Virginia Cooperative Extension

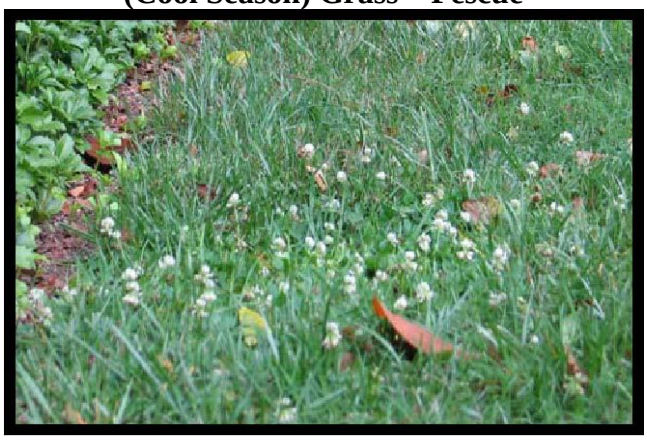
Virginia Tech • Virginia State University

York County/City of Poquoson Office
PO Box 532, 5338-I George Washington Mem Hwy, Yorktown, Virginia 23690
757-890-4940
Web Site: http://www.york.ext.vt.edu

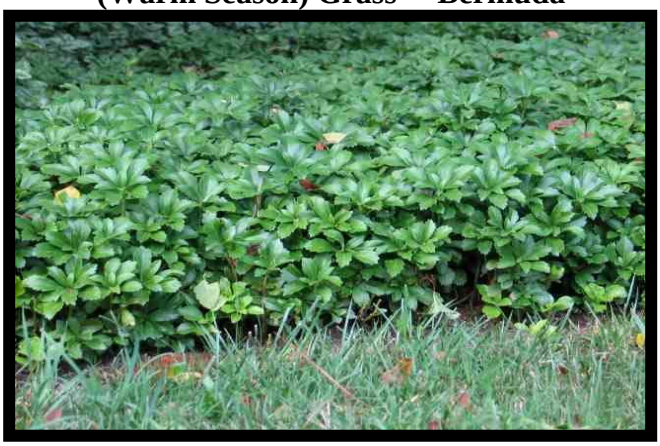
Lawn Care

(Cool Season) Grass—Fescue

(Warm Season) Grass —Bermuda



Lawn Renovation



Ground Covers

Guidelines for a Healthy Lawn

On the Virginia Peninsula

www.pubs.ext.vt.edu

Virginia Cooperative Extension programs and employment are open to all, regardless of age, color, disability, gender, gender identity, gender expression, national origin, political affiliation, race, religion, sexual orientation, genetic information, veteran status, or any other basis protected by law. An equal opportunity/affirmative action employer. Issued in furtherance of Cooperative Extension work, Virginia Polytechnic Institute and State University, Virginia State University, and the U.S. Department of Agriculture cooperating. Edwin J. Jones, Director, Virginia Cooperative Extension, Virginia Tech, Blacksburg; M. Ray McKinnie, Administrator, 1890 Extension Program, Virginia State University, Petersburg.

This page was left blank intentionally.

Table of Contents

This page was left blank intentionally.

Virginia Cooperative Extension
Virginia Tech • Virginia State University
Hampton: 727-1401
James City County: 564-2170
Newport News: 591-4838
York-Poquoson: 890-4940

Introduction

Welcome to the Peninsula. This publication will make an effort to capture the important points that are needed to maintain a fescue lawn (cool season grass) or a bermuda/zoysia lawn (warm season grass) on the Peninsula. This publication reflects research based unbiased information. This publication will not recommend services or companies but rather a maintenance and management plan that you can implement to attain desired results.

It is important to understand that it takes three years to establish a lawn. Patience and perseverance over time will help you to attain the desired results. This publication is sensitive to our water quality issues. Adhere closely to these recommendations.

Vital Statistics for a Healthy Lawn

	Fescue Lawn	Bermuda/Zoysia Lawn
Proper Soil pH	6.2 — 6.5	6.2 — 6.5
Mowing Height	2.5 —3.0 inches	1.0 —1.5 inches
Fertilization Timing	September, October, November	Mid-spring — summer
Aeration Timing	Fall	Mid spring — mid summer
Total Amount of Nitrogen	2.0 - 3.5 lbs of active Nitrogen / 1,000 sq. ft. / year	2-4 lbs of active Nitrogen for Bermuda or 1-2 lbs of active Nitrogen for Zoysia / 1,000 sq. ft / year
New Lawn Seeding Rate	4 - 6 lbs of seed / 1,000 sq. ft.	1 -1.5 lbs of seed / 1000 sq. ft.
Maintain A Lawn Seeding Rate	3 - 5 lbs of seed / 1,000 sq. ft.	N/A
Amount of Water / Rainfall per Week	1 inch	1 inch
Mower Blade Sharpening (keep a sharp blade)	15 hours of operation	15 hours of operation

This page was left blank intentionally.

