fescue ^a , perennial ryegrass)	When to Apply to Warm-Season Grasses (bermudagrass, zoysiagrass ^a)
Low	1	Oct-Nov	June
Medium	2	Sep-Oct	May
		Nov-Dec	June
High	3	Sep-Oct	April
		Oct-Nov	June
		Nov-Dec	Aug
Very High	4	Sep-Oct	April
		Oct-Nov	May
		Nov-Dec	June
		late May-early June (1/2 rate)	Aug

^aFine fescue and zoysiagrass should be fertilized only one time per year after the lawn is established completely.

Spreader Calibration

Calibrating your spreader becomes necessary when you use a brand of fertilizer that does not provide calibration information or the bag does not include information on the spreader model you own. Since fertilizers' density and granule size vary a lot, you may have to recalibrate the spreader for almost every application. When using a rotary or drop-type spreader, begin by guessing at a spreader setting. Then:

- Apply a known amount of fertilizer to a test area and determine the square footage covered (length times width) or
Apply the fertilizer over a plastic sheet or sidewalk area of known square footage. Then collect and weigh the fertilizer deposited.
- After calculating the rate per 1,000 square feet that you applied, if your first guess at the spreader setting was right, treat the lawn at that setting. If not, readjust the spreader and repeat the procedure until the correct calibration is achieved.
- Calibrating your spreader to a half-rate setting and going over the yard twice in different directions will ensure a more uniform coverage and color.



Push- or drop-type spreaders are very accurate but require many more trips across the lawn than rotary spreaders. Take care to prevent striping the lawn.



A hand-crank (shoulder strap) rotary spreader is somewhat easier to calibrate than a push-type rotary spreader.

It is somewhat easier to calibrate a rotary-type push spreader or a hand-crank (shoulder strap) rotary spreader, since the width of coverage is 10 to 25 feet. Measure a test area of lawn (for example, a side yard that equals 2,000 square feet) and put the correct amount of fertilizer (for the 2,000 square feet) into the spreader with the opening adjusted just slightly larger than the size of the individual granule.

If more than two or three passes is required to dispense the fertilizer, select another area (for example, the backyard) and try again. Increase or decrease the size of the opening and continue to refine the calibration until the total amount needed is spread in two or three passes through the yard.

Calibration is not easy and usually requires more time than the application itself. Whether the calibration information from the bag or your own calibration is used, always recheck to see if the approximate amount of fertilizer calculated is actually applied. Because of wear and rust, spreader openings often change in size. Also, fertilizer density and particle size will vary considerably and cause major calibration changes.

Spreader Care

Because of its high salt content and ability to absorb moisture, fertilizer left in a spreader will cause immediate rusting, so, after you finish applying fertilizer, immediately clean the spreader. (Do not let the wash water from the spreader run onto the lawn, because it may cause uneven growth or excessive burning.) You should also coat all moving parts of the spreader with oil.

Liming Lawns

Lawns can be limed any time during the year. A soil test is needed to determine the amount of agricultural limestone (ag lime) needed to decrease acidity to a pH of 6.0 to 6.5. The limestone normally purchased at rock quarries is cheap but is almost impossible to apply in normal lawn spreaders. Quarry lime is probably most easily applied by shovel from the back of a pickup truck. Often as much as 100 to 200 pounds will be required per 1,000 square feet of lawn. However, it is usually suggested that only 100 pounds or less be applied in a single application. If more than 100 pounds per 1,000 square feet is required, the rest of the recommended lime can be applied three to six months later.

Ag lime is often sold through garden centers in 50-pound bags as finely ground ag lime or dolomitic limestone. The finely ground particles are also difficult to apply with lawn spreaders in sufficient quantities, and they are very dusty. The dolomitic limestone is usually slightly more expensive because it contains some magnesium carbonate as well as calcium carbonate (ag lime). Since our Kentucky soils contain enough magnesium, the higher cost of dolomitic limestone does not mean it is better in chemical quality. Lime can be applied during any season of the year.

A more convenient “pelleted lime” is available in many lawn and garden centers. This product flows freely through lawn spreaders and is not extremely dusty. It is, however, more expensive than ag lime and must be used at equivalent rates.



Pelleted



Dolomite



Ag



Very high nitrogen rates, as much as 6 pounds nitrogen per 1,000 square feet per year, are often recommended for trees. Such high rates will cause excessive turf growth and disease problems. When applied in drilled holes, the fertilizer may also cause unsightly growth and spot damage.

You can often purchase hydrated and burned lime. Although somewhat lesser quantities are needed to reduce acidity, some leaf burn problems may occur, and the residual effect of hydrated or burned lime would be much less than agricultural lime.

Often, gypsum (CaSO_4) is sold in garden centers, but although it is readily soluble in soil, it is not effective in changing pH or improving the structure of Kentucky soils.

Sources of sulphur are also available and are utilized to reduce soil pH. Although reduced pH is important for many landscape plants, turfgrasses are not generally affected by high pH in Kentucky soils.