



## LAWN ESTABLISHMENT IN VIRGINIA

This publication will explain the importance of each of the steps involved in lawn establishment. These steps or principles are similar whether planting seed, sod, sprigs or plugs. They are also important in renovating a lawn of poor quality or in just repairing isolated areas. Every effort should be made, where applicable, to use the guidelines explained herein. Taking short cuts during the establishment phase often can result in a poor quality lawn.

The steps to consider in successful turfgrass establishment are:

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## TURFGRASS SELECTION

Proper turfgrass selection is one of the most important factors to be considered in the success of a home lawn. It is not a task to be taken lightly since all species and varieties will not perform equally when placed in the wide diversity of climates, soils and management programs that are found in Virginia. There are two distinct environments to consider in growing turfgrasses in Virginia: 1) the Northern Piedmont and areas in and west of the Blue Ridge Mountains, and 2) the Southern Piedmont and Eastern Virginia.

In the Northern Piedmont and areas in and west of the Blue Ridge Mountains, the cool-season species of Kentucky bluegrass or tall fescue will produce the best year-round turf on home lawns. The performance of a Kentucky bluegrass lawn is improved if two or three varieties are blended together. Many seed companies package such blends. Zoysiagrass can also be used in this area but it may be objectionable because it is a warm season species and will go dormant, turning brown, at the first hard frost in fall and remaining brown until late spring when it starts to regrow. Improved cultivars of zoysiagrass must be established vegetatively from plugs or sod.

Other cool-season turfgrasses that are used for special purposes are creeping red fescue and perennial ryegrass. Creeping red fescue has the best shade tolerance of all the cool-season grasses. For this reason, it is often included in a mixture with Kentucky bluegrass varieties. Perennial ryegrasses can sometimes produce an acceptable turf under certain circumstances; however, they are predominantly used as a nurse grass during establishment when small amounts (less than 20%) are included in a Kentucky bluegrass mixture. When used in this manner, the perennial ryegrasses (which germinate quickly) will help to stabilize the soil until the slower developing Kentucky bluegrass can become established.

Tall fescue, bermudagrass, and zoysiagrass are best adapted species for lawn use in the Southern Piedmont and Eastern Virginia. Bermudagrass and zoysiagrass are warm-season grasses and will go dormant at the first killing frost in the fall. All of the improved varieties of bermudagrass must be vegetatively propagated from sprigs, plugs, or sod. Only common bermudagrass can be seeded. Selection of a winter hardy cultivar is extremely important, especially as one gets further north or further inland. The rank for recommended bermudagrass varieties for winter hardiness would be as follows: Midiron  $\geq$  Vamont > Tufcote > Tifway > Common.

### Selecting adapted turf varieties

Care should not only be taken in choosing a turfgrass species (i.e., Kentucky bluegrass, tall fescue, creeping red fescue, perennial ryegrass, zoysiagrass, and bermudagrass) but also in choosing between varieties for each species. Some turfgrass varieties perform better than others under Virginia conditions. Therefore, deciding what variety to purchase is an important consideration for the homeowner. To simplify matters for the homeowner in purchasing turfgrass seed, the Extension Divisions of Virginia Tech and the University of Maryland have developed a seed-labeling system for Kentucky bluegrass and tall fescue seed.

By purchasing seed which has one of the two Virginia-Maryland labels affixed to the package, the homeowner is assured of buying seed mixtures or blends which comply with the quality standards and the variety recommendations of the Extension Divisions of Virginia Tech and the University of Maryland. This seed is inspected and certified by the Virginia Crop Improvement Association to not contain serious weed contaminants and to include only certified varieties that have been recommended by both institutions. Before being recommended, varieties undergo at least 3 years of performance testing in both states. Seed packages with a burnt orange label contain a high quality blend of improved Kentucky bluegrass varieties, while seed packages with the yellow label can contain some improved Kentucky bluegrasses, common Kentucky bluegrasses, and creeping red fescue for shade tolerance. The green tall fescue label indicates the package contains certified and recommended tall fescue varieties or tall fescue-Kentucky bluegrass mixtures.

Refer to the Virginia Cooperative Extension publication entitled "Species and Mixtures for Lawns, Playgrounds, and Parks in Virginia" for the latest turfgrass variety recommendations for Virginia.

#### Establishment methods and turf selection

Lawns can be established by seed, sod, sprigs, or plugs. Seed and sod establishment are commonly understood. However, sprigging and plugging are unfamiliar to most homeowners. Therefore, before selecting a turfgrass one should be familiar with the establishment options available. Sprigging is commonly used to plant bermudagrass. Sprigs or vegetative plant parts (stolons and rhizomes) can be purchased or can be obtained by thoroughly shredding a piece of sod. Sprigs are perishable and should be planted within 24 to 48 hours of harvesting. Plugging is the vegetative propagation of turfgrasses by planting plugs or small sod pieces. The method of planting will depend upon the type of grass, time of year, and your location in Virginia. Table 1 lists the establishment options for Virginia.

