Home Lawns in Kentucky

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UNIVERSITY OF KENTUCKY | COOPERATIVE EXTENSION SERVICE
AGRICULTURE AND HOME ECONOMICS

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A good lawn is an important feature of your home grounds and provides the proper setting for all other landscape plantings. It helps to keep dust and dirt out of your home and prevents erosion of the soil while serving as an outdoor carpet for your landscape. Grass is the most widely used ground cover in the United States and bluegrass is the natural ground cover in Kentucky.

Good lawns do not just happen. They require planning, work, and the right materials. A properly established, well-managed lawn is not difficult to have and is not expensive to keep if you practice good management from the start. In addition, mowing will be easier if a mulch is used from the foundation wall out to the drip line in front of shrub areas. Where conditions make grass growing difficult, use other ground cover plants or mulches; or for particularly difficult areas, paving may be the best solution.

MAKING A NEW LAWN

Time to Sow Lawn Grasses

The best time for seeding new lawns is between August 15 and September 15, but seeding can be done until the end of September. In the extreme southern and western areas of the state, these planting times can be extended by two weeks. Lawns can also be seeded at other times of the year but the fall gives by far the best results. January 15 to March 30, depending upon the particular year, would be the second choice for seeding time. Seeding later in the spring increases competition from annual weeds. If spring seeding is to be attempted, start as early as possible.

Kentucky Lawn Grasses

Kentucky bluegrass

Common Kentucky bluegrass grown in Kentucky is recommended for lawns in most of the state. When properly cared for,

it makes the most satisfactory lawn for general use. Bluegrass forms an excellent sod and vegetatively propagates itself in the lawn by underground stems called rhizomes (see Figure 1B).

Several varieties of Kentucky bluegrass are available; each has one or more traits which make it a desirable turfgrass. Bluegrass varieties which perform well in one area of the United States may be a complete failure in other areas. The Kenblue variety, which is described in Kentucky Leaflet 308, is considered the best adapted for all of Kentucky. Some other varieties of bluegrass are Merion, Park, Newport, Windsor, and Delta.

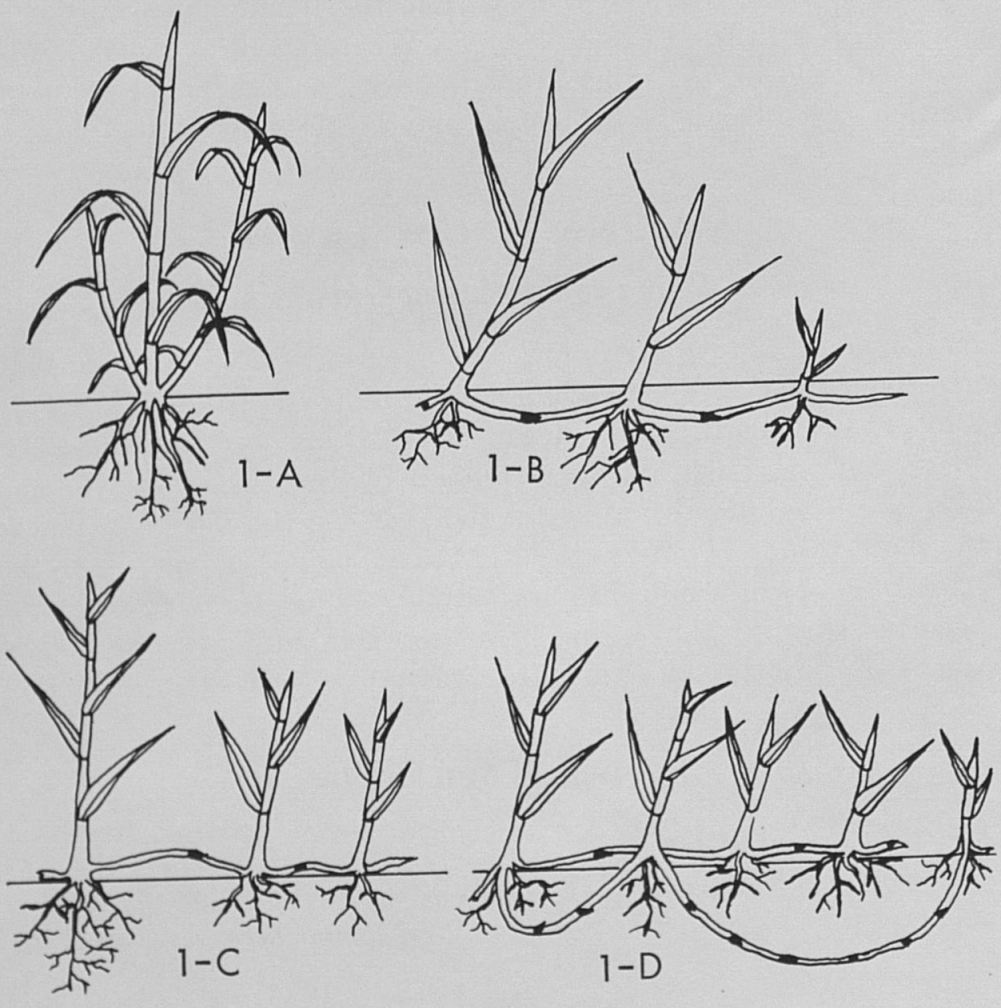

Fig. 1. -- Diagrammatic illustrations of growth and spreading habits of lawn grasses. 1-A, bunchgrass type: fescues and ryegrass; 1-B, rhizomatous: Kentucky bluegrass; 1-C, stoloniferous: bentgrass and zoysia; and 1-D, combination: bermudagrass.

Red fescue

If shade is a problem now or will be later, fescue may be added to bluegrass seed and sown as a mixture. The red fescues are better adapted to shade, drought, and low fertility areas of the lawn than is Kentucky bluegrass. These fescues have a fine needle-like leaf blade which blends well in color with Kentucky bluegrass. The red fescues, however, should not be confused with the tall fescues which are discussed later.

