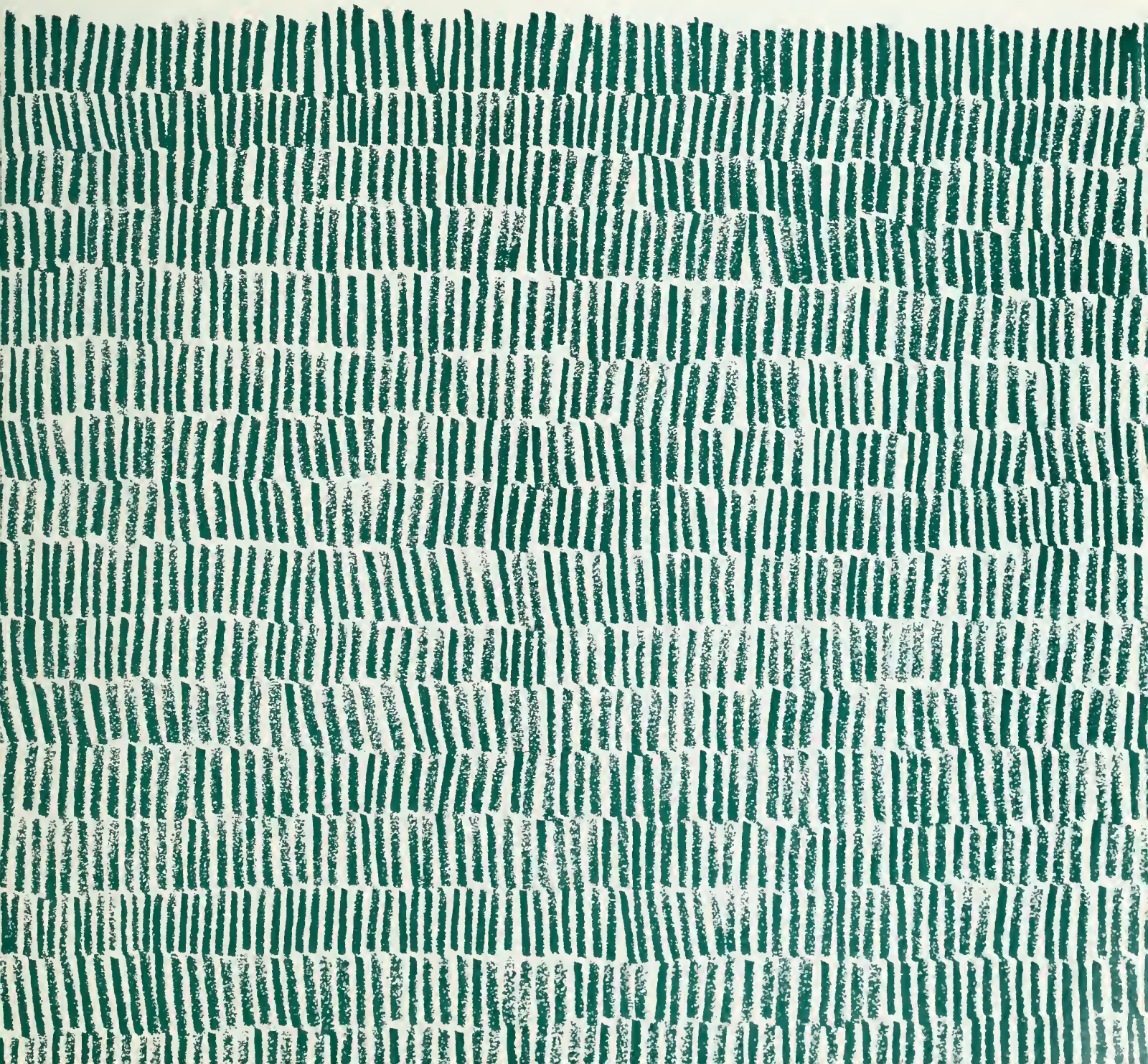
LAWN ESTABLISHMENT

University of Illinois at Urbana-Champaign
College of Agriculture • Cooperative Extension Service