Table 1. Lawn establishment options commercially available in Virginia

Grass	Seed	Sod	Sprigs	Plugs
Kentucky bluegrass	Yes	Yes	No	No
Tall fescue	Yes	Yes	No	No
Bermudagrass	Yes*	Yes	Yes	Yes**
Zoysiagrass	No *	Yes	Yes***	Yes
Perennial ryegrass	Yes	No	No	No

\*Only common bermudagrass and common zoysiagrass can be seeded. The more winter hardy varieties of zoysiagrass (Meyer) and the improved varieties of bermudagrass (i.e., Midiron, Vamont, Tifway, and Tufcote) must be sprigged, sodded or plugged.

\*\*Not the preferred method of establishment.

\*\*\*Successful establishment is difficult.

## DECIDING WHEN TO PLANT

Turfgrasses are best established under the right growing conditions. There are certain periods of the year when temperature, moisture, and day-length are most favorable for establishing cool-season and warm-season grasses. Cool-season turfgrasses (i.e., Kentucky bluegrass, tall fescue, fine fescue, and perennial ryegrass) are best seeded in late summer or early spring. Late summer seedings give the greatest chance for success and are preferred. Warm season turfgrasses (bermudagrass and zoysiagrass) are best established from May to July. The following table gives the approximate best establishment dates for the two distinct environments in Virginia.

Table 2. Periods that offer the best chance in the establishment success for cool- and warm-season grasses in the two distinct environments in Virginia.

Area of Virginia	Cool season grasses <sup>1</sup>		Warm-season grasses <sup>2</sup>			
	Seed	Sod*	Seed	Sod	Sprigs	Plugs
Northern Piedmont and areas in and west of the Blue Ridge	August 15 to September 15 or March to early April	Anytime soil is not frozen	NR	June 1 to July 15	June 1 to July 1	June 1 to July 1
Southern Piedmont and Eastern Virginia	September 1 to October 15 or February and March	Anytime soil is not frozen	a) Hulled bermudagrass: May to July 15 b) Unhulled bermudagrass: Late fall or winter prior to growing season	Late May to August 15	Late May to July 15	Late May to July 15

<sup>1</sup>Cool-season grasses = Kentucky bluegrass, tall fescue, fine fescue and perennial ryegrass.

<sup>2</sup>Warm-season grasses = Bermudagrass and zoysiagrass.

\* Sodding cool-season grasses during the warmest part of the year (i.e., July and August) can reduce the chance of successful establishment unless judicious watering is practiced.

NR = Not Recommended for this area.

## THE SOIL TEST

Soil testing will determine whether the soil pH and nutrient (phosphorus, potassium, calcium and magnesium) levels are in a range that favor turf growth. The soil test report will indicate how much fertilizer or lime needs to be applied. Lime and fertilizer applications work best when they can be mixed into the upper 4 to 6 inches of the soil. Soil sample boxes and soil analyses are available through your local office of the Virginia Cooperative Extension Service.

## CONTROLLING PERENNIAL GRASSES AND BROADLEAF WEEDS

Undesirable perennial grasses (i.e., quackgrass, nimblewill, bermudagrass, orchardgrass, and fescue) should be controlled prior to tilling the soil. This is essential in order to eliminate their competition with new grass plants as well as to enhance the quality of the new lawn. If left uncontrolled, they detract from the appearance of the lawn and cannot be selectively removed with herbicides after the turf is established. These perennial grasses along with broadleaf weeds can be controlled with dalapon (Dowpon) or glyphosate (Roundup, Kleenup) as directed in the labeling of the formulation. Dalapon is biodegraded in the soil but it is only safe to plant the treated area 30 to 45 days after the last application. Glyphosate has no soil residual and planting is recommended 7 days after spraying.

For further information regarding weed control refer to Virginia Cooperative Extension Service publication 427-045 entitled "Lawn Weed Control" or publication 456-013 entitled "Pest Management Guide for Turfgrass." Always follow label directions when using any pesticide.

## SOIL GRADING AND TILLAGE

It is advisable to plan to completely till the soil to a depth of 4 to 6 inches where: 1) soil compaction is severe; 2) large amounts of phosphorus or lime are recommended; 3) surface drainage is inadequate; or 4) the soil is to be modified. If the area is to be graded to establish surface contours, save the topsoil by moving it to one side, stockpiling it for later use.