Establishing the Lawn or Renovating an Older Lawn

Producing quality lawns on the Peninsula can be challenging. Geographically, the Peninsula is located in what is known horticulturally as a transition zone for turf grasses. This means the climate can be hostile to both cool-season grasses (tall fescue) and warm-season grasses (Bermudagrass, Zoysiagrass). So, growing just one type of grass on your lawn may be difficult, but not impossible. With proper cultural practices, a healthy lawn can be established and maintained on the Virginia Peninsula. To establish a fescue lawn, use seed or sod. If possible, use only certified (blue tag) seed and sod. To establish a Bermudagrass lawn, use seed or sod, but Zoysiagrass needs to be established with sod or sprigs. The same requirements for soil preparation apply for either seed or sod methods.

When to Plant: Tall fescue is best established during the fall when temperature, moisture, and day length are most favorable for germination of cool-season grass. **Cool-season turf grasses** are best seeded in late summer; early spring seedlings are prone to damage from crabgrass invasions and summer drought. On the Peninsula, the best time to plant fescue seed is Sept 1 to Oct 1. Tall fescue sod can be installed throughout the year except in mid-winter when the ground is frozen. Sod should not be placed in extreme heat or drought conditions. **Warm-season grasses** are best established between mid-spring thru mid-summer. Warm-season grasses need soil temperatures in the 65 to 75 degree range, but the optimal establishment period continues into mid-July as long as irrigation is available to support initial growth and establishment.

Soil Preparation. The assumption is that the following activities will be performed to prepare the soil *prior* to the optimal planting time.

Test the soil to determine which nutrients are available in the soil and to obtain liming and fertilization recommendations per 1,000 square feet (See Calculating the Area of your Lawn on Page 4). Forms and instructions for obtaining soil samples are available from your local Extension office. Soil pH should be 6.2—6.5. Adjusting the pH of the soil takes between 6-12 months for the chemical reaction to be complete.

Apply lime to correct soil pH if needed. Most of the Peninsula soils are acidic and will need lime. Lime should be applied in several partial applications – Divide the recommended amount of lime by 3 or 4, and apply the partial amount in applications spaced several months apart. Max at any one application is 50# per 1000 square feet.

Eliminate Weeds prior to planting by properly applying a herbicide. This is a tough decision if your lawn is 60% weeds. Should you kill it all or use a selective herbicide? This is a management decision. Register for an on-site lawn clinic by calling your local Extension Office to obtain a schedule and to sign up. (Available in York/Poquoson and James City County only.)

Grade the soil to establish surface drainage. Save the topsoil by moving it to the side if extensive grading or subsoil drainage or irrigation is required.

Finish applying the recommended lime, 2 inches of compost throughout the area, and the recommended amount of fertilizer. Apply 2/3 of the fertilizer recommended by the soil test.

Till the amendments into a depth of 4-6". **Finish** the grade by fine raking. Be sure to mark all utilities, sprinkler heads, cable lines and septic lines before you till or dig. Call 811 or visit VA811.com.

Apply the remaining 1/3 of the fertilizer and rake into the surface an inch.

Seed or sod the area. Sow **fescue** seed at a rate of 4-6 lbs per 1000 square feet (sq. ft.) or sow **warm season grass** seed at a rate of 1 - 1.5 lbs of seed per 1000 sq. ft. Divide seed in half; sow first half of seed in one direction (north/ south) and sow the remaining seed in the crosswise direction (east/west). Cover the seed by raking lightly with a leaf-type rake.

Roll the area with a moderately heavy roller. Renting a roller is worth the effort and money.

Water daily with several shallow waterings to insure rapid germination of seedlings.

Mulch the area with straw or other suitable material so that about 50 to 75% of the soil surface is covered. This is normally accomplished by spreading 1/2 to 2 bales of high quality, weed-free straw per 1000 square feet. This light mulch does not need to be removed after turfgrass establishment.

Sodding. Soil preparation is similar to that described for seeding; a smooth, firm surface is needed. On hot days, moisten the soil to cool it before laying sod. Premium quality, certified sod is easier to transport and install than inferior grades. Good sod is light; does not tear easily; and quickly puts a root system into prepared, well-watered soil. Install sod as soon as you get it; it is perishable and should not remain in a stack longer than 36 hours.

Establish a straight line lengthwise through the lawn area; lay the sod on either side of the line with the ends staggered as when laying bricks. A sharp masonry trowel is very handy for cutting, forcing the sod tight, and leveling small depressions. Roll and water the new lawn immediately; irrigate to moisten the soil below the sod until it is well-rooted into the soil.

Seed versus Sod. Successful, weed-free establishment is more difficult with seed than with sod. Also, because of the time required for germination and root growth of seed, the area is exposed to erosion. Sodding practically eliminates such problems, an especially important factor on steep slopes.

Caring for a New Lawn

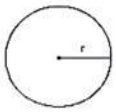
Post-Planting Irrigation. New seedlings and spriggings require frequent watering to ensure constant surface moisture for 30 days following planting. On hot days, several light waterings may be required during the day. Sod and plugs also need constant moisture until rooted.

New Lawn Maintenance. Begin mowing the new lawn when the grass is one-third taller than the intended mowing height. Be sure the mower blade is sharp. Avoid excessive traffic on a lawn until it is mature. Weed control may be necessary, but do not apply herbicides to new lawns until they have been mowed twice. Fertilization programs will be discussed later in this publication.

