

LAWN CULTURE IN MISSOURI

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The lawn is one of the most important adjuncts of the home and should be one of the first things to receive attention from the home owner. It may be the only area of natural beauty. When the residence crowds the street or highway, flowers, shrubs, and trees may become impracticable but a small well kept lawn between house and street is always cool, inviting, and beautiful.

Made as large as conditions permit, the lawn should be encumbered as little as possible. Drives and walks cutting through the

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middle of the grounds destroy the beauty of the garden picture. Buildings should be located toward one side, and trees and shrubs confined largely to the boundaries, except where needed to screen the house foundation and to break sharp angles or corners.

The lawn is the setting for flowers, shrubs, and trees with the house as the center of interest. A yard showing good grass and care is a thing to be sought with courage and persistence. Nothing is more pleasing or treasured more highly. Fairly smooth and gently rolling spaces are usually most attractive.

Preventing Injury to Trees

Before starting lawn development, plans should be made to protect valuable well located trees. If possible, the soil around and near trees should be left undisturbed. When preparing fills over tree roots make provision for air and water movement in the soil. In car parking areas, avoid soil packing which may result in tree-root suffocation.

Trees are often damaged seriously by making fills of a few to several feet about the trunk bases. To prevent such injury, brick or stone walls or circular areas extending a few inches above the surface soil should be built around trees. Allow from 9 to 12 inches of space between the wall and the tree trunk to provide for growth.

It will usually cost less to protect and preserve large, desirable trees already growing on an area than to remove them after they die and replace them with smaller, less valuable specimens. Moreover, protective barriers placed around trees during construction work may prevent serious injury to trunks, branches and roots. On exposed embankments, guard against soil erosion.

Grading and Drainage

In excavating for construction, save the topsoil for future surfacing. After the cuts and fills are made to established grade, spread this topsoil over the surface so all sub-soil is covered at least three inches deep.

Drainage should be away from the house. If surface water from adjacent property or other areas is a menace, construct a shallow ditch near the upper property line. This may be mulched or sodded to prevent washing. In low-lying areas, or on plots where surface drainage is inadequate, tile drains may be used. Lines of 4-inch tile, 15 or 25 feet apart, laid 2 or 3 feet deep, with a fall of 3 inches for every 50 feet, should take care of most drainage problems. Tile

drains, however, are rarely required if the area is graded and leveled to provide proper surface drainage.

After grading there should be no depressions or sunken spots that will collect and hold water. Final leveling is done with harrow, drag, or hand rake. An iron rail may be used as a drag. For best results the grade of the lawn must provide for good general drainage without serious erosion. If possible, avoid terraces or abrupt changes in slope.

Soil Preparation

It is difficult to make a satisfactory lawn on subsoil, whether excavated or exposed by grading. If feasible, cover the exposed subsoil with 3 to 4 inches of loamy topsoil. Barnyard manure, well rotted to kill weed seed, applied at the rate of 1 ton or 2 cubic yards per 1000 square feet, and thoroughly worked in to a depth of 3 or 4 inches will greatly improve subsoil that cannot be surfaced with topsoil. Other organic materials such as compost or peatmoss can be used if well rotted manure is not available.

Small-seeded lawn grasses require a good seedbed for successful establishment. Usually the soil must be plowed or spaded to incorporate fertilizer and organic matter, to kill weeds, to increase soil aeration, and to facilitate root penetration. Then it must be worked down until the soil is mellow but firmly packed except for about $\frac{1}{2}$ -inch of loose, finely granulated soil at the surface. Farm implements such as the plow, disk, harrow, spike-tooth harrow, and corrugated roller can be used to prepare seedbeds on large lawns; but spade or spading fork, hoe, rake, and roller must be used for this purpose on small lawns.

Soil Treatment Before Seeding

An attractive lawn turf, thickly spaced and weed-free, cannot be established and maintained on infertile soil. All lawn soils are deficient in nitrogen, most are deficient in phosphorous, and some are deficient in potash and calcium.

Manure or compost worked into the soil supply available nitrogen as they decompose. Mixed fertilizers also contain readily available nitrogen. A 4-12-4 fertilizer contains 4 per cent nitrogen, 12 per cent phosphate, and 4 per cent potash. This fertilizer, or one similar in composition, should be applied to the soil at the rate of 25 pounds per 1000 square feet. If 4-12-4 fertilizer is not available, substitute 25 pounds of 0-14-7 supplemented by 4 pounds of ammonium nitrate or comparable amounts of other nitrogenous fertilizers per 1000

square feet. These fertilizers should be mixed thoroughly with the soil to a depth of 3 or 4 inches. Fertilizers that contain inorganic nitrogen should not be applied long before seeding because it is readily soluble and would be leached from the soil by rain.

Ground limestone applied at the rate of 100 pounds per 1000 square feet will improve grass on a very acid soil. If a soil test shows that the lime requirement is less than 2 tons per acre, no lime need be applied. Better mixture of limestone with soil is obtained if it is applied ahead of the rough grading.