The subgrade should slope away from buildings and the area should be allowed to settle through two or more rains before planting. This will help determine the location of areas that need fill. All building debris and large rocks should be removed from the site. If the topsoil has been stockpiled it should be spread uniformly over the entire lawn area. Ideally, there should be a minimum of 8 to 10 inches of topsoil. Avoid putting topsoil over a hard, compacted soil. Where topsoil is limited, mix the available topsoil into the upper inch of subsoil by tilling to reduce layering.

Once the soil is in place, care must be taken not to disturb the prepared soil to the extent that deep footprints or wheel tracks persist. These depressions give an uneven appearance and inhibit sod rooting if the soil does not come into contact with the sod.

## SOIL MODIFICATION

In certain instances where the physical properties of the available topsoil are not adequate for plant growth, soil modification may be advisable. Most commonly, sand or organic matter are used to modify soil in Virginia. Organic matter is used to improve soil aeration, water retention and nutrient holding capacity. Sand is used to improve water infiltration and aeration and reduce compaction problems. Refer to the following sections if considering soil modification.

Organic matter amendment

Organic matter materials that can be used include composted sludge, sawdust, composted leaves, farm manure, and sphagnum or hypnum peat moss. The most critical factors for successful use are amount and proper incorporation. All materials should be incorporated to a 4 to 6 inch depth. Table 3 lists the suggested rates of application of some common soil amendments.

Table 3. Soil amendments and their rate of application of incorporation into turfgrass soils.

Material	Volume per 1000 sq. ft.	Depth before incorporated to 4 to 6 inches
	Cubic Yards	-----inches-----
Composted Sludge**	3 to 6	1 to 2
Sawdust*	3 to 6	1 to 2
Composted Leaves	3 to 6	1 to 2
Peat or Sphagnum	3	1
Rotted Farm Manure**	3	1

\*Additional nitrogen will be required with the use of sawdust.

Incorporate 40 lbs of 10-10-10 per 1000 sq. ft. with the sawdust in lieu of standard fertilization recommendations.

\*\*With composted sludge and farm manure, do not apply additional nitrogen at establishment.

Sand amendment

Sand modification is only recommended in those instances where drainage is poor or compaction excessive. It is commonly used on golf course putting greens. However, due to the high cost of proper modification and the need for exact specifications it is rarely used to modify soil in home lawns. When used, any sand amendment must provide a final mixture containing at least 75% of a medium sized sand to provide improved aeration. Modification below this level will actually decrease aeration pore space in the soil and decrease turf quality. Turfgrasses grown in a soil that has been extensively modified with sand will likely require more frequent irrigation and fertilization.

## FERTILIZATION AND LIMING

Apply the amounts of fertilizer and lime recommended by the soil test and work these amounts into the upper 4 to 6 inches of soil. In the absence of a soil test the following recommendations often give good results:

Lime

Most of the soils in Virginia are below the pH at which turfgrasses perform best. Lime should be applied and incorporated to 4 to 6 inches to bring the soil pH up to 6.2. About 100 lbs of ground limestone per 1000 sq. ft. will raise the pH approximately 1 unit on loam soils. Sandy soils require less lime than clay soils. If a soil test analysis has not been made, or the lawn area has not received lime in 18 months, apply 80 lbs of ground limestone per 1000 sq. ft. of lawn area.

Fertilizer

Apply the following nutrients if a soil test analysis has not been made. Incorporate these nutrients to a depth of 4 to 6 inches.

1 1/4 to 2 1/2 lbs of actual nitrogen (N) per 1000 sq. ft.

3 1/2 to 5 lbs of phosphate ( $P_2O_5$ ) per 1000 sq. ft.

1 1/2 to 3 1/2 lbs of potash ( $K_2O$ ) per 1000 sq. ft.

Note 1: Use the lower rate of nitrogen when sodding Kentucky bluegrass or tall fescue from January to September 1. These nutrients need not be applied separately, but can be and usually are applied in the form of a complete fertilizer. A complete fertilizer is one that contains nitrogen (N), phosphate ( $P_2O_5$ ) and potash ( $K_2O$ ). Examples of complete fertilizers that furnish these nutrients within the above ranges are:

25 to 50 lbs of a 5-10-5 fertilizer per 1000 sq. ft.

12 1/2 to 25 lbs of a 10-20-10 fertilizer per 1000 sq. ft.

Also, many commercial fertilizer companies manufacture "starter-type" fertilizers specially formulated to contain the higher amounts of phosphate that are required by turfgrass seeds during establishment.