It usually takes two full growing seasons for a lawn to become fully established and exhibit the desirable characteristics for the individual turf species, such as drought tolerance, wear tolerance, density, and competition against weeds. Following a sound maintenance program will help your lawn mature and persist.

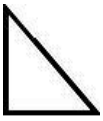
Calculating the Area of Your Lawn

For the Area of a Circle use $A = 3.14 \times r^2$
Example: Circle's radius (r) is 10 feet. Multiply the constant 3.14
by the radius squared. $A = 3.14 \times 10^2$ $A = 3.14 \times 100$ $A = 314$ square feet

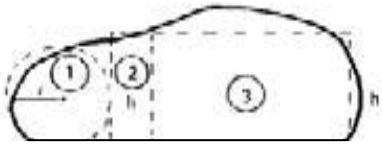


For the Area of a Rectangle use A = Base x Height
Example: Rectangle's base is 23 feet, and the rectangle's height is 10 feet.
A = 23 x 10. Thus A = 230 square feet

For the Area of a Right Triangle use A = (Base x Height) / 2
Example: Triangle's base is 10 feet and the height (base to point) is 12 feet.
A = (10 x 12) / 2 or A = 120 / 2 Then: A = 60 square feet



For an Irregular Freeform break the area into regular forms
Calculate the area of each form. Then add the
areas together to derive the total area.
Example: Circle (1): $A = 3.14 \times r^2$, Rectangle (2) A = b x h
Rectangle (3) A = b x h
Form (1) is a Circle [A(1) = 3.14 x 5 x 5 = 78.5]
Form (2) is a Rectangle [A(2) = 6 x 3 = 18]
Form (3) is a Rectangle [A(3) = 7 x 8 = 56]
The total area is approximately 78.5 + 18 + 56 = 152.5 square feet



Fertilizing the Lawn

Fertilization of lawns is essential for the production of quality turf on the Peninsula. However, exceeding recommended fertilizer application rates or improper application timing can negatively impact surface water and groundwater quality. No matter where you live on the Peninsula, your lawn practices will affect the bodies of water in the Tidewater area. Choosing a well-planned and environmentally-sound turfgrass fertilization program will ensure success.

Selecting a Fertilizer—Fertilizers are used to improve or maintain turfgrass quality. The value of a fertilizer depends upon the total amount of nutrients and the source of nitrogen in the fertilizer. Before selecting a fertilizer, become familiar with these terms: **soil testing, fertilizer analysis, fertilizer ratio, and nitrogen availability**.

Soil Testing - Soil tests taken every three or four years provide important information about the pH and fertility of your lawn soil. The results will indicate the amounts of phosphorus, potassium, calcium, and magnesium your soil can provide to the turfgrass. It will also indicate the acidity (pH) of your soil and whether lime is needed. A soil test may indicate that you do not need to apply some nutrients. A soil test report will indicate the specific amounts of lime, phosphorus, and potassium your soil needs to provide adequate nutrition for the turfgrass. The soil test report will not contain a nitrogen evaluation or recommendation because nitrogen content in the soil is transient. Nitrogen applications appropriate for cool-season and warm-season grasses are recommended in this publication on pages 6 and 7.

Your local Virginia Cooperative Extension Office (refer to the Introduction page for the phone number of your local Extension office) can provide information on how to sample the soil and submit it to the Virginia Tech Soil Testing Lab for analysis. Information about your soil type is also available.

Fertilizer Analysis - Fertilizers are described by a series of three numbers, such as 28-0-4 or 10-10-10. These three numbers indicate, respectively, the percent by weight of **nitrogen (N)**, **phosphate (P_2O_5)**, and **potash (K_2O)** in the fertilizer and are required to be on every fertilizer bag or container. For example, a 28-0-4 fertilizer would contain 28% nitrogen, 0% phosphate, and 4% potash by weight. Complete fertilizers contain all three. Lawn maintenance fertilizers are now phosphate-free, and if a soil test indicates no phosphorus is needed, these are the type of fertilizers you should select.

If a soil test indicates additional phosphate or potash is needed, it may be applied with a complete fertilizer or in separate applications from phosphate or potassium fertilizers. Fertilizers normally utilized to correct severe phosphorus and/or potassium deficiencies are 0-20-20, 0-28-0, 0-0-54, or 0-0-60. Never apply more than 3 lbs of 0-0-54 or 0-0-60 per 1000 sq. ft. to an established turf in hot weather without watering in the material to prevent foliar burn.

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 potassium and phosphate is now 0; therefore, ratios of 4-0-2 or 4-0-3 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 produce a quick 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), Isobutylidene diurea (IBDU), natural organics (bone meal, fish meal, dried blood, and animal manures) and composted 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). For instance, a 20-0-10 fertilizer with 5% WIN has 5/20 or ¼ (25%) of the nitrogen in the slowly available form. If you chose a fertilizer that provides nitrogen in a slowly available form, you should understand how to evaluate WIN in order to determine which fertilizer program to use. For example, assume that a fertilizer label provides the following information:

Guaranteed Analysis	To find the % nitrogen that is WIN, use the following calculation:	Therefore:
Total Nitrogen……..16% 5.6 Water Insoluble Nitrogen (WIN) Available Phosphoric Acid ($P^2 0^5$)..0% Soluble Potash ($K^2 0$)……...8%	$\frac{\%\ WIN}{\%\ Total} \times 100 =$ % of total nitrogen that is WIN or slowly available	$\frac{5.6}{16.} \times 100 = 35\%$ of the total nitrogen is WIN or slowly-available and this fertilizer is most suitable for use in Program 2.