Circular 1066



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An attractive lawn is generally the result of proper mowing, watering, fertilization, and other practices in the maintenance schedule. Many problems encountered in caring for a lawn can be avoided or reduced by paying close attention to certain procedures when the lawn is established. The following steps are important in developing a new lawn:

- Control weedy perennial grasses such as quackgrass and bentgrass.
- Rough-grade the area to be planted so that it has the desired slope and uniformity of surface.
- Make soil modifications if needed.
- Apply lime and "basic" fertilizer (see page 4) if soil test results indicate deficiencies.
- Plow, rototill, disc, or otherwise work the soil to a depth of 6 inches.
- Remove stones and other debris.
- Smooth-grade the area to achieve a uniform surface free of depressions and high spots.
- Apply "starter" fertilizer and rake it into the soil surface.
- Plant seed, sod, or other vegetative materials.
- Rake the seedbed lightly, allowing some seed to remain on the surface.
- Mulch the seedbed with weed-free straw or other suitable material.
- Water the seedbed and keep it moist until plant growth is well established.

Preparing the Site

Perennial weedy grasses such as bentgrass and quackgrass will reappear and detract from the appearance of the new lawn if they are not controlled prior to establishment. Herbicides suitable for eliminating undesirable grasses include dalapon and amitrole, which may be used separately or in combination. A single application may be adequate to control most perennial grasses. Quackgrass, however, may require several applications: till the area three to four weeks after the initial treatment and reapply the herbicide soon after regrowth occurs; wait at least four weeks after the last herbicide treatment before planting so that herbicide residue will not impede development of the new lawn.

If the area requires extensive grading, remove the topsoil and stockpile it nearby; the underlying subsoil can then be shaped to the desired contour. Generally, a 2- to 3-percent slope away from buildings is recommended for proper surface drainage. Steep slopes should be avoided if possible, since it is difficult to establish and maintain lawn turf on these areas. After rough grading, redistribute the topsoil uniformly over the site.

Extensive soil-moving operations — especially those related to installing drainage, sewer, and water lines — may result in uneven settling and, consequently, a nonuniform surface. After such operations be sure to allow enough time for the soil to settle. Careful packing and several thorough waterings will help the settling process.

Modifying the Soil

Turfgrasses can survive and persist on almost any soil, provided nutrients, water, and aeration are adequate. A sandy loam to loam soil, however, is preferred since turfgrass quality is generally better and management requirements are less stringent. An existing soil may be considered unsuitable because of poor drainage (as in clayey soils) or poor water- and nutrient-retaining capacity (sandy soils). On turfed soils subjected to heavy traffic, resistance to compaction is a highly desirable characteristic. Most soils can be modified to improve their physical properties significantly.

To improve aeration and drainage and to reduce the potential for compaction, soils high in clay may be diluted with organic matter (peat, rotted sawdust, etc.), sand, or other coarse aggregates such as calcined clay. A fibrous peat (sphagnum) is preferred over muck, as the latter frequently contains large amounts of dispersed clay and silt that may clog soil pores and actually reduce drainage and aeration. Sand should be used to amend an existing soil only if enough sand is available to make a resulting mixture that is at least 50 to 80 percent sand. Smaller quantities may actually do more harm than good, and the resulting mixture may be more compactable than the original soil. Calcined clay, a synthetic material formed by firing clay granules at very high temperatures, may be substituted for sand on a one-for-one basis. The quantities required and the cost of calcined clay or sand may limit their use for soil modification.

Drouthy, sandy soils may be improved with the addition of organic matter or finer textured mineral soils. A 2-inch layer of these additive materials, incorporated to a total depth of 6 inches, may substantially improve the water-holding capacity of the original soil and also provide for better storage of essential plant nutrients. Alternatively, enough soil of more desirable properties can be purchased to cover the existing soil by at least 6 inches. This is usually the most expensive method of soil amend-

ment and, depending upon the quality of available soil, may not be the best answer. Any additional soil purchase should be free of quackgrass rhizomes and vegetative plant parts of other undesirable perennial grasses, for if such grasses develop in the new lawn, they cannot be controlled selectively with the herbicides presently available.