Both the fine and tall fescues are bunch grasses and do not vegetatively propagate themselves in the lawn; their typical growth habit is shown in Figure 1A. Varieties of red fescues are Creeping Red, Illahee, Pennlawn, Chewings, and Trinity. When used as a mixture with Kentucky bluegrass, the red fescue should compose approximately 30% to 50% of the mixture.

Tall fescue

The tall fescues are coarse-leaved grasses which are commonly used for pastures. They are also used for lawn or play areas which will receive rough usage. The tall fescues make a satisfactory lawn for certain difficult areas, but because of their coarseness, they cannot be kept as nicely manicured as a bluegrass lawn. The tall fescues should never be used in mixtures, and when used, they should always be sown alone at relatively heavy rates. They should be mowed at least 3 inches high using a sharp mower. Tall fescue varieties are Ky 31, Kenwell, and Fawn.

Temporary grasses

The two most commonly used groups of temporary grasses are redtop and the ryegrasses. There are seldom sufficiently valid reasons for including either of these groups of grasses in a lawn mixture. They are often added to lawn seed mixtures because they are cheap and because of their rapid germination, which gives the buyer a false sense of having successfully established his lawn. Because these grasses germinate rapidly, the homeowner often drastically reduces watering too soon, and the germinated temporary or "nurse" grass, as it is sometimes called, seriously competes for water, nutrients and space with any permanent grass that attempts to germinate later.

The only time temporary grasses may be used satisfactorily is for the sowing of a spring lawn which would be tilled under in the fall and reseeded to a permanent lawn. Such lawns can often be used to advantage, both to keep down mud and dust around newly finished homes and to serve as a green manure crop for the permanent lawn.

Although they are referred to as temporary grasses, they can and do persist for many years when sown into the permanent lawn. The redtop tends to form clumps and is quite distinctively different in both color and texture from Kentucky bluegrass. The ryegrasses generally blend quite well with bluegrass in the early seedling stages. However, as the ryegrasses mature, they become considerably coarser, tougher, and weedier.

Bentgrass

Creeping bentgrass is commonly used on golf courses in Kentucky. Bentgrass requires *intensive* care with respect to watering, feeding, mowing, and pest control. The problems involved in growing bentgrass are numerous and make it unsuitable for home lawns in this area. Bentgrass requires quite different management practices than does bluegrass and, therefore, these two should not be sown as a mixture.

Zoysiagrass

Zoysiagrass can be used in Kentucky; it is better adapted to the warmer portions of the state than to the cooler. It forms a tough, dense sod of relatively slow growth. All named varieties must be started by planting vegetative runners. Zoysia turns brown in the fall with the first hard freeze and does not green up again until midspring. Some garden stores now stock dyes which can be sprayed on these grasses to give a green color all during the winter. Two named varieties which can be used in Kentucky are Meyer Z-52 and Emerald. Emerald is considerably finer textured than Meyer. Zoysia spreads by creeping stems which root at the nodes; this is shown in Figure 1C.

Bermudagrass

There are several selected strains of bermudagrass for lawn use. Like zoysia, seed is not available and they must be propogated vegetatively by planting small plugs or pieces of stem across the

lawn. Bermuda also turns brown early in the fall and remains this way until late spring. In addition to these disadvantages, bermuda has deep underground stems which will readily spread into the neighbors' lawns (Figure 1D). The underground stems are difficult to kill if you should decide to try some other lawn grass. Zoysia, which does not have such underground stems, can be readily killed with the proper herbicide if you decide to change to another type of lawngrass.

Clover

Clover is not recommended for home lawn areas for several reasons. The main reason is that clover flowers attract bees, and children going barefoot on the lawn are likely to be stung. Too, the white clover flowers in the lawn are distractive, interrupting the smooth expanse of green. Clover does not blend well with grasses because of its darker color and its different leaf texture; it is soft and slippery underfoot and is a common cause of "grass stain" on clothing.

Seeding Rates

It is false economy to buy cheap seed. It is more economical to use only high-quality grass seed which is free of any noxious weed seeds or other undesirable material. The cost of seed in comparison with the other costs involved in putting in a new lawn, is a very minimal amount. Kentucky bluegrass seed, when sown alone, should be used at the rate of 1½ to 2 pounds per 1,000 sq ft of lawn area. Beneath trees where shade may become a problem a mixture of 30% to 50% red fescue and 50% to 75% Kentucky bluegrass should be sown at the rate of 1½ to 2 pounds per 1,000 sq ft. Tall fescue should be sown at the rate of 5-6 pounds per 1,000 sq ft. If a temporary lawn of ryegrass is to be sown, this should be seeded at the rate of 5-6 pounds per 1,000 sq ft, but both tall fescue and ryegrass may be sown as heavily as 10 lb per 1,000 sq ft.

Table 1 lists the number of seed per pound and the recommended sowing rate for several kinds of lawn seed. The third column gives the average number of seed which will be distributed over 1 square inch of lawn area when the seed is sown at the recommended rate. These values indicate that there is a rather large safety factor in the seeding rate to assure the homemaker a good stand of grass. This is done because many of the seeds sown

Table 1.—Pure Stands of Seed

Grass	Approximate seed/lb	Sowing rate lb/1000 sq ft	Seed/sq in.
Kentucky bluegrass	2,200,000	1½-2	23-30
Red fescue	545,000	3-4	11-15
Tall fescue	225,000	6-10	10-16
Ryegrass	225,000	6-10	10-16
Redtop	4,990,000	1	34.6
Creeping bentgrass	7,800,000	1	54.1

will not produce plants; some will be killed because of fluctuations in moisture (see "Watering the New Lawn," page 12), some will be raked in too deeply, while others will not be planted deep enough. Birds will eat some of the seeds; others will be attacked by disease or insects about the time they germinate; and some seeds will be too weak to germinate and grow. It is for these and other reasons that the large safety factor is used. Ideally, about one living plant per square inch of soil area is desired. Excessive seeding rates cause crowding, which contributes to weak growth and disease. Therefore the recommended rates should not be exceeded. Under good conditions the rates may be reduced.