If WIN is not listed on the fertilizer label, one should assume it is all water-soluble or quickly available nitrogen, unless the fertilizer label indicates it contains sulfur-coated urea. Sulfur-coated urea fertilizers do provide slowly-available nitrogen, but the fertilizer label does not list it as WIN. If the fertilizer contains sulfur-coated urea, include that portion as 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 contains 50% slowly-available N. Calculation of WIN as noted above or determination of the amount of another slowly available nitrogen source is the only reliable method of determining the portion of the fertilizer that is slowly available.

Proper Timing

Seasons of Application for Cool Season Grass

Proper timing of nitrogen applications to a cool season lawn is the Fall. Excessive spring application of nitrogen to cool-season grasses is detrimental because it leads to excessive leaf growth at the expense of stored food reserves and root growth. This increases the injury to lawns from summer disease and drought. **The best time to fertilize cool-season grasses is from August 15 through November. Do not fertilize in December.** Research tells us that a December application of Nitrogen will keep a cool season grass succulent. This succulent grass is highly susceptible to a disease called brown patch in early spring.

Nitrogen Fertilizer Programs for Cool-Season Grass

Programs 1, 2 and 3 state when to apply nitrogen to cool season grass. The units used are pounds of actual nitrogen per 1000 sq ft of lawn area. Applications in successive months should be approximately 4 weeks apart.

Tall fescue should be fertilized using either Program 1, 2, or 3. Program 1 uses predominantly quickly available nitrogen fertilizers. Program 2 uses slowly available nitrogen fertilizers from 15-49%. Program 3 has 50% or more slowly available nitrogen. See Publication CSES-135P, Lawn Fertilization in Virginia, for the amount of fertilizer to apply for each program and the Factors Affecting Nutrient Management to determine the appropriate amount and frequency of fertilization.

Seasons of Application for Warm Season Grass

Proper timing of nitrogen applications to a warm season lawn is mid-spring through mid-summer. As a rule of thumb, initiate fertility programs after the complete spring greening of the warm-season turf, which usually takes 3 - 4 weeks. Warm-season species have annual root systems that must be replaced each spring. However shoot systems are regenerated first because the food-making process (photosynthesis) is essential for new growth. Until photosynthetic rates and leaf emergence are complete, root development and food storage are put on hold. Application of heavy nitrogen fertilization too early will excessively deplete food reserves, thereby reducing root formation and promoting shoot growth at the expense of roots.

Nitrogen Fertilizer Programs for Warm-Season Grass

Programs 1, 2 and 3 state when to apply nitrogen to warm season grass. The units used are pounds of actual nitrogen per 1000 sq ft of lawn area.

Program 1 uses predominantly quickly available nitrogen fertilizers. Program 2 uses slowly available nitrogen fertilizers from 15-49%. Program 3 has 50% or more slowly available nitrogen. See Publication CSES-135P, Lawn Fertilization in Virginia, for the amount of fertilizer to apply for each program and the Factors Affecting Nutrient Management to determine the appropriate amount and frequency of fertilization. Note: Mature Zoysiagrass performs best at 1 to 2 lbs. of nitrogen per 1000 square feet per year.

Calculating the Correct Amount of Fertilizer

After calculating WIN and selecting a fertilization program, use this table to find the correct amount of fertilizer to use on your lawn. If the available fertilizer is not listed in the table, use the following calculation to determine the exact amount of fertilizer to apply per 1000 sq. ft. of lawn area.

$$\frac{\text{Recommended lbs of N per 1000 sq ft}}{\text{(\% N in fertilizer)}} \times 100\% = \text{= lbs of fertilizer needed per 1000 sq ft.}$$

Example: to apply 0.7 lb. of N per 1000 sq. ft. using a 12-0-8 fertilizer:

$$\frac{0.7}{12.\%} \times 100\% = 5.83 \text{ lb. of 12-0-8 required per 1000 sq. ft.}$$

The table entries are the amounts of fertilizer at four recommended application rates for each of nine formulations.

Pounds of Fertilizer per 1000 Square Feet

Fertilizer Analysis (%)	—— lbs N / 1000 sq. ft.——			
	0.5	**0.7**	**0.9***	**1.0***
6-2-0	8.3	11.7	15.0	16.6
10-10-10	5.0	7.0	9.0	10.0
16-4-8	3.1	4.4	5.6	6.2
24-25-4	2.1	2.9	3.8	4.2
28-0-4	1.8	2.5	3.2	3.6
32-0-10	1.6	2.2	2.8	3.2
20-0-0	2.5	3.5	4.5	5.0
38-0-0	1.3	1.8	2.4	2.6
45-0-0	1.1	1.6	2.0	3.3