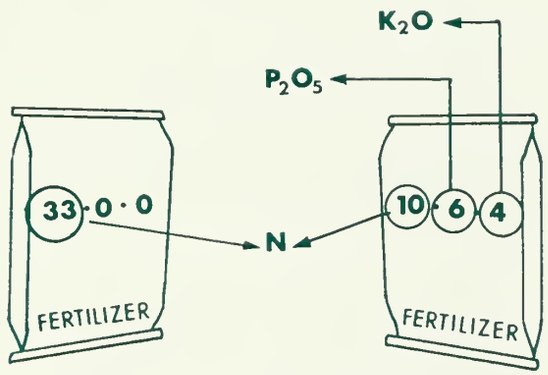
Under a vigorously growing turf, soil conditions generally will eventually improve without soil modification. This is a relatively slow process, however, and may be offset by the compacting effects of severe traffic.

Fertilization and Liming

"Basic" fertilizer materials include phosphorus (P) and potassium (K). These should be incorporated into the seedbed as the soil is being tilled. The specific amounts of each nutrient should be based on soil test results. Take soil samples from a depth of 6 inches (tillage depth) and from several locations so that the total sample is representative of the area to be established.* Superphosphate (0-20-0) and muriate of potash (0-0-60) are suitable for correcting deficiencies in these basic nutrients (see Fig. 1). When soil test information is not available, a general recommendation is 1½ to 2 pounds of P_2O_5 (7½ to 10 pounds of 0-20-0) and the same amount of K_2O (2½ to 3 pounds of 0-0-60) per 1,000 square feet. There is little value in incorporating soluble nitrogen deeply into a soil, since much of it may be leached out of the root zone before the turfgrass is sufficiently well developed to utilize it.

The ideal soil pH for most turfgrasses is 6.0 to 7.0. Lime (ground agricultural limestone) should be applied only if the soil test indicates that the pH is below 6.0. The amount of lime applied should be based on soil test results. Excessive application rates should be avoided, as too much lime may be more detrimental than too little. If lime is added, incorporate it with the basic fertilizer materials.

* For information on interpreting soil test results, refer to "Fertilizer Recommendations for Turf," H-690, available from the Horticulture Department, 124 Mumford, Urbana 61081, or contact your local County Agricultural Extension Adviser.



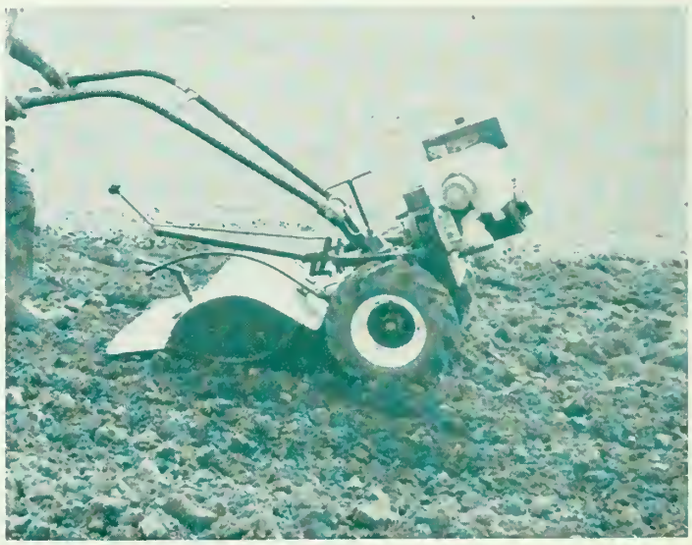
In describing the analysis of a fertilizer, the first number refers to the percent of nitrogen present, the second number refers to the percent of P_2O_5 (phosphorus as phosphorus pentoxide), and the third to the percent of K_2O (potassium as potash). A "complete" fertilizer contains N, P, and K. *(Fig. 1)*

Preparing the Seedbed

The first step in the actual preparation of the planting bed is to work the soil to a depth of 6 inches (Fig. 2). This provides sufficient soil porosity so that initial growth and development of the grass plants will not be restricted.

