



Use only what you need, and avoid spring applications.

Just like people, lawns need a balanced diet, too. If you feed them too much, too little, or apply the wrong kind of fertilizer, they won't be healthy.

**When** you fertilize is critical, too. (Fall is better than spring.)

**Test your soil.** A soil test will tell you how much (if any) phosphorus (P) and potassium (K) fertilizer your lawn needs. Contact your local extension or the Cornell Nutrient Analysis Laboratory for more information.

If tests indicate that no P or K is needed, use nitrogen fertilizer sources that contain little or no P and K.

**Adjust pH, if needed.** Lawns should have a slightly acid pH, between 6.0 and 7.0. If your soil tests fall outside of this range, follow instructions for adding lime or sulfur to bring pH into this range.

**Focus on fall.** If phosphorus and potassium levels are adequate in the soil, nitrogen (N) is the most important nutrient for grass growth. Understanding [how grass grows](#) is important when making decisions about how much and when to apply nitrogen fertilizer.

For most low-maintenance lawns, a single application (1 lb. N/1,000 square feet) between Halloween and Thanksgiving (about 2 weeks after your last mowing) is the best time. Most home lawns with modest expectations do just fine with a single late-fall fertilization.

Do not fertilize during "Indian summer" - a warm period following hard frost. This may cause excessive topgrowth, reduce root storage and increase winterkill. The best window for fall application is after topgrowth stops, usually after 10 days with average daily temperatures below 50° F. Roots will continue growing and taking up fertilizer until the ground freezes.

Organic nitrogen sources are not a good choice for fall fertilization because they require warm soil and microbial action to release nitrogen. Soluble nitrogen sources are readily available to the plant, but on sandy soils there is the risk of leaching. A 50%-50% or 70%-30% mix of slow-release to quick-release N is less risky to the environment.

For higher maintenance lawns, you can also apply 1 lb. N/1,000 sq. ft. around Labor Day and/or Memorial Day. Avoid early-spring applications. Research shows that these applications do not really enhance spring green-up compared with late-fall applications. (Neglected lawns or sods thinned by winterkill may benefit from .5 lb. N/1,000 sq. ft. after the soil

- [Introduction](#)
- [Healthy Lawn Overview](#)
- [Why Lawns Matter](#)
- [Choosing a Lawn Care Service](#)
- [How Grass Grows](#)
- [Choosing Lawn Grasses](#)
- [Mowing](#)
- [Fertilizing](#)**
- [Watering](#)
- [Dealing with Leaves](#)
- [Coping with Shade](#)
- [Relieving Thatch](#)
- [Managing Lawn Weeds](#)
- [Managing Lawn Insects](#)
- [Preventing Lawn Diseases](#)
- [Salt Damage](#)
- [Repairing Dog Urine Damage](#)
- [Renovation and Establishment](#)
- [What's Wrong with This Image?](#)
- [Timely Tips](#)



# Turfgrass Maintenance Fertilization

Department of Crop and Soil Sciences - Cooperative Extension

- Introduction
- Fertilizer Definitions
- Types of Nitrogen
- Recommended Fertilizer Programs

## Introduction

A regular fertilization program is necessary to maintain good quality turfgrass. Dollar for dollar, fertilization does more to improve poor quality turfgrass or maintain good quality turfgrass than any other single management practice.

First, a soil test should be made to establish the basis for a regular fertilization program. Soil testing service is available from The Pennsylvania State University Soil and Forage Testing Laboratory and from private testing laboratories. Soil test mailing kits for University testing may be obtained from county Cooperative Extension Service offices at a nominal cost. The soil sample is forwarded to the University. After analysis, recommendations for fertilization are made.

Grass plants normally need nitrogen, phosphorus, and potassium (potash) in larger amounts than can be supplied naturally from the soil. Nitrogen, which is essential for vegetative growth and good green color, is a constituent of plant proteins, chlorophyll, amino acids, and other plant substances. Phosphorus is necessary for good root development and important in many vital growth processes. Potassium is required for physiological functions and promotes disease resistance and winter hardiness in grasses.

Fertilizer should be bought on the basis of its quality rather than on bag size and price. Value depends on the total amount of plant food contained in the bag and the source of the nitrogen-carrying portion of the fertilizer. The law requires that the total amount of plant nutrients be shown on the bag. The bag may or may not indicate the source of nitrogen used; ask your dealer or county agent. If the fertilizer contains slow release nitrogen materials, the percent water insoluble nitrogen (WIN) or controlled release nitrogen (CRN) must be stated on the bag. A guarantee that 30% or more of the total nitrogen is water insoluble or controlled release nitrogen indicates a quality turfgrass fertilizer.

## Fertilizer Definitions

**Complete fertilizer.** A complete fertilizer contains the three major fertilizer elements - nitrogen, phosphorus (phosphate), and potassium (potash).