* Use only for N containing 15-49% slowly available and/or water-insoluble N

Note: for Program 3 with WIN greater than 50% see Publication CSES-135P

Liming - The Why's and How To's

S.J. Donohue
Crop and Soil Environmental Sciences
Virginia Tech

Liming is an important part of a turf management program in the humid eastern United States. Rainfall exceeds 30 inches per year, leaching basic or alkaline-forming ions such as calcium and magnesium from the soil and resulting in an acid soil condition, which restricts growth of turf. In over 24,000 lawn samples analyzed by the Virginia Tech laboratory in 1987, more than 51% tested less than pH 6.0. **The optimum pH level for turf is in the 6.2-6.5 range.** More importantly, 28% of the samples tested less than pH 5.5, a level at which growth of turf can be adversely affected. However, lime should not be applied unless a soil test indicates that it's needed. Too much lime can be as harmful as too little, causing potential trace element deficiencies. The proper soil pH is essential for complete utilization of the fertilizer by the plant.

Making the Application

Limestone is simple to apply using a drop spreader. Uniform coverage is the key as lime is very insoluble and essentially stays where it is put. Skipped areas won't receive the lime needed to neutralize acidity. Overlapped areas, where double the recommended amount is applied, will have too high a pH level with the potential for trace element problems. To ensure even coverage, one half of the lime should be applied in one direction, and the remainder applied in a perpendicular (crisscross) pattern. If one is using pulverized ground lime, it is simple to determine if coverage is uniform because of the visible white color of the material. More care should be taken if pelletized lime is used. If the recommendation calls for more than 50-lbs/1000 sq. ft. to established turf, the lime application should be split. For aesthetic reasons, each additional application, if required, should be applied 3 to 6 months after the previous application. Applications of less than 50-lbs/1000 sq. ft. will disappear from the surface after one or two rains, while larger amounts will remain visible for a longer period of time.

Best Time to Apply

It is recommended that lime be applied in the late winter to enable the material to react in the soil for fall fertilization. However, lime can be applied any time. If a soil test in the spring indicates lime is needed, apply it at once. Lime reduces acidity and improves turf growth. One word of caution - if urea fertilizer is used, wait three weeks before applying the lime to permit the urea to react with the soil. If urea is applied at the same time as lime, nitrogen will be lost due to the increased pH around the fertilizer granules. Lime is safe to use! The common forms of lime applied to turf (calcitic lime and dolomitic lime) are non-toxic to humans or grass, and will not cause pollution problems.

How Often Needed

An application to bring the soil pH to 6.5 should last 4 to 6 years. Soils tend to revert to their natural acidity levels, and most nitrogen fertilizers used on lawns are acid-forming, gradually decreasing the soil pH. Ammonium nitrate and urea, two commonly used nitrogen fertilizers, break down in the soil to produce nitric acid. Approximately 1 3/4 lbs. of pure lime is needed to neutralize the acidity caused by 1 lb. of nitrogen from either of these fertilizers. In a yearly fertilization program where a total of 4 lbs. of nitrogen is applied per 1000 sq. ft., approximately 7 1/4 lbs. of pure lime would be needed to neutralize the acidity the nitrogen fertilizer produces. Therefore, the soil should be tested periodically (3 years) and lime applied when needed.

Cost of Lime

When compared with other materials applied to turf, lime is very inexpensive. With limestone, product cost is specified in terms of cost per 50-lb. bag. For an acid soil with a pH of 5.3 to 5.6 about 100 lbs. of lime would be needed per 1000 sq. ft. Total cost for this material would be approximately $2.00 for pulverized lime or $4.70 for the pelletized lime. Assuming the application will last 4 years (a conservative estimate), the yearly cost is $.50 for the pulverized lime and $1.18 for the pelletized lime. This is only 1/3 to 1/10 the cost of fertilizer.

Types of Lime

Lime materials available for purchase are calcitic lime, dolomitic lime, burned lime, hydrated lime, marl, and pelletized lime. However, not all of these are appropriate for use on established lawns.

Calcitic lime is mined from natural limestone bedrock deposits. The soil is bulldozed off the bedrock; holes are drilled in the limestone, and then it is blasted out with dynamite charges. It is crushed to about 1-inch stones then pulverized or ground to screening specifications. Calcitic lime, also called aglime (agricultural lime), has a neutralizing value between 85-100%. In addition to neutralizing soil acidity, calcitic limestone supplies calcium, an essential element for plant growth.

Dolomitic lime is mined in a manner similar to calcitic lime. It has a neutralizing value between 85-109% and supplies both calcium and magnesium for plant growth.

Burned lime (calcium oxide) is also called quicklime or unslaked lime, and is manufactured by roasting crushed lime in a furnace to drive off carbon dioxide. It has a neutralizing value between 150-175%, which is the highest of all liming materials. It is a powdery, caustic material that is difficult to handle because it absorbs water very quickly. When applied, use only on the soil surface and incorporate immediately to prevent the formation of granules or flakes, which decompose slowly.

Hydrated lime (calcium hydroxide) is also called builder's lime or slaked lime, and is manufactured by adding water to burned lime. It has a neutralizing value of between 120-135%. Hydrated lime is a caustic, powdery material and should not be applied to established turf since it can burn.