Rough-grade the seedbed to make it as uniform as possible (Fig. 3). Surface irregularities make maintaining a uniform and attractive turf difficult. Low spots or depressions tend to collect water and remain wet longer than surrounding areas. High spots, because they tend to dry out faster, show symptoms of wilting (moisture deficiency) sooner than adjacent areas. Careful attention to final grading reduces for many years the problems of maintaining the new lawn. It is sometimes advisable to roll the soil during final grading so that low spots or irregularities will be well delineated and thus easier to correct.

A "starter" fertilizer should be applied at this time. This need be only nitrogen if phosphorus has already been incorporated into the soil but may also include P_2O_5 and K_2O, as in a "complete" fertilizer. Generally, 1 to 2 pounds of actual nitrogen per



Soil tillage operation. *(Fig. 2)*

Preparing the final grade. *(Fig. 3)*

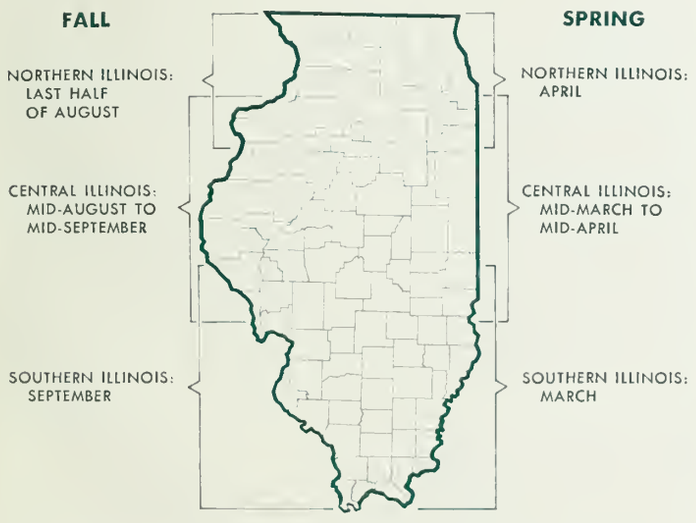
1,000 square feet is adequate to supply the needs of the developing turfgrass plants (for example, 10 to 20 pounds of a 10-6-4 fertilizer or 3 to 6 pounds of 33.5-0-0 fertilizer). The fertilizer may be raked into the soil surface alone or with the grass seed.

Planting the Lawn

Seeding. The best time for seeding a new lawn is during late summer to early fall (see Fig. 4). Soil moisture and temperature are most favorable for rapid grass establishment then, and weed competition during the early development of the lawn is generally less severe. Early spring seeding is an alternative, but excessive soil moisture and severe competition from annual weeds can threaten successful lawn establishment during the spring. Midsummer plantings are frequently unsuccessful because of high temperatures, drouth, weed competition, and disease.

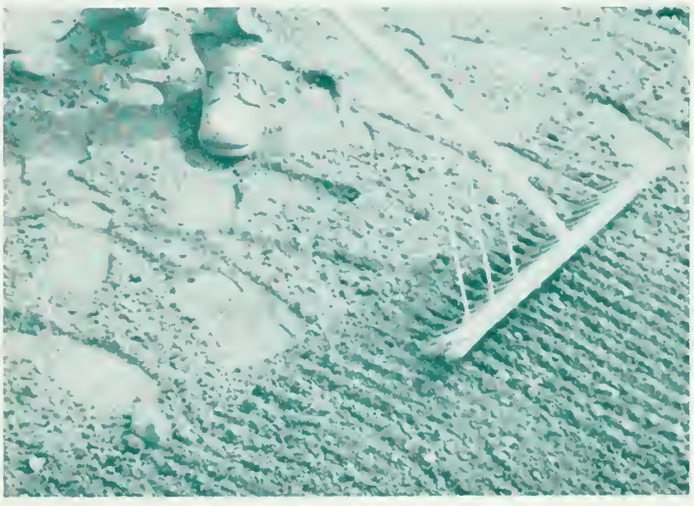
A good seedling stand is dependent upon proper care in placing the seed. Distribution should be as uniform as possible and at the recommended rate for the specific lawn grass planted. This is best done by a mechanical seeder or fertilizer spreader (Fig. 5), although hand application may be suitable, depending upon the skill of the applicator. An even distribution is more likely if one-half of the seed is applied in an east-west direction and one-half in a north-south direction.