Zoysia and bermuda grass are sprigged or plugged in spring or early summer. Six square feet of zoysia sod or 10 sq ft of bermuda sod is usually enough to sprig 1,000 sq ft of lawn area. About 50 sq ft of either will be required to sod 2 inch x 2 inch plugs 6 inches apart on 1,000 sq ft of lawn area.

Soil Preparation

Grading

Successful lawn management begins with grading. Before construction is begun on a new home, the lawn should be considered. Four to 6 inches of top soil should be bulldozed from the building area and piled on one of the corners of the lot. Soil removed from the basement of the new home can then be used as fill to establish the desired grades. After the home is completed, the top soil which was saved is finally replaced over the sub-soil.

The final grade of a lawn area should carry excess water away from the foundation walls and toward storm sewers, drainways, or streets. The lawn should drop 1 to 3 feet per 100 linear feet; slopes steeper than 1 foot fall in 10 linear feet are not recommended.

Terraces should be used only as a last resort, and then with the realization that the slope on a terrace is a constant trouble area. Retaining walls can be used in place of the sodded terrace and thus avoid the steep sodded slopes. Three methods of avoiding terraces are shown in Figure 2.

On most properties, the house is already finished and there are many fixed grade points which cannot be changed easily; for example, walks, driveways, and curbs. Here the problem is to grade the lawn as gently and pleasantly as possible without over-running these fixed grade points and still accomplish the purposes of grading. Keep the soil surface 1 inch below the surface of the sidewalks, drives, etc.

After grading has been finished, there should be at least 4 to 6 inches of top soil over the entire lawn area, and 6 to 12 inches is still better. If at least 4 inches of top soil is not available, additional top soil can be brought in. If you must buy top soil, be particular about the quality of the material which is delivered to you. It may be heavily infested with weed seeds which can be killed by steaming or gassing. In many instances, the homeowner would be further ahead to buy organic matter and till it into the existing soil than to buy top soil.

Organic matter and fertilizer

If good top soil is not available, you can improve the existing soil by adding to it large amounts of organic material such as well rotted animal manure, composted materials, peatmoss, green manures, ground tobacco stalks, peanut hulls, or sugar cane pulp. Organic matter additions must be thoroughly mixed into the top 4 to 6 inches of soil. This may be done in the spring or just before fall seeding. The organic material may be added as heavily as 1 inch of organic material for each 2 inches of depth of the soil that is to be tilled. If possible a soil test should be made before adding the organic material so that fertilizer and limestone (if needed) may all be tilled in one operation. Your local area Extension agent can instruct you as to how to take a soil sample and where to have it analyzed. Limestone should be added to a soil area only as indicated by a soil test.

If you do not have a soil test to guide you, a complete fertilizer —that is, one composed of three numbers such as 10-10-10 or 8-6-4,