Marl is mined from deposits that lie below peat bogs. It is calcium carbonate material that was formed by shell deposits or produced in aquatic plants. The material, deposited along with clay and organic debris, is somewhat impure, and has a neutralizing value between 70-90%.

Pelletized lime is finely ground agricultural lime to which a cementing agent has been added to form "pellets." It has been in use for several years, and while it is more expensive, this material is easier to spread than regular liming materials and eliminates the dust problem commonly associated with them. The lime pellets dissolve with a soaking rain or irrigation. If pelletized lime is used for establishing new lawns, apply to the soil surface and water thoroughly before tilling. If intact pellets are incorporated, neutralization will be confined to pockets within the tilled soil since lime moves very slowly in soil.

Watering the Lawn

Excerpts taken from: “Summer Lawn Management: Watering the Lawn”.
Publication Number 430-010.

Why Water The Lawn?

Water composes from 75 to 85% of the weight of a healthy grass plant. It is essential for seed germination, tissue formation, plant cooling, food manufacture, and nutrient absorption and transport. Water loss from a grass plant is greatest under conditions of high light intensity, high temperature, low relative humidity, and windy conditions. Without adequate water, the grass plant can't cool itself and becomes susceptible to wilting, desiccation, and death.

Are some grasses more drought tolerant?

Yes, grasses differ in both their need for water and their drought tolerance. Seedling or recently established lawns (less than 12 months old) have little drought tolerance. Some mature grasses develop deep roots and require less water. Not all of the following grasses are suited to all areas in Virginia. Consult your local Extension Agent for specific information for your area.

Tall fescue when properly managed develops a deep root system and can be very drought tolerant. However, this advantage is lost if grown on shallow or extremely compacted soils.

Kentucky bluegrass can survive extended drought periods by gradually slowing growth, turning straw colored and entering summer dormancy. Once water becomes available again, it can initiate new growth from the crown of each plant.

Perennial ryegrasses have little tolerance to dry conditions and usually do not persist well in non-irrigated areas.

Fine fescues such as creeping red fescue, chewings fescue, and hard fescue tolerate dry periods quite well due to their low water requirements.

Warm season grasses such as Bermudagrass, Zoysiagrass and St. Augustinegrass actually prefer warm conditions and can tolerate most drought conditions due to their deep and extensive root systems.

How much water does my lawn need?

In general, applying one inch of water per week is the recommendation when there is insufficient rainfall during summer drought. An inch of water can be measured by marking the side of a tuna or pet food can placed within the pattern of the sprinkler head. Remember that if nature provides water by rainfall, irrigation may not be needed.

What about too much or too little water?

Over-watered lawns frequently lead to summer fungal diseases, excess blade growth, and the need for more frequent mowing. Excessive watering of lawns also wastes water and increases the risk of fertilizer and pesticide run-off from the lawn to paved surfaces. This could negatively impact local water quality.

Lawns that receive little to no water from irrigation or rainfall during summer months will go dormant. Grass blade coloring will lighten. Most lawns will recover when water returns. During a severe drought, the grass may die; fescue grass may require overseeding in the fall while warm season grass may require overseeding or resodding in the spring. This may be acceptable to those looking to conserve water during summer months.

Tips for better watering

- Deep and infrequent watering maintains a healthy root system and reduces weed infestation (as opposed to light and frequent irrigation, which promotes shallow roots and germination of weed seeds).
- Applying one inch of water is often difficult to achieve in a single watering given the slow infiltration rate on most Virginia soils. Therefore, smaller amounts of water applied every 3 to 4 days may be required to allow water to enter the soil without causing runoff.
- Water is best applied early in the day (5 to 10 a.m.) when evaporation loss is lowest. Afternoon watering is acceptable but wind may affect uniformity. Night watering minimizes evaporation, but may increase fungal diseases. Consider that numerous automatic sprinklers all running during periods of high household use (early morning) may place extreme demands on a community's water system.
- Water the lawn, not driveways, sidewalks, or roads, by adjusting sprinkler heads.
- Mow your cool season grass at a height of 3 inches during the summer. Longer grass blades increase the depth of the root system, shade the soil, and help drought tolerance.
- Mow your warm season grass at a height of 1.5 inches during the summer.
- If your current grass is not drought tolerant, consider replacing it with one that is. Contact your local Extension Office for recommendations.
- Precondition your cool season lawn for summer by applying fertilizer in the late summer or early fall, avoiding spring applications. This favors root growth and better drought tolerance. Lush, over-fertilized lawns require more water.
- Remember that newly sodded or seeded lawns require more frequent watering (for the first 3 to 4 weeks), than do well established (older than 12 months) lawns.
- Keep your mower blade sharp.
- Annual core aeration can loosen compacted soil and allow water to infiltrate deeper into the ground.

What about sprinklers?

Look for sprinklers that keep water close to the ground rather than sending a fine mist or spray high into the air. This will help reduce evaporation as well as keep the water on the lawn. Check for uniform water distribution and overlap so that dry spots don't develop.

Aerating Your Lawn

Authors: Marc Aveni, Extension Agent, Prince William County; and David Chalmers, Extension Agronomist.
Virginia Tech Publication Number 430-002

What is lawn aeration?