Note 2: Use the lower rate where the soil has only been surface tilled in the upper 1 to 2 inches.

## FINAL SOIL PREPARATION

After the fertilizer and lime have been worked into the soil, the soil should be firmed by rolling before seeding, sodding and plugging. It is not desirable to pulverize the soil. The best soil condition for seeding has a granular texture with small clods of soil varying from 1/8 inch to 3/4 inch in size. However, if the area is to be sprigged the soil should remain loose in the upper 2 to 3 inches so a portion of each sprig can be set (pushed) into the soil.

## PLANTING SEED, SOD, SPRIGS, AND PLUGS

Seeding

Turfgrasses used for lawns should be sown at the following rates.

Turfgrass Species -----	Seeding Rate lbs/1000 sq. ft. -----
Kentucky bluegrass	2 to 3
Tall fescue	4 to 6
Fine fescue	3 to 5
Perennial ryegrass	3 to 5
Bermudagrass (hulled)	1 to 1 1/2
Bermudagrass (unhulled)	5 to 10

Sow half of the seed in one direction and the other half in a direction perpendicular to the first. Insure good seed-soil contact by lightly raking and then rolling the seedbed. A finished seedbed should have a majority of the seed in the upper 1/2 inch of soil. It should not be smooth, but have shallow, uniform depressions or rows approximately 1/2 inch deep and 1 to 2 inches apart as are made by a fan-type rake or corrugated roller.

Sodding

Sod of cool-season grasses can be installed anytime during the year as long as the soil is not frozen. However, during the hot summer days, the soil should be dampened just prior to laying the sod to avoid placing the turf roots in contact with excessively dry and hot soil. Before ordering or obtaining the sod be sure you are prepared to install it and have adequate irrigation capability. Sod is perishable; it should not remain on the pallet or stack longer than 36 hours. The presence of mildew and distinct yellowing of the leaves is usually good evidence of reduced turf vigor.

To reduce the need for short pieces when installing sod, it is generally best to establish a straight line lengthwise through the lawn area. The sod can then be laid on either side of the line with the ends staggered as when laying bricks. A sharpened concrete trowel is very handy for cutting pieces, forcing the sod tight and leveling small depressions. Immediately after the sod is laid, it should be rolled and kept moist until the sod is well-rooted into the soil. Newly transplanted sod should be watered immediately to wet the soil below to a 3 inch depth to enhance rooting. During the 2 to 3 week establishment phase, sod should be watered daily to maintain this soil moisture.



### Seed vs. Sod

A quality lawn containing recommended mixtures and species can be established with either seed or sod. Both seed and sod of Virginia-Maryland recommended varieties are available to Virginia residents.

Initially, seed is less expensive than sod. However, successful establishment is more risky with seed than with sod, and often when reseeding areas where erosion is likely, overall expense may be less with sod. Sodding nearly eliminates the chances for failure where erosion is a concern.

Sodding saves establishment time and provides an immediately functional and aesthetic turf where weed infestations will not be an immediate problem. When using seed, a weed control program must be implemented to reduce the weed competition. Sod offers less time limitations in that it may be established during any season, even in summer, if irrigation is available.

### Sprigging and Plugging

The best quality and environmentally adapted bermudagrass and zoysiagrass varieties must be planted vegetatively using sprigs or plugs.

Sprigs can be either broadcast over an area and covered lightly with soil (by discing or by using a sprig setter) or can be individually row planted on 6 to 12 inch centers. In either case, a portion of each sprig should be partially buried or "set" with another portion of the sprig being left exposed at the soil surface. Sprigs are often purchased by the bushel. One bushel of sprigs is composed of approximately one square yard of sod that has been shredded to yield sprigs. The sprigging rate can range from 2 to 10 bushels of sprigs per 1000 sq. ft. depending upon the speed of coverage desired.

Plugs of zoysiagrass are available and are 1 to 2 inches in diameter and contain 1 to 2 inches of soil. The plugs should be fitted tightly into prepared holes and tamped firmly into place. Plugs are normally planted on 6 or 12 inch centers. However, closer spacings will speed establishment. Establishment by plugs planted on 12 inch centers will require 1000 plugs per 1000 sq. ft. while planting on 6 inch centers will require 4000 plugs per 1000 sq. ft. of lawn area.

Zoysiagrass plugs planted on 6 inch centers will require at least two growing seasons for complete coverage. Zoysiagrass can also be sprigged but its establishment success using sprigs is not common.

## POST PLANT CARE

### Watering

Turfgrass seed, sod, sprigs or plugs all need water, either in the form of irrigation or natural rainfall, to survive the establishment process and grow into a mature lawn. Naturally, more frequent watering will be needed under dry conditions. Use the following guidelines for each planting method.