After seeding, rake the area lightly to partially cover the seed (Fig. 6). Turfgrass seeds should not be covered by more than one-quarter inch of soil. The seeded area should then be rolled lightly (Fig. 7) to firm the surface and to provide good contact between the seed and the soil.



Probable best times for seeding cool-season grasses. *(Fig. 4)*

Seeding operation. *(Fig. 5)*



Raking the seedbed lightly. *(Fig. 6)*

Rolling to firm the seedbed. *(Fig. 7)*

Mulching is recommended to reduce drying of the seedbed and to provide a more suitable environment for germination and early seedling development. In addition, mulching helps reduce erosion due to wind or rain. Straw is most commonly used and should be spread uniformly over the seeded area at the rate of 50 pounds per 1,000 square feet. The straw should be free of weed seeds and vegetative plant parts (such as rhizomes and stolons) of weedy perennial grasses. Once applied, the straw can be kept in place to some extent by rolling and watering. If winds tend to blow the straw away, twine staked over the area or an asphalt spray can be used to hold the straw down. It is not necessary to remove the mulch since it will decompose as the lawn develops.

Watering is essential to grass seed germination and seedling survival. The amount and frequency of required irrigation depends upon several environmental factors, including soil type, wind, temperature, and sunlight intensity. Generally, light watering two or three times a day for the first three or four weeks should be adequate. More frequent irrigation may be necessary on hot, windy days to compensate for faster evaporation of water from the soil surface. Use a nozzle or other device to break up the water stream into a fine mist. This is less damaging to soil structure and helps avoid washing seeds away. About three or four weeks after seeding, the turfgrass plants should have developed an adequate root system so that watering frequency can be reduced.

Sodding. An alternative to seeding is the installation of a previously established turf as sod. This can be done at any time during the growing season following soil preparation. The sodbed should be prepared in the same manner as a seedbed except that, to promote rapid rooting, the surface of the sodbed should be moist when the sod is laid. Sod pieces should be laid with the edges fitted snugly together and the ends staggered so that there will be no cracks in the surface. The sod should not be stretched excessively, as this may result in shrinkage and openings in the surface during drying. Once in place, the sod should be rolled to ensure good contact with the underlying soil. This will remove air pockets, which cause drying of the roots. On steep slopes the sod should be pegged in place so it won't slip. The newly sodded lawn should be watered thoroughly immediately after laying. Thereafter, daily watering is required to maintain adequate surface moisture during the rooting period of two to three weeks.

Vegetative planting. Other means of establishing a lawn include using stolons, plugs, and sprigs. These are used to produce a turf when seed is scarce or when a particular grass does not come true from seed. In Illinois, some bentgrass lawns are started with shredded sod in which the surface runners or stolons take root and produce new plants. The shredded material should be applied uniformly over the area at the rate of 2 to 10 bushels per 1,000 square feet. Additional soil is placed over the stolons to partially cover them, and the area is rolled to firm the surface. These small pieces of plant material are very susceptible to drying, so more watering is necessary with this method.

Plugs are small pieces of sod two or more inches wide. They are generally placed 1 to 2 inches deep in the soil, spaced 6 to 12 inches apart. Zoysiagrass and some Kentucky bluegrass varieties are available as plugs. Soil should be packed firmly around the plugs after planting and the area watered thoroughly to prevent drying. Moderate watering every two or three days is normally adequate for proper establishment.

Sprigs are individual plants or small clusters of plants used for vegetative establishment of a lawn. They are planted in slits 2 or 3 inches deep and 6 to 12 inches apart. The sprigs should be arranged in a more or less continuous line within the slit and placed so that the upper third of a plant is above soil level. Backfill the slits with soil, then roll to ensure good soil contact with the plant material. Water requirements are essentially the same as for plugs.