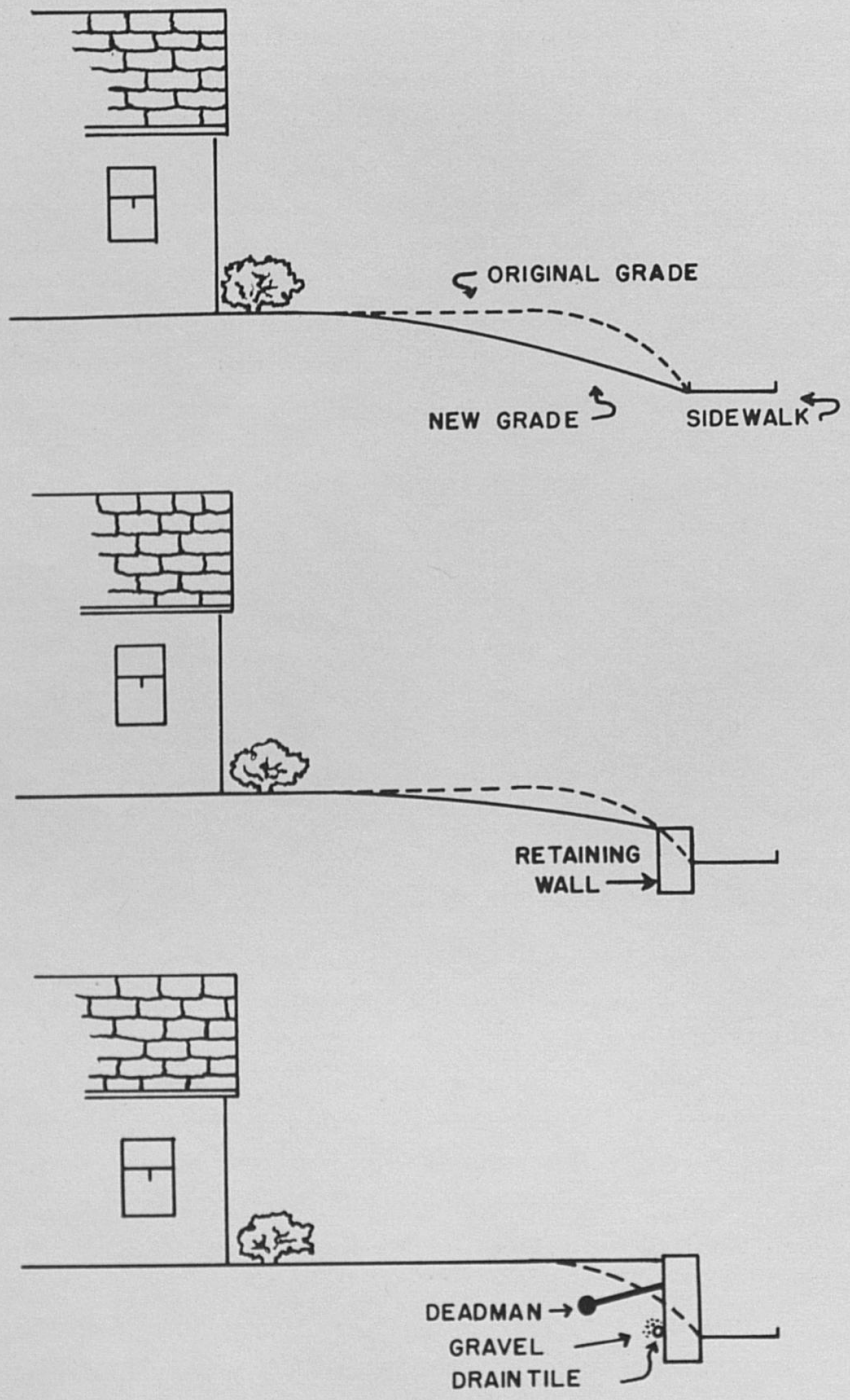

Fig. 2.-- Three methods of avoiding a steep terrace slope. Top: Fair, slope is reduced. Middle: Good, small retaining wall further reduces slope. Bottom: Best, full retaining wall with gravel bed and drain tile to guard against freeze damage to the wall, and anchored to increase stability.

etc.—should be applied. The rate of application can be determined from Figure 3. The values given on the graph are for fertilizer applications to establish lawns. For incorporation into the soil before planting a lawn, use twice the amount determined from the graph.

Preparing the seedbed

The soil should be tilled 4 to 6 or more inches deep. On large lawn areas this is best done with a tractor. On smaller areas a rototiller or garden tractor may be used. The organic matter,

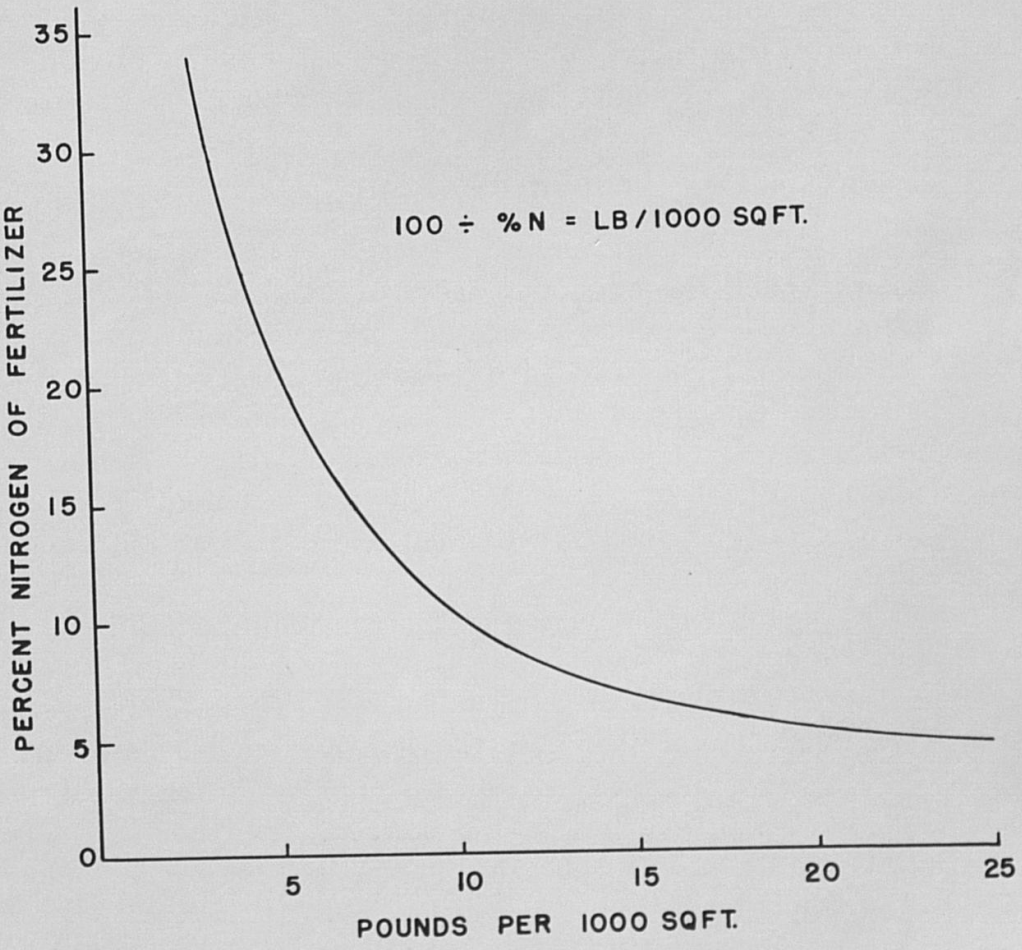

Fig. 3.-- Determining the amount of fertilizer to apply to your lawn. Find the percent nitrogen content of the fertilizer; this will be given on the package. Draw a horizontal line from the percent nitrogen on the left-hand scale to the curved fertilizer line on the graph, then draw a vertical line to the bottom of the graph and read the pounds of fertilizer to apply per 1,000 square feet of lawn area.

fertilizer, and limestone (if required) are first spread evenly over the soil. Thorough incorporation will loosen the soil and provide for easier root penetration, increase the water drainage and air capacity of the soil, and distribute the fertilizer nutrients throughout the soil mass. *Do not work the soil if it is too wet.* Tilling should provide a fine seedbed with few lumps larger than 1 inch in diameter. After tilling, remove stones, debris, and clay lumps from the surface as you rake the soil to smooth the seedbed. Roll the area with a heavy roller. If time is not pressing, the seedbed may be firmed and settled by watering. The water should be applied at a rate which will prevent run-off and allow all of the water to soak into the soil. A thorough soaking will settle your seedbed better than using a roller. When the soil surface is dry, minor adjustments in surface leveling can be made to give a smooth seedbed and a level lawn.