SEED OR SPRIGS: Water lightly and frequently so the seed or sprigs do not dry out. The goal is to water often enough to keep the seedbed moist but not saturated, until the plants can develop sufficient root systems to take advantage of deeper and less frequent watering.

SOD OR PLUGS: Watering should be heavy enough to wet the soil underneath the sod or plugs to ensure rooting into the prepared soil. Water often enough so the sod or plugs never dry out.

### Mulching

Mulching is a common practice used on newly seeded turf areas. It conserves moisture from rainfall or irrigation and prevents crusting of the soil surface. If water is applied frequently, as outlined above, then mulch is not necessary. If frequent watering is a problem, or watering is impractical, a newly seeded area should be mulched. Bermudagrass or zoysiagrass sprigs should not be planted without adequate irrigation, as previously outlined.

The most common mulch is straw. However, it is important to avoid using straw containing objectionable, difficult-to-control weeds. The most effective straw mulching rate is from 80 to 100 lbs (1 1/2 to 2 bales) per 1000 sq. ft. Straw can be removed when the turf reaches a height of 1 to 1 1/2 inches, or can be left to decompose if not too dense.

Other mulches are available, such as jute and wood fiber mulches. The latter is commonly used when hydroseeding.

### Weed Control

There are two basic types of weeds that invade newly seeded, sprigged or plugged turf that can be selectively controlled with herbicides. Broadleaf weeds can be a problem in spring, summer or fall plantings. Annual grassy weeds are a problem in spring and summer plantings.

Broadleaf weed seedling control in a newly seeded turf can be accomplished after the grasses emerge but before the broadleaf weeds are past the 3-leaf stage of growth as rosettes or are greater than 1 inch in diameter. At this stage they can be controlled with bromoxynil. After the turf has matured enough to have been mowed two to four times, other broadleaf herbicides (2,4-D, Dicamba, 2,4-D + Dicamba, Mecoprop, 2,4-D + Mecoprop, 2,4-D + Mecoprop + Dicamba, or 2,4-D + Dichloprop) can be used without damage to the young turf.

Annual grasses such as crabgrass, barnyardgrass and foxtails can be effectively controlled with the preemergence herbicide Siduron (Tupersan) applied at the time of spring planting for newly established lawns. A second application, one month after the first, is usually needed to maintain a desirable level of crabgrass control during the summer. Siduron should not be used on bermudagrass lawns. Control of these annual grasses in a fall seeding is generally not necessary as they will be killed by the first heavy frost.

Note: Refer to Virginia Cooperative Extension publication 427-045 entitled "Lawn Weed Control" or publication 456-013 entitled "Pest Management Guide for Turfgrass" for current recommendations. Always follow product labels for rates and timing of treatments.

Mowing

Allow the turfgrass plant to reach a height that is 1/3 greater than the desired mowing height for turfgrass maintenance before beginning to mow. The recommended mowing heights for turfgrasses commonly used in lawns are as follows:

Kentucky bluegrass	1 1/2 to 2 1/2 inches
Tall fescue	2 to 3 inches
Perennial ryegrass	1 1/2 to 2 1/2 inches
Bermudagrass	1/2 to 1 inch
Zoysiagrass	1/2 to 1 inch

Higher mowing heights usually benefit cool-season grasses during summer stress periods. Sharp mowers are essential. Dull mowers can dislodge young seedlings from the soil.

Fertilization

Ninety days after a cool-season lawn is planted, begin to follow a maintenance fertilization program. For warm-season grasses, begin to follow a maintenance fertilization program 30 days after planting. Refer to Virginia Cooperative Extension publication 430-011 entitled "Lawn Fertilization in Virginia" for fertilizer rates and application timing for established cool-season and warm-season lawns.

Prepared by: D. R. Chalmers, Extension Agronomist, Turf  
 J. R. Hall III, Extension Agronomist, Turf  
 R. E. Schmidt, Associate Professor, Agronomy

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## KEYS TO PROPER USE OF PESTICIDES

1. Read the label on each pesticide container before each use. Follow instructions to the letter; heed all cautions and warnings, and note precautions about residues.
2. Keep pesticides in the containers in which you bought them. Put them where children or animals cannot get to them, preferably under lock and away from food, feed, seed, or other material that may become harmful if contaminated.
3. Dispose of empty containers in the manner specified on the label.

SEE YOUR DOCTOR IF SYMPTOMS OF ILLNESS OCCUR DURING OR AFTER  
 USE OF PESTICIDES

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VIRGINIA POLYTECHNIC INSTITUTE  
AND STATE UNIVERSITY  
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