Care After Planting

A newly planted lawn should be mowed when the foliage has grown to about 50 percent higher than the height desired after mowing. For example, a lawn that is to be maintained at a height of 2 inches

should receive its first and all subsequent mowings by the time it reaches 3 inches. A lawn mower should always be sharp for best mowing quality. This is especially important for the first few mowings, since the young grass seedlings can easily be pulled out of the soil by a dull mower. Early establishment is hastened by applying ½ to 1 pound of nitrogen per 1,000 square feet when the young seedlings are 2 inches high. The fertilizer should be applied to dry grass and watered immediately to preclude burning. Any injury from spilled or improperly applied fertilizer is often serious, since the young grass is not sufficiently developed to recover easily.

Lawns seeded in late summer or early fall may be relatively free from severe weed competition during the critical establishment period. Lambsquarters and pigweeds are usually eliminated by mowing, and annual weeds are killed by the first frost. Occasionally, however, some annual grasses and broadleaved weeds may be troublesome, especially in spring-seeded lawns. Applications of 2,4-D and related herbicides for controlling broadleaved weeds should be delayed until the grass has received at least two or three mowings (until six to eight weeks after seeding). A preemergence application of siduron, applied at the time of seeding, is useful in preventing infestations of crabgrass and other annual weeds. Applications of postemergence herbicides for controlling annual weedy grasses should be delayed for at least two months after planting.

Leveling the New Lawn

Lawns established on a firm and uniform seedbed may not require leveling unless a very close mowing height is used. Frost heaving during the early period of development, however, may necessitate rolling or topdressing to smooth the surface. A lawn roller filled approximately one-third with water is generally satisfactory for eliminating small irregularities in the surface. To avoid severely compacting the soil, the ground should be fairly dry when rolled.

If large ridges and depressions develop, the problem cannot be solved by rolling. Intensive rolling may simply compact the soil and cause a marked deterioration of the lawn. A better solution is to lift the sod, add or remove soil, and replace the sod.

Localized topdressing may also be used to smooth the lawn surface. Several light applications of screened soil can be applied and worked into the turf with a heavy steel mat or flexible rake. The topdressing soil should be as nearly identical to the underlying soil as possible to prevent layering. Not more than one-quarter inch of soil should be applied at any one time — more may smother the grass.

Selecting the Right Grass

Careful selection of turfgrass species and varieties is important in developing a lawn that will fulfill the purpose for which it is intended. The cost of grass seed or vegetative planting materials is low, considering how long the lawn will be in existence or the amount of time and money spent on its maintenance. Using the wrong grass for a particular environment, intensity of maintenance, or use will likely result in failure or an inferior quality turf.

The seedbag tag provides specific information on the percent purity and germination as determined in laboratory tests. The percentage of weeds and other crop seed is also listed. Best results from seeding are usually expected with seed containing no weeds or other crop seed such as bentgrass, redtop, or annual bluegrass. The higher price paid for quality seed is a good investment.

The principal lawngrasses used in Illinois are Kentucky bluegrass and red fescue. The many varieties that exist within these species display marked differences in color, texture, and disease susceptibility. In general, however, Kentucky bluegrasses are usually best adapted for use in open, sunny locations, while red fescues are more suited to shaded environments. Environmental variation is the principal reason for combining different grasses for seeding. Combinations of several varieties within a species are referred to as "blends"; a combination of two or more species is a "mixture." Blends of Kentucky bluegrasses offer the advantage of potentially greater adaptation to a broad range of conditions, while pure stands of selected varieties generally provide the finest quality turfs. Mixtures of Kentucky bluegrass and red fescue are used for shady locations or where there are wide variations in sunlight intensity. This combination is also suggested for low-quality lawns that will receive minimal maintenance.

Ryegrass and redtop are frequently found in seed mixtures. They germinate several days after planting and provide quick cover. However, they tend to persist in the lawn as unsightly weeds for several years. They are not recommended for use with Kentucky bluegrass unless a quick cover is absolutely necessary for erosion control or a midseason seeding is demanded. If required, use only perennial ryegrass

(not redtop) at no more than 25 percent of the seed mixture.