Lawn aeration involves the removal of small soil plugs or cores out of the lawn. Although hand aerators are available, most aeration is done mechanically with a machine having hollow tines or spoons mounted on a disk or drum. Known as a core aerator, it extracts 1/2 to 3/4 inch diameter cores of soil and deposits them on your lawn. Aeration holes are typically 1-6 inches deep and 2-6 inches apart. Other types of aerators push solid spikes or tines into the soil without removing a plug (spiking). These are not as effective because they can contribute to compaction. Core aeration is a recommended lawn care practice on compacted, heavily used turf and to control thatch buildup.

What will aeration do for my lawn?

As lawns age or sustain heavy use from play, sports activities, pets, vehicle traffic and parking, soil compaction can result. Soil compacting forces are most severe in poorly drained or wet sites. Compaction greatly reduces the pore space within the soil that would normally hold air. Roots require oxygen to grow and absorb nutrients and water. Compaction reduces total pore space and the amount of air within the soil. It has a negative impact on nutrient uptake and water infiltration, in addition to being a physical barrier to root growth. This results in poor top growth and lawn deterioration. Core aeration can benefit your lawn by:

- Increasing the activity of soil microorganisms that decompose thatch.
- Increasing water, nutrient and oxygen movement into the soil.
- Improving rooting.
- Enhancing infiltration of rainfall or irrigation.
- Helping prevent fertilizer and pesticide run-off from overly compacted areas.

How do I know if I need to aerate?

If in doubt about aeration, remove a square foot section of lawn at least 6 inches deep. If grass roots extend only into the first 1-2 inches, your soil may be compacted and could benefit from core aeration. Expect a seasonal effect with cool-season grass roots being shortest in late summer and at their greatest depth in late spring.

Other reasons to aerate include:

- Your lawn is heavily used or driven upon on a regular basis, causing the turf to thin or look unhealthy.
- The thatch layer is in excess of 1/2 inch.
- You have a heavy clay soil.

Is there any reason not to aerate?

A lawn that is not exposed to soil compacting events will likely grow well and may not need aerification. Winter freezing and thawing cycles and earthworm activity can help loosen slightly compacted soils. If the lawn has a thatch layer in excess of 1/2 inch, then core cultivation can be used as a preventative approach to control excess thatch build up. Newly seeded or sodded lawns should not be aerated in the first year.

When should I aerate?

In Virginia, the best time to aerate cool season lawns of tall fescue and Kentucky bluegrass is in late August to mid September. This is when these lawns are coming out of summer dormancy and beginning a period of vigorous growth. Lawns will recover quickly from aeration at this time. Competition from weeds is also minimal during this time. Warm season lawns like Bermudagrass and Zoysiagrass are best aerated during June and July, as this is their period of rapid growth.

Where can I get an aerator?

Aerators may be rented at many garden or rental centers. Some lawn or landscape companies will perform the service for a fee. Be sure that the machine has hollow tines or spoons to bring the soil core to the surface. Look for machines with deeper tines and weight over the tines for better penetration into the soil. Busy rental times include most spring and fall weekends; reserve early or plan on weekday use. These machines are large and heavy; they will require special handling and larger vehicles for transport. Many people cooperate with neighbors and make it a group effort, thereby also lowering the overall cost. If renting, be sure you are instructed in and comfortable with the operation of the machine before bringing it home.

How do I aerate?

- The soil should be moist but not wet.
- Lawns should be thoroughly watered two days prior to aerating, so tines can penetrate deeper into the soil and soil cores easily fall out of the tines.
- If aerating after prolonged rainfall it is important to wait until the soil has dried somewhat so soil cores do not stick in the hollow tines.
- Thorough watering means 1 inch of water from irrigation or rainfall. An inch of water can be measured by marking the side of a pet food can and placed in the lawn.
- Applying 1 inch of water may be difficult to achieve in a single watering, given the slow infiltration rate on most Virginia soils. Therefore, smaller amounts of water applied every 3 to 4 days may be required to allow water to enter the soil without causing runoff.
- Aerate the lawn in at least two different directions to insure good coverage. Be careful on slopes, especially steep ones, as well as near buildings and landscape beds.

What else do I need to know?

- Aeration helps to control thatch.
- It is extremely difficult to core aerate heavy clay soils or soils that have stones, rocks or tree roots below the soil surface.
- Be sure to mark sprinkler heads, shallow lines from sprinkler, underground utilities, cable, and septic lines before aerating so they will not be damaged. Call 811or visit VA811.com before you dig.
- Soil cores are best left on the lawn surface; they typically work back into the grass in 2-4 weeks.
- Lawns may be fertilized and seeded immediately following aeration with or without further soil top dressing.
- If your soil is heavily compacted, you can apply mature compost 1/4 inch deep. Rake the compost over the lawn, filling the aeration holes.
- Lawns can be aerated once a year, especially under heavy use conditions.
- The best way to incorporate compost into the soil is through aeration. A good method of incorporation is to apply the compost first, followed by several passes with an aerator equipped with hollow-tines and a heavy drag mat attached. The drag mat will break-up the cores and mix the compost with the soil, dragging some of the mix back into the holes. This operation is best performed during cool/moist seasons when grass is actively growing. Aeration and dragging can be stressful to the turf during hot, dry weather.