**Fertilizer grade.** The fertilizer grade designates the percentages of nitrogen, available phosphate, and water soluble potash in the product. A 20-5-10 grade fertilizer contains 20 percent nitrogen, 5 percent available phosphates, and 10 percent water soluble potash. Thus, a 40 pound bag of 20-5-10 contains 8 pounds of nitrogen (20 percent of 40), 2 pounds

## Fertilizers & Pesticides

---

### Fertilizer Use

### Pesticide Use

#### Fertilizer Use

To grow properly, plants need nutrients (nitrogen, potassium, calcium, zinc, magnesium, iron, manganese, etc.) which normally can be found in the soil. Sometimes fertilizers are needed to achieve a desired plant growth, but they are not always used properly. Below are a few tips:

#### Apply compost

When added to the soil, compost creates a balanced medium for sustained plant health.

#### Apply a specific mineral

Talk to your local home garden center specialist for the right one.

#### Apply a packaged fertilizer

Choose a fertilizer that contains slow-release nitrogen and other nutrients. This is the most environmentally safe and cost-effective method and requires fewer applications. Look for a fertilizer with at least 30% slow-release nitrogen; you can figure this out by looking at the percent of water insoluble nitrogen, which indicates the percent of slow-release nitrogen (see [Figuring Out Fertilizer](#)). Plus, for most applications, only 0 - 2% phosphorus is needed.

#### Reading a fertilizer label

- For example, 10-2-10 means 10% of the bag is Nitrogen, 2% is phosphorus, and 10% is Potassium.
- Read labels closely to see if other nutrients are included.
- As a general rule, the first and third number should be the same.
- The middle number should be no more than half the total value of the other included nutrients.

#### Try to reduce the use of fertilizer

When over-applied, fertilizers can increase insect and disease problems. Rapidly growing plants are weak and without an adequate root system. The excess also increases run-off from yards and can contaminate waterways.

#### Pesticide Use

The use of pesticides has become the most common approach to pest control. This has resulted in pest resistance to pesticides, and the destruction of beneficial organisms.

Pesticides and other chemicals are often seen as essential tools to maintaining a beautiful yard. However, pesticides used in urban landscaping contain chemicals, such as [diazinon](#) (which is no longer available for purchase) and [chlorpyrifos](#), which can migrate through the ground and be toxic to a number of organisms, including fish and invertebrates. Most pesticides do kill their target pests but



## Help the Chesapeake Bay

Prevent pollution and reduce runoff with a healthy yard. Use care when gardening to protect your local water supply, streams, rivers, and the Chesapeake.

### Control Erosion & Improve Your Soil

- Plant gardens in raised beds with solid sides.
- Recycle nutrients and improve soil by adding compost to your garden.
- Cover bare soil with leaves or cover crops during fall and winter.
- On slopes, plant along the contour, not up and down; construct terraces to hold your soil.

### Garden Cover Crops

Seed in fall; mow and dig into the soil 2 weeks before spring planting. Try these:

- Oats
- Crimson Clover
- Winter Rye
- Winter Wheat

### Lawn Fertilizer

- **Test your soil first!** Only fertilize based on your soil's needs. Re-test every 3-5 years.
- If phosphorus level in your soil is adequate, use a low- or no-phosphate fertilizer.
- Select fertilizer that contains at least 40% of its nitrogen in a slow release form.
- Do not over-fertilize.
- Keep fertilizer off of paved surfaces.
- Do not apply fertilizer to frozen ground or dormant turf or before a heavy rain.

### Mowing Guide

The proper mowing height reduces weeds by 50-80%!!!

	Spring & Summer	Fall & Winter
Tall fescue	2½ - 3½ inches	2½ inches
Kentucky bluegrass	2½ - 3½ inches	2 - 2½ inches
Fine fescue	2½ - 3½ inches	2 - 2½ inches
Bermudagrass	2½ - 3½ inches	1½ - 3½ inches
Zoysiagrass	2 - 3 inches	½ - 2 inches

**Grasscycle!** Leave grass clippings on the lawn. They return nutrients to your lawn and reduce the amount of fertilizer needed by 25-50%.

Keep mower blades sharp.

### Watering

- In dry spells, allow an established lawn to go dormant.
- If turf looks blue-gray and you leave footprints after walking on it, water is needed.
- *Early morning* is the best time to water.
- Water slowly; wet to a depth of 4-6 inches.
- Avoid water run-off from the lawn.
- Light, frequent watering or watering in the evening can damage your lawn.
- Plant and maintain a landscape that will survive on natural rainfall amounts.

### Control Pests with IPM

- Check plants regularly for signs of problems. Look at leaf undersides for spider mites and egg masses.
- Avoid routine application of pesticides. Spot treat affected areas only rather than spraying the entire lawn and landscape.
- When necessary, use environmentally friendly pesticides like horticultural oils and soaps, botanical insecticides, biological controls, and beneficial insects.
- Hand pick insects and diseased leaves and pull weeds, when possible.