What to Sow

Kentucky bluegrass is the best lawn grass for Missouri, and should be seeded alone except on sandy soils, in deep shade, on poorly drained areas, or in large meadow-type lawns that will receive little care after establishment.

Bermuda grass is well adapted to sandy soils in the southern part of Missouri, and there provides a satisfactory lawn cover. Farther north, Bermuda grass is brown from early fall to late spring, and may winterkill. Even in southern Missouri, bluegrass is a better lawn grass on most soils because it is green during a greater portion of the year and because it is easier to mow. Bermuda may spread and become a weed in gardens and fields.

Neither bluegrass nor Bermuda grass thrives in dense shade. Red fescue or Chewing fescue are good lawn grasses for shady locations.

If grass must be sown on raw subsoil, on poorly drained areas, or under other unfavorable conditions, the addition of 1 pound of redtop for each 4 or 5 pounds of bluegrass seed will improve the chances of successfully establishing a grass cover. Redtop may also be added to reduce the cost of seeding large, meadow-type lawns, or in any lawn that will be mowed infrequently or be given little other care after seeding. A mixture of bluegrass and redtop is not, however, as attractive in appearance as a turf of pure bluegrass.

Ryegrass should *never* be sown as a part of a seed mixture for a permanent lawn. Ryegrass is short lived but so aggressive a competitor that it retards or suppresses the growth of associate grasses. Ryegrass can be used to provide a temporary vegetative cover if construction is completed too late in spring or fall for permanent but slower growing grasses to be sown. If thus used, it should be mowed to prevent seed production, and destroyed by cultivation before permanent grasses are sown.

Creeping bentgrass, which is used so successfully on golf courses for putting greens and fairways, can be used on lawns if the same care is given the lawn that the greenkeeper gives his turf. Bentgrasses are susceptible to diseases and require more frequent mowing, fertilizing, and watering than bluegrass.

White clover, whether sown or volunteer, usually occurs in patches that destroy the uniformity desired in lawn turf. White clover does supply nitrogen to the associate grass; and if nitrogen fertilizers are not to be applied to the lawn after grass is established, the addition of 5 per cent by weight of white clover seed to the mixture might be advisable. In lawns that will be given proper attention, white clover should not be sown.

Grass Seed

Too much emphasis cannot be placed upon procuring good clean seed capable of growing and free from noxious weed seed. Trusted and reliable dealers with good records for service and honest dealings can usually be depended upon for supplies of high grade seed. The kind and quality of seed used is an important factor in producing a fine lawn.

Rate of Seeding

Kentucky bluegrass, seeded alone or mixed with redtop, should be sown at the rate of 1 or 2 pounds per 1000 square feet. Red fescue or chewings fescue should be sown at the rate of 2 or 3 pounds per 1000 square feet because there are fewer seeds in each pound.

Bermuda lawns may be started from plants or seed. If seeded, sow about 1 or 2 pounds of good quality seed per 1000 square feet.

In sodding, pieces of Bermuda grass sod or sprigs are dropped in furrows 12 to 18 inches apart and covered lightly with soil. The soil surface is then made smooth. Sodding or sprigging may be done at any time during the growing season when sufficient moisture is present, but conditions are usually more favorable during April and May.

Bermuda grass established from sod or sprigs growing locally is less likely to winter-kill than that from seed which may have been grown in a much milder climate.

Time to Sow Lawn Grass Seed

Lawn seedings made in late summer or early fall generally give better results than spring sowings. Suitable dates for sowing grasses other than Bermuda are: for the northern one-third of the state, August 20 to September 5, for the central one-third August 25 to

September 10, and for the southern one-third September 1 to 15. If conditions are favorable, satisfactory results may come from early spring seedings, which should be made in southern sections in late February and early March and in northern sections in late March and early April. In fall or spring, weather plays an important role in turf establishment. Bermuda grass, if used, should be seeded during April.

Distribution of Seed

On large areas the seed may be drilled by farm drills, but broadcasting, the only method of lawn seeding that usually is available, is satisfactory. Sowing with a horn seeder, consisting of a seed sack which hangs from the shoulder and which feeds into a long tube, is one of the easiest methods of distributing grass seed uniformly. It is well worth while to obtain such a seeder if you have more than half an acre to sow. The hand-operated "cyclone" grass seeder is equally good.

After broadcasting, the seed should be raked in lightly and evenly. If available, a light coating of well-rotted manure or a thin coating of loamy soil or leaf mold mixed with sand may be spread evenly over the surface. Seed should not be covered deeper than one-half inch. After seeding, the ground should be rolled with a roller of medium weight when the soil is not wet, but in good working condition.

Mulching

To prevent serious erosion and to protect seedling grass plants on steep slopes, particularly on terraced slopes, the use of a mulch is advisable. Straw, lawn clippings, and hay free from weed seed should be applied in a very thin layer. One bale of straw per 1000 square feet is enough. It is advisable to roll as soon as the mulch is applied, lightly if the soil is moist and heavily if dry. Keep the ground moist, if possible, until the grass is established. On steeply terraced slopes, stake down cheese cloth, open mesh sacking, or other cloth through which the grass can sprout and which can be left to rot.