Anything else I can do?

Contact your local Virginia Cooperative Extension office and speak with an Extension Agent or Master Gardener volunteer for more advice and information on upcoming lawn and landscape classes and seminars in your area.

Turf Alternative Ground Covers

Excerpts taken from: "Selecting Landscape Plants: Ground Covers"
Virginia Tech Publication Number 426-609

Ground covers are low-growing plants that spread quickly to form a dense cover. They add beauty to the landscape and, at the same time, help prevent soil erosion. Grass is the best known ground cover, but grass is not suited to all locations. Other ground cover plants should be used where grass is difficult to grow or maintain.

Unlike grass, most ground cover plants cannot be walked on. They can be used effectively to reduce maintenance work and to put the finishing touch on any landscaping project.

Location

Ground covers can be found to fit many conditions, but they are used most frequently for the following locations:

- ♦ Steep banks or slopes
- ♦ Shady areas under trees and next to buildings
- ♦ Under plantings in shrub borders and beds
- ♦ Where tree roots grow close to the surface and prevent grass from growing
- ♦ Very wet or very dry locations

When planted under trees, ground covers reduce the possibility of mower damage to the base of the tree. Some ground covers may be used to protect the roots of shallow-rooted trees. They shade the soil and keep it from drying out rapidly. Some ground covers don't require as much moisture and nutrients as grass. Therefore, they are in less competition with trees and shrubs.

Selection

Selection of a suitable plant for ground cover depends on the area where it will be grown. Some ground cover plants prefer partial shade; others thrive in deep shade or full sun; and a few grow well in either sun or shade. The selected ground cover plants listed on the following page grow well in a wide variety of soil types. Some, however, prefer moist soil, while others need dry or well-drained soil. All the ground covers discussed are reliably cold hardy throughout Virginia. First, select ground cover types that are best suited to the existing conditions where the ground cover is needed. Then from these, choose one that ornamentally compliments surrounding plantings.

Establishment

Bed preparation: If you need to add a soil amendment, such as organic matter or fertilizer, add it to the entire planting bed, not just to individual planting holes. Organic materials, such as leaf mold, compost, or well-rotted manure, improve drainage in clay soils and improve water-holding capacity of sandy soils. Eight to ten bushels of organic materials per 100 square feet incorporated into the bed may be necessary in very poor or heavy soils.

In open sites: A well-prepared planting bed is necessary to develop a dense, healthy ground cover planting. The soil should be worked to a depth of 6 to 8 inches. Take care to eliminate perennial weeds and grass that might compete with the ground cover during establishment.

In sites under trees: When establishing a ground cover under existing trees, choose shallow-rooted plants, such as hostas. Since the majority of fibrous tree roots are found in the top 12 inches of soil, prepare the soil for planting only 2 or 3 inches deep to minimize disturbance of these roots and prevent damage to the tree.

Most ground cover plants can be planted any time during the growing season, but either spring or fall is preferred.

The arrangement and spacing of plants in the planting bed depends on the growth characteristics of the plant. Space plants so they will develop a uniformly covered area in a relatively short period of time. Plant in staggered rows, not straight lines, to get faster coverage. (Fig. 1)

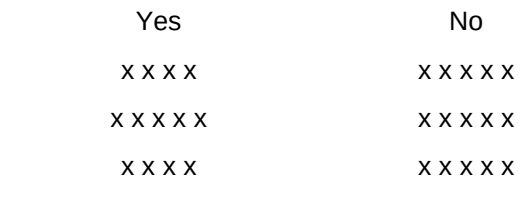


Figure 1: Arrangement of plants in bed

Plants that spread rapidly may be spaced much wider than slow-spreading types. Spacing also depends on how many plants you can purchase and how quickly a complete cover is wanted. Spacings from 6 inches to 2 feet are most frequently used. For example, if plants are spaced 4 inches apart, 100 plants will cover about 11 square feet.

Watering, weeding, mulching, and feeding will be the main requirements of the new ground cover planting. Water during dry periods. An occasional thorough soil soaking is better than frequent light waterings. Occasional hand weeding with a minimum disturbance of the soil may be necessary. A 1- to 2-inch mulch layer of leaf mold, compost, or similar organic material will conserve soil moisture and reduce weed growth.

Selected Ground Cover Plants

Groundcover	Growth Rate	Height in Feet	Soil Conditions	Required Light
Ajuga, bugleweed	medium	0.2	moist	shade, part shade
Christmas fern	slow	2.0 – 3.0	moist	shade
Creeping juniper	fast	1.0 - 1.5	dry - moist	full sun
Holly fern	slow	1.5 – 2.5	dry - moist	shade - sun
Hosta *	medium	0.5 – 2.0	moist - wet	shade, part shade
Liriope *	medium	1.0	dry - moist	shade - sun
Mondo grass	slow	0.4	dry - moist	shade - sun
Ornamental grasses *	various	1.0 – 10.0	dry - wet	full sun
Pachysandra	medium	0.4	moist	shade, part shade
Periwinkle	fast	0.2	dry - moist	shade - sun
Sedum *	medium	0.1 – 2.0	dry	full sun (part-shade)

*Many varieties