Seeding the Lawn

A starter fertilizer applied to the lawn area just before seeding will aid in getting the new lawn off to a good start. The starter application should be made at one-half the rate shown in Figure 3—for example, 5 lb of a 10-6-4 fertilizer per 1,000 sq ft.

The square foot area of each lawn panel should then be used to determine the amount of seed each panel will receive. To assure equal distribution of the seed, divide it into two equal portions, and sow one portion in one direction and the second at a 90° angle to the first.

After seeding is completed, the lawn area should be lightly raked or dragged to cover the seed. A lawn rake, or a light board may be used, but avoid covering the seed too deeply. This operation will also mix the starter fertilizer into the soil surface. The lawn may be rolled after seeding; although not essential, rolling does help to level out small irregularities in the surface and bring the seed into intimate contact with the soil, thus assuring better and more uniform germination.

Watering the New Lawn

Grass seed will germinate and grow when the proper conditions of moisture and temperature are supplied. It is particularly important to keep the lawn area moist for 10 to 20 days after seeding. Water should be applied with sprinklers which break it into

Fig. 4.-- When properly cared for, Kentucky bluegrass makes the most satisfactory lawn for general use in Kentucky.

fine droplets and which supply the water at a slow, even rate. If possible, set enough sprinklers out on the area to water all of it without having to walk out on the lawn to move them. With proper planning one need only couple and uncouple hoses from walks, driveways, or the house faucet to change sprinklers.

During dry, windy weather, the sprinklers may need to be turned on from 5 to 10 times per day, but only for short periods of time since once the soil is thoroughly wetted only enough water need be applied to keep the surface area moist. There are no grass roots in the soil at this time to pick up the water from the lower level and excess water applied here does little good. Those areas which dry rapidly or are not as heavily watered by the sprinklers should be touched up by hand watering.

If you do not have an adequate water supply or enough sprinklers to keep the entire seedbed watered, sow at one time only an area that can be kept adequately watered.

Maintaining a moist, but not wet, soil surface for 10 to 20 days after seeding is one of the most important steps in successful establishment of a new lawn. When water is applied to a newly seeded

area, the grass seeds will begin to germinate. First a small root tip is pushed out of the end of the seed. This is the most critical period in the life of a grass plant. If the soil surrounding the emerging root tip dries off, so probably will the root and the seed will be killed. When water is again applied to this area of the lawn, other seed in this region will begin to germinate. If the wetting and drying procedure continues too often, there will not be enough grass seed left in the soil to provide a satisfactorily dense lawn. The extra time and effort spent in keeping the lawn area moist during this critical period will be amply rewarded in a good seedling stand.

Your new lawn should begin to show green 7 to 14 days after seeding, depending upon temperature and moisture. Avoid walking on the lawn area as much as possible. When the grass is 1 to 2 inches tall, the frequency of watering should be reduced to once every 7 to 14 days, depending upon weather conditions. A new Kentucky bluegrass lawn should be mowed for the first time when the grass is 3 to 4 inches high. For the first mowing set the mower to cut 3 inches high, and continue to mow the new lawn area as often as necessary until winter approaches. Usually a new lawn will require fertilization again in October. An application of either a complete or a nitrogen fertilizer should be made according to the directions given in Figure 3.

Sodding

In some parts of Kentucky you can obtain Kentucky bluegrass sod for your new lawn. Sodding is frequently used for establishing a lawn quickly and is often a part of the building contract for new homes. Sodding may be the only satisfactory answer for steep slopes or for spots where traffic ruins a new seeding.

Much of the sod used in Kentucky is from pastures. This sod is usually treated to kill broad-leaved weeds, but not grassy weeds. Such sod is practically worthless. If you purchase sod it should be purchased only from a reputable sod nursery. Nursery sod should be relatively pure and free of both broad-leaved and grassy weeds. Reject sod with mixtures of coarse and fine grasses. Bluegrass sod should not contain tall fescue, bentgrass, bermudagrass, or weeds such as nimblewill, orchardgrass, or quackgrass. Be just as careful in buying sod for your new lawn as you would be in buying good seed.

Fig. 5.-- Tall fescues are coarse leaved and hardy; they withstand very hard use. When sown alone at relatively high rates, and mown high, as on this lawn, they make a satisfactory lawn turf.

HOME LAWN MAINTENANCE

Once the home lawn is established, there are several maintenance practices which must be carried out to keep the lawn in good condition.

Aerification

Aerifiers are sometimes used to punch small holes in the soil. This permits better movement of air and water into the soil. This practice is most desirable if the soil has a high clay content and tends to become compacted with a hard crust. Aerification is most valuable on paths and other areas where there is heavy foot traffic. Aerators that remove a plug of soil are the most satisfactory. The plugs removed by an aerator may be raked up and removed or they may be crushed by rolling and the soil raked into the turf. Crushing and raking them into the soil is particularly helpful where thatch has begun to accumulate.

Thatch Removal

On dense lawns where clippings are left, the clippings may accumulate to the point where there is a heavy build-up of thatch. Heavy thatch favors disease and insect invasion and prevents good water penetration; this results in deterioration of the turf. If heavy thatch accumulates, it is advisable to remove it.

Machines that vertically cut and slice the turf are available to aid in removing thatch. This cuts the old thatch and brings up the dead stems and leaves, which can then be swept up and removed. If thatch removal is attempted, go over the lawn in two directions giving the turf a vigorous combing. This causes no permanent damage to turf. Material brought to the top of the turf must be removed. Thatch removal is best done in September. Reseeding, liming, and fertilizing could also be done at this time.