### What we do matters!

**Our landscapes are connected to the Chesapeake Bay by a network of storm drains, streams, and rivers.**

**HAVE A LAWN OR GARDEN QUESTION? CALL THE HOME & GARDEN INFORMATION CENTER!**

**1-800-342-2507**

Consultants available Monday-Friday, 8 A.M. to 1 P.M. Recorded information available 24 hours a day.

The Maryland Cooperative Extension's programs are open to all citizens without regard to race, color, gender, disability, religion, age, sexual orientation, marital or parental status, or national origin.

The Chesapeake Bay Trust funded the printing of this publication.



**Fertilizer Ratio** - If the fertilizer analysis is 16-4-8, the fertilizer ratio is 4-1-2; similarly, a 14-7-14 analysis would have a 2-1-2 ratio. Mature lawns generally require more nitrogen than phosphorus and potassium; therefore, ratios of 4-1-2 or 4-1-3 are commonly recommended. Turf maintenance fertilizers vary in nitrogen content and may contain a portion of the nitrogen as water insoluble or slowly-available nitrogen.

**Nitrogen Availability** - The source of nitrogen in fertilizers influences nitrogen availability and turf response. There are two categories of nitrogen sources; quickly-available and slowly-available. Quickly-available materials are water soluble, can be readily utilized by the plant, are susceptible to leaching and have a relatively short period of response. Quickly-available sources include

ammonium nitrate, urea, ammonium sulfate and calcium nitrate. Slowly-available nitrogen sources release their nitrogen over extended periods of time and are applied less frequently and at somewhat higher rates than the quickly-available nitrogen sources. Slowly-available sources are less susceptible to leaching and are preferred on sandy soil types which tend to leach. Slowly-available sources include urea formaldehyde (UF), UF based products (methylene ureas), sulfur coated urea (SCU), IBDU, natural organics (bone meal, fish meal, dried blood, and animal manures) and activated sewage sludge.

If a fertilizer contains a slow release nitrogen source it will be listed on the label. For UF based fertilizers the portion of the nitrogen that is slowly-available is listed on the fertilizer bag as Water Insoluble Nitrogen (WIN).

## Nitrogen Fertilization of Cool-Season Grasses

**Program 1** - Nitrogen fertilization of cool-season grasses using predominantly quickly-available nitrogen fertilizers (less than 50% slowly-available nitrogen or WIN)

### Nitrogen Application By Month

Quality Desired	Sept.	Oct.	Nov	May 15- June 15
	lbs N/1000 sq ft			
Low	0	1	0	0-1/2
Med	1	1	0	0-1/2
High	1	1	1	0-1/2

**Program 2** - Nitrogen fertilization of cool-season grasses using predominantly slowly-available fertilizers (50% or more slowly-available nitrogen or WIN)

### Nitrogen Application By Month

Quality Desired	Aug 15 to Sept 15	Oct 1 to Nov 1	May 15 to June 15
	lbs N/1000 sq ft		
Low	1.5	0	0
Med	1.5	1.5	0
High	1.5 to 2	1.5	0 to 1.5

### Important comments about Programs 1 and 2:

1. Fine fescue perform best at 1-2 lbs of nitrogen per 1000 sq ft per year.
2. Applications in successive months should be approximately four weeks apart.
3. Natural organic and activated sewage sludge products should be applied early in the August 15 to September 15 and the October 1 to November 1 application periods to maximize their effect.
4. Up to 1 lb of nitrogen in Program 1 and up to 1.5 lb of nitrogen in Program 2 may be applied per 1000 sq ft in the May 15 to June 15 period if nitrogen was not applied the previous fall or to help a new lawn get better established.

## Nitrogen Fertilization of Warm-Season Grasses

**Program 3** - Nitrogen fertilization of warm-season grasses using predominantly quickly-available nitrogen fertilizers (less than 50% slowly-available nitrogen or WIN)

### Nitrogen Application By Month

Quality Desired	April	May	June	July/ Aug
	lbs N/1000 sq ft			
Low	1	1	0	0
Med	1	1	1	0
High	1	1	1	1

**Program 4** - Nitrogen fertilization of warm-season grasses using predominantly slowly-available nitrogen fertilizers (50% or more slowly-available nitrogen or WIN)

### Nitrogen Application By Month

Quality Desired	April/May	June/July
	lbs N/1000 sq ft	
Low	2.0	0
Med	1.5	1.5
High	2.0	2.0

### Important comments about Programs 3 and 4:

1. If overseeded for winter color add 1/2 to 1 lb of readily available nitrogen per 1000 sq ft in Sept./Oct. and/or Nov.
2. Applications in successive months should be approximately four weeks apart.
3. Centipedegrass and mature zoysiagrass perform best at 1 to 2 lbs of nitrogen per 1000 sq ft per year.
4. Improved winterhardiness on bermudagrass will result from the application of potassium in late August or September.