Tall fescue is used as a low-maintenance grass where its coarse texture is not objectionable. It should not be mixed with Kentucky bluegrass as it will tend to "bunch" and become a serious weed in the lawn.

Bentgrass is the finest quality turfgrass available, provided it receives meticulous care. It is not recommended for use in most home lawns because of its stringent maintenance requirements.

Rough bluegrass or *Poa trivialis* may be found in some grass seed mixtures because of its adaptation to moist, shaded conditions. However, it does not blend well with other turfgrasses and lacks traffic and drouth tolerance. It may actually form dense patches that look similar to bentgrass and is not recommended except in moist, shaded sites where red fescue will not persist.

Seeding Rates for Lawn Establishment

Pure Stands

Gross species	No. of seed per pound	Lb. of seed per 1,000 sq. ft.
Kentucky bluegrass	2,200,000	1 to 3
Red fescue	600,000	3 to 4
Bentgrass	6,000,000	½ to 1½
Tall fescue	250,000	6 to 8
Perennial ryegrass	250,000	4 to 5

Mixtures and Blends

Condition	Gross species	Percent composition	Lb. of seed per 1,000 sq. ft.
Shady	Red fescue	50	3 to 4
	Kentucky bluegrass	50	
Steep slopes	Perennial ryegrass	25	2 to 3
	Kentucky bluegrass	75	
Sunny	Kentucky bluegrass blend	equal parts of each	1 to 3

Turfgrass Varieties

Kentucky bluegrass (*Poa pratensis*) is the most widely used turfgrass in Illinois and is best adapted to well-drained, fertile soils. Because of its extensive underground rhizome system, it forms an excellent sod. Seed germination is relatively slow, requiring 14 to 21 days. The most popularly used seed of this species is referred to as common Kentucky bluegrass. A composite of many biotypes, "common" is not considered a variety. Kenblue and South Dakota Certified are varietal names for seed previously called common Kentucky bluegrass. They are particularly useful for medium- to low-maintenance lawns that receive 2 to 4 pounds of nitrogen per 1,000 square feet per year. Diseases caused by *Helminthosporium* fungi (leaf spot, crown rot, and melting out), however, limit the use of these varieties for high-quality lawns. Other varieties susceptible to *Helminthosporium* diseases include Park and Delta. They are characterized by vigorous establishment from seed and good early-spring color.

Pennstar, Fylking, and A-20 have good *Helminthosporium* disease resistance and develop high-quality turfs. These grasses respond best to high levels of nitrogen fertilization — 4 to 6 pounds per 1,000 square feet per year. Merion has been the standard for high-quality Kentucky bluegrass turf for many years. Although *Helminthosporium* disease resistance is good, leaf smut diseases are a serious concern on Merion, and the quick development of powdery mildew disease in the shade limits its adaptation to sunny locations only. Windsor is a fine-textured variety that responds to high nitrogen fertilization but is intermediate in disease resistance.

Newer varieties include Nugget, Adelphi, Baron, Sodco, Sydsport, Windsor II, Bonnieblue, and A-34. All are reported to be resistant to *Helminthosporium* and leaf smut diseases, and all tolerate relatively low cutting heights. A-34 has shown better shade tolerance than other varieties.

Red fescue (*Festuca rubra*) is a very fine textured turfgrass well adapted to sandy soils, drouthy sites, and moderate shade. Its management requirements are low compared to those of Kentucky bluegrass: 1 to 3 pounds of nitrogen per 1,000 square feet per year are adequate for good growth. It is fairly rapid to establish, requiring five to six days for seed germination. For shade or as a low-maintenance turf, red fescue serves as a good companion grass with Kentucky bluegrass. All available varieties of red fescue are susceptible to *Helminthosporium* diseases, which frequently cause severe thinning or death of large patches of turf in midsummer. Some of the known varieties are Pennlawn, Highlight, Jamestown, and Wintergreen. Most have short rhizomes, while Chewings-type red fescues have a bunch-type growth habit.