Lime

A soil test at least every three years should be the basis for lime application. Most turfgrasses grow best when the soil pH is between 6.5 and 7.0. Fescue and Zoysia will tolerate a lower pH than bluegrass. Finely ground or pulverized limestone is easily applied and is an effective material for raising the pH of a soil. Overliming can be as detrimental to good turf as no lime.

Fertilizer

The frequency of fertilizing the lawn can be varied. In general, the more frequent the fertilization the nicer the lawn. All soils are low in nitrogen, and nitrogen (with water) is the main stimulator of grass growth. At least two fertilizations should be given each year—spring and fall. Table 2 suggests the times and amounts of nitrogen fertilizer to apply for four levels of lawn care.

Table 2.—Suggested Fertilization Schedule for Bluegrass Lawns in Pounds of Nitrogen per 1,000 Square Feet

Fertilization	Months								
Level	March	April	May	June	July	August	Sept.	Oct.	Nov.
Basic	1						1		
Fair	1					1		1	
Good	1		1			1		1	
Best	1	1	½	½	½	½	1		1

A basic application of a complete fertilizer in the spring and fall is adequate for most bluegrass and fescue lawns. A basic application of fertilizer would be 1 pound each of nitrogen, phosphoric acid (P_2O_5), and potash (K_2O) per 1000 sq ft. Six pounds of nitrogen, 2 pounds of P_2O_5, and 4 pounds of K_2O per 1000 sq ft per

year would be ample for bluegrass lawns. In addition to the basic spring and fall applications of complete fertilizer, many people are now applying additional nitrogen during the late spring, summer, and early fall to maintain turf growth and color. This extra nitrogen is very beneficial if the lawn is watered.

Nitrogen may be manipulated to get color to the lawn. Excessive nitrogen results in soft, succulent grass, favoring disease development and requiring extra mowing. Turfgrasses can tolerate high levels of phosphorus and potash under normal conditions but excessive phosphorus and potash may cause turf deterioration.

The fertilization of Zoysia and Bermuda grass lawns is given in Table 3.

Table 3—Suggested Fertilization Schedule for Zoysia and Bermudagrass Lawns in Pounds of Nitrogen per 1,000 Square Feet

Level	April	May	June	July	August
Basic		1		1	
Fair		1	1	1	
Good		1	1	1	1
Better	1	1	1	1	1

Bermuda and Zoysia should receive heavy fertilization during hot weather, but not in the fall. Excessive fertilization late in the fall may result in some winter kill; therefore, don't fertilize these grasses after the last of August. Winter kill can also occur on bluegrass-fescue lawns, and therefore applications made in October should be made early in the month while fertilization in November should not be done until the end of the month.

Fertilizer Burn

High nitrogen fertilizers will burn grass if they are not used properly. A light burn is unsightly for a week or more, but does no permanent damage. Severe burning can kill lawn grasses.

Fertilizers differ in the amount of burn they can cause. Ammonium sulfate, ammonium nitrate, urea, and "farm grade" high nitrogen complete fertilizers are most likely to cause foliage burn. Complete fertilizers containing slow-release nitrogen, such as organic or urea-form, are intermediate; activated sewage sludge and

urea-form are nonburning unless applied at exceptionally high rates. To avoid fertilizer burn:

1. Do not apply more than 2 pounds of actual nitrogen per 1,000 sq ft at one time.
2. Spread the fertilizer evenly.
3. Do not excessively overlap or spill fertilizer.
4. Apply fertilizer only when the grass blades are dry.
5. Finely ground fertilizers are more likely to burn than are pelleted fertilizers of the same composition, because more of the fertilizer remains on the grass leaves.
6. Water immediately after fertilization to insure against burn.

Slowly available nitrogen fertilizers

Organic nitrogen fertilizers, such as activated sewage sludge and soybean meal, release their nitrogen slowly and do not burn grass unless applied in extremely large amounts. Organic fertilizers generally cost three or more times as much as inorganics for equivalent amounts of nitrogen. Either type of fertilizer will produce a good lawn. Urea-form fertilizers also release nitrogen slowly and do not cause fertilizer burn when applied at recommended rates. Urea-forms are produced synthetically by combining urea and formaldehyde. Urea-forms are sold as straight nitrogen materials containing 38 percent nitrogen, or they may be included with phosphorus and potassium carriers to produce complete fertilizers.

Liquid fertilizers

There are many brands and formulas of liquid fertilizers and soluble powders available. These produce no better results than the same quantities of plant nutrients supplied from dry fertilizers. Liquids may be more convenient to apply, but they may also be more expensive than dry fertilizers.

Fertilization is but one aspect of good lawn management. Addition of fertilizer alone will not insure a good lawn. Watering, mowing, and pest control are also important. For instance, a bluegrass lawn which has weeds, is improperly mowed, and is watered infrequently, should not be fertilized in the summer. Bluegrass tends to go dormant in the summer and fertilizing would benefit the weeds more than the grass. If however, the lawn is weed-free

and is watered during the summer, it will not go dormant and the grass will benefit from additional fertilization.

Over-Seeding

Grass seedlings have little chance in old sod. Much seed is wasted in attempts to seed into established thin lawns. Do not reseed unless there are bare areas of at least 1 square foot. Fertilizer, water, and intelligent management are much more beneficial to a thin lawn than is the practice of overseeding.

If there are bare spots that need reseeding, use the same mixture of grass seed as is prevalent in the rest of the lawn. Rake the area thoroughly to remove plant debris and expose the soil before sowing the seed. Plugs of sod taken from inconspicuous places and put in small bare spots are better than seed.

Mowing

Table 4 gives suggested mowing heights for grasses. Bluegrass can be maintained at less than a 2-inch cut, but lower cutting requires more intensive management, such as additional fertilizer and water and increased attention to control of weeds, diseases, and insects. Plant foods are produced in the grass leaves through the action of sunlight; the more leaf, the more food, the more roots, and the stronger the plant. The depth and strength of grass roots are proportional to top growth.

Rotary or reel type mowers can be used to cut grass. Reel mowers are preferred for short cuts. No matter what type of mower is used be sure to set it to the recommended cutting height and keep it well sharpened.

"Cutting high" does not mean to let the grass get tall before you cut it. You should cut often enough so that not more than one inch of blade is removed at one time. This may require cutting the grass at least twice a week during periods of rapid growth. Never allow the grass to become so tall that two inches of growth is re-

Table 4.—Mowing Height for Lawn Grasses

	Inches
Kentucky bluegrass	2-2½
Creeping red fescue	2-2½
Zoysia	½-1
Bermudagrass	½-1

moved. When grass is cut after being allowed to grow too tall, the lower part will be bleached and unsightly and susceptible to sunburn. Begin mowing early in the spring and continue as late into the fall as needed. Whenever the grass grows tall enough to need cutting it should be cut.

In general, grass should be cut often enough so that the clippings can drop between the blades of grass and remain on the soil as a mulch. This conserves moisture, keeps the soil cooler, and permits reuse of the fertilizing materials in the grass. However, if the lawn has been left until there is a windrow of "hay" behind the mower, the clippings should be removed. It may be necessary or desirable to remove clippings following very heavy fertilization. A grass catcher does this with much less work and with less injury to the grass than raking.

Watering

Zoysia and bermudagrass make most of their growth during hot weather. They may benefit from timely watering, but they tolerate dry weather very well.

In Kentucky, bluegrass cut at the proper heights will not be killed by dry weather. Unwatered lawns may turn brown, but will recover when the drought is over. However, if you want a green lawn during dry summers, you will have to water. If it does not rain, you should expect to water the lawn every week to 10 days.

Water whenever the lawn needs it, whether the sun is shining or not. Wet the soil to a depth of 3 to 6 inches. This may require that the sprinkler remain in one place for several hours. A trowel or spade may be shoved into the ground to check the depth of water penetration; once you know how long it takes to wet the soil to the proper depth, checking can become less frequent.

There is no need to apply water faster than the soil will absorb it. Water that runs down the gutter doesn't help the lawn. Sprinkling with hose-in-hand may cool you but does little for the lawn.

Weed Control

Zoysia and bermudagrass, when well cared for, are excellent competitors of weeds, and a dense bluegrass or fescue lawn is the best insurance against weed invasion..

Several weeds grow in lawns. Crabgrass, dandelion, common

plantain, buckhorn plantain, and chickweed are the most troublesome in Kentucky. These tips on good management will aid in keeping weeds under control:

1. Mow at the proper height; this is at least 2 inches high for bluegrass-fescue lawns. This will give a dense turf which reduces weed infestation.
2. Apply adequate fertilizer. Lawns need at least two "square meals" each year; one in early spring and another in September.
3. Water properly. Sprinkling or rain every day keeps the surface wet, favoring both disease and weed seed germination. Water only when the rootzone is dry; then apply sufficient water to wet the soil 3 to 6 inches deep.
4. Don't seed lawns in late spring. Late spring seedings often do not establish a thick cover of grasses in time to compete with weeds.
5. Pull scattered weeds early—before they compete with bluegrass. A kitchen "grapefruit" knife with sawtoothed edge is easy to use, and keeps damage to the turf minimal.
6. Renovate early in the fall. When the nights turn cool and fall rains start, grasses begin to grow again.

Chemical weed control

Descriptions and drawings of various weeds which infest lawns are given in Cooperative Extension Service Circular 577, *Common Lawn Weeds,* and control chemicals for specific weeds are listed in Misc. 322, *Weed Control Recommendations for Established Bluegrass Turf.* In general, broad-leaved weeds such as dandelion, plantain, and chickweed can be controlled with the chemical herbicides of the 2, 4-D type. Knotweed can be controlled with dicamba. Of the formulations on the market, only the low-volatile type of ester, amine, and salt formulations should be sprayed on lawns. Since the materials may vary in concentration, you should follow the directions on the container.

Best results are usually obtained with either spring or early fall applications applied to young weeds while moisture condition and temperature are favorable for rapid growth. Retreatment is sometimes necessary to complete the kill of weeds. Fertilizing and watering the area will stimulate grass growth and help cover the bare spots formerly occupied by the weeds.

Chemicals may also be applied in dry form as granules using rates recommended on the label. Special formulations, such as a wax bar containing the chemical, may also be used. The bar is attached to the back of the mower and drawn over the turf, thus applying wax plus the chemical to the growing weeds.

Caution

Chemicals should not be applied immediately before seeding or to newly-seeded lawns; they may kill the young seedling grasses. Do not allow chemicals to come in contact with, or drift onto, branches and leaves of trees, shrubs, ornamentals, or garden and fruit crops. Use low pressure and coarse droplets to reduce the drift. Do not spray on windy days. Since sprayers are difficult to clean, it may be best to have a special sprayer for applying herbicides only. Wash your face and hands thoroughly with soap and water after handling herbicides.

Nimblewill

Nimblewill is a perennial that reproduces by seed formed in late fall, as well as by spreading stems which root at the nodes. Because of this, nimblewill grows in dense patches, which, after frost, show as brown patches throughout the winter. Careful, severe raking, close mowing, and vertical thinning can reduce the density of nimblewill. No selective control with herbicides is available.

Creeping bentgrass

Creeping bentgrass often makes dense patches of fine-leaved matted clumps in bluegrass lawns. Raking and vertical mowing in early spring and early fall will reduce this problem. No selective control is available.

Tall fescue

Tall fescue clumps with coarse, wide leaves, which stay green over winter, are a problem in many lawns. Avoid seed mixtures containing any tall fescue. No selective control is available. If clumps are few, cut underneath and replace with sod in fall or spring. If clumps are numerous, repeatedly use vertical mowers, or hack and cut into the clumps with a tool such as a shovel or knife,

weakening the tall fescue. Do the same to other wide-bladed grasses, including bromegrass, orchardgrass, and timothy.

Quackgrass and bermudagrass

Quackgrass and bermudagrass often invade bluegrass and fescue lawns. These grasses turn brown with the first frost, making uneven, brown patches in the lawn that are unsightly. No selective control is available. For this reason, new lawns should be kept free of these grasses. Never buy or use sod for sodding a bluegrass or fescue lawn if these two grasses are present.

When heavy infestations of the above weeds occur in a lawn, the only satisfactory means of controlling them is to kill all vegetation by cultivation or chemicals and remake the lawn. Materials such as dalapon, amitrol, methyl bromide, caccodylic acid, and paraquat can be used to kill all the vegetation. Treatment for complete eradication is best left to professional lawn people since some of the materials are quite hazardous and if a thorough job is not done the same problem reoccurs in a few years. Always carefully measure the areas to be treated, use only recommended rates, and apply uniformly. Currently, the labeling on most formulations is quite adequate.

Crabgrass

Crabgrass is an annual grass that can be controlled with chemicals. When properly used, many chemicals will give fair to excellent control of crabgrass without causing injury to desired turfgrasses. Several materials are listed in Misc. Publication 322.

To be effective, pre-emergent chemical controls must be applied early, before crabgrass germinates, and only to well-established lawns where overseeding is not necessary. Occasionally poor control of crabgrass occurs even though the chemical was applied at the right time and in the right amount. When this happens post-emergence control can be used. If post-emergence control is to be used, don't wait too long; the younger the crabgrass the easier it is to kill. Early control will reduce its competition with, and its smothering of, desired turfgrass. (See Misc. 322).

Diseases

Many diseases can affect turfgrass. Most are never severe enough to warrant attention. However, with the right environ-

mental conditions, many are capable of almost complete destruction of turf.

If proper care is given to a lawn, diseases are less likely to be a serious problem. Be sure to follow the recommendations as to mowing height, fertilizing, and watering. Even with these precautions there is always a chance that your lawn may be infected by disease.

Chemical controls of turf diseases are available, but two factors reduce their practicability for home lawn use. (1) Fungicides are best used as a preventative procedure; that is, the fungicide is applied before the disease attacks the turf and application is continued at 3- to 14-day intervals depending upon the weather, fungicide, and disease cycle. (2) Once diseases become sufficiently prominent as to cause concern to the homeowner, they have usually passed their peak of damage and the application of fungicide does little good. In most instances the application of fertilizer and water to stimulate new growth and help the grass outgrow the disease and aid in filling in the turf where the disease has killed plants is the most practical control for the homeowner. Removing the clippings, especially during periods of disease, would also be helpful.

Insects

Ants

These insects build nests in the ground and usually form mounds of soil around the openings. The ant hills may smother the surrounding grass and contribute to an uneveness of the lawn. In some instances parts of the grass plants may be chewed off by the ants to clear trails. For control of ants see U.S.D.A. House and Garden Bulletin No. 28, entitled *Ants in the Home and Garden* If your county Extension office doesn't have this bulletin, it can be ordered for you.

Grub worms

These usually thick, sluggish, white-bodied worms with yellow to brown heads and legs are the larvae stage of the Japanese, May, or June beetles. When fully grown the grubs are ¾ to 1½ inches long. Usually they remain coiled. They feed on the grass roots just below the soil surface, causing areas of dead grass. To

determine if grubs are attacking the lawn dig just below the soil surface beneath dead spots; if grubs are found they are probably at fault. Misc. Publication 358, available from the Kentucky Cooperative Extension Service, deals with grub worm control.

Sod webworms

Sod webworms go through four life stages: the eggs, the larvae (or worms), the pupae, and the adults (moths). The larvae live in silk-lined tunnels near the soil line. The silken tube is usually covered with bits of grass. The larvae are grayish white with small dark spots on the body and a dark head. At first they are very small, but when fully developed they are about ¾ to 1 inch long. At this time they change into pupae in the tunnel.

When the moths are present, they are stirred from their hiding places in the grass as you walk on the lawn. They fly in a jerky, zig-zag manner and then quickly return to the grass to hide again. The moths lay eggs on the wing which drop into the grass and within a short time the eggs hatch into larvae, completing the life cycle. There are about three generations of the webworms per year.

Type of Damage: Damage is done by the larvae when they clip grass blades close to the ground and pull them back into the tunnel to feed. As the larva grows, it clips an area of lawn about the size of a baseball or larger. During dry weather this area turns brown and dies. If the webworm population is dense, these small patches may run together to form large patches. However, large dead patches usually indicate white grub damage rather than webworm damage. Small round holes about the diameter of a pencil may also be in the lawn when webworms are present. These holes are not made by the webworms but by blackbirds which feed on the worms.

During wet seasons sod webworm damage is not so common as during dry seasons, for two reasons: (1) wet weather is not favorable to sod webworm development, and (2) during wet weather the grass has a better chance of recovering from webworm damage.

If you are not able to find these pests in the larval stage, the best method for timing a treatment is to check the number of moths. Within 1 to 2 weeks after the peak moth abundance, most of the eggs for the next generation have been laid and hatched, and the insecticides will be most effective at this time in reducing the danger of damage from these larvae.

Control measures for sod webworm are given in Misc. Publication 363, available from the Kentucky Cooperative Extension Service.

Worms

Many types of worms infest home lawns. The only damage done by worms is the throwing up of castings which contribute to the unevenness of the lawn. Worms are controlled by the same materials as those used for grub worm control.

Moles

These small burrowing animals may sometimes be very troublesome. Trapping may be the best immediate control but it is time-consuming. Moles feed on soil insects such as grubs and worms; the elimination of these insects with a soil insecticide is recommended. The destruction of the moles' food supply causes them to leave the area. This is the preferred method for mole control, but is comparatively slow.

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