Mulching subsoils or soils deficient in organic matter also increases seed germination and seedling emergence by retaining moisture in the surface soil where the seed are placed and by preventing the soil from crusting. Mulching is also highly beneficial to a new seeding that must be made too late in fall or spring.

Sodding

On steep banks subject to washing and on thin or bare spots where hard and frequent usage makes successful seeding difficult,

sodding may be necessary to establish a satisfactory stand of grass.

Prepare and fertilize in the same manner for sodding as for seeding. Sod placed on hard, poorly drained, or heavily shaded plots probably will fail. Cut the sod uniformly to a thickness of about 1 inch and lay it so the joints are entirely closed. After laying, thoroughly water the sod, then tamp or roll it with a roller of medium weight. Water thoroughly and frequently until the grass roots are firmly anchored or until rain supplies adequate moisture. By watering every few days, sodding can be done anytime during the growing season, except mid-summer, but best results are usually obtained with a minimum of labor, during spring or early fall.

Why Old Lawns Deteriorate

Some of the causes of lawn deterioration are:

- (1) Poor soil or too thin a layer of good surface soil.
- (2) Poor drainage or settling, resulting in irregular cutting.
- (3) Presence of large trees with roots near the surface and heavy shade.
- (4) No fertilizer or improper use of fertilizers.
- (5) Improper maintenance such as general neglect and too close cutting.

Soils may become greatly depleted after remaining in lawn for a number of years without fertilization. Almost all soils are deficient in nitrogen and phosphorus, and some in potash. These elements can be supplied by applying commercial fertilizers.

Fertilizing to Maintain and Improve Old Lawns

To maintain good lawns and to improve poor ones apply 10 pounds of 10-6-4, 4 pounds of ammonium nitrate, or 5 pounds of ammonium sulphate per 1000 square feet every spring in late March or early April. In addition, 10 to 20 pounds of 4-12-4 or similar fertilizer per 1000 square feet applied during the latter half of September will be beneficial. To prevent possible injury to the grass by burning, the fertilizer should be applied when the grass is dry, and then be watered in.

The use of nitrogen fertilizers in late spring and summer should be avoided in Missouri because of the stimulus they give crabgrass. Fall and early spring fertilization with nitrogen stimulates bluegrass before and after the summer period when crabgrass grows, and thus enables bluegrass to compete better with this troublesome summer annual weed grass.

Fertilizers recommended for spring application to bluegrass also

will improve the turf density and color of Bermuda grass, but should not be applied until late April or early May.

Watering the Lawn

Watering or sprinkling the lawn is of doubtful value, especially during July and August when high temperature exhausts food reserves in bluegrass plants that are kept growing vigorously by frequent watering. Artificial watering should be resorted to only when necessary to keep the grass green or to keep it alive during long and severe drought.

Frequent applications of water in small quantity are undesirable and damaging. If it is necessary to water the lawn, apply enough water to wet the soil to a depth of 5 inches or more, and then do not water again until the grass begins to wilt. Frequent watering during mid or late summer encourages the development of crabgrass. When drought-breaking late summer rains do not occur before September 15, thorough watering then will benefit bluegrass.

Rolling

Because of freezing and thawing that occur in all parts of the state, rolling the lawn each spring is usually a good practice. The best time for this is soon after frost leaves the ground, and while it is still fairly soft or springy. This period will usually occur in early March for southern sections and in late March for northern districts. Rolling tends to smooth the surface, and press into the soil grass crowns and roots that have been pushed up by alternate freezing and thawing.

Reseeding

Experience and observation have shown the reseedling of bluegrass lawns not only to be unnecessary, but usually a complete waste of seed and effort. Even a thin stand of old bluegrass plants offer competition that bluegrass seedlings cannot survive. Furthermore, if the grass is thin because of bad mowing practice or depleted soil, setting the mower to cut high and applying needed fertilizers will improve the turf, but sowing more seed will not.

Reseeding, therefore, is effective only if sizeable areas of grass have been killed. In these, vegetation should be removed and the surface soil should be loosened enough to cover the seed.

It is sometimes advisable to reseed where bluegrass has been severely injured by a heavy growth of crabgrass. This should be done in late September after the crabgrass has ceased growth.

Shady Lawns

In growing grass under trees it is important to get all the growth possible when the trees are dormant and leafless. A complete fertilizer such as 4-12-4 or 5-10-5 applied at the end of September will stimulate fall growth. Another application higher in nitrogen should be made in March to stimulate early spring growth. Mowings should be high and infrequent.

Management Near Trees, Shrubbery, and Walks

Cut the grass close to trees with hand shears. The space about small trees may be kept cultivated. Avoid striking the base of young or old tree trunks with the lawn mower, as this may injure and eventually destroy trees. The removal of comparatively low branches of shade trees increases materially the amount of sunlight in shaded areas. This is likely to result in better grass growth. Views from the house and yard may be improved and the areas beneath the trees become serviceable for chairs, lawn benches and other uses.

Mowing

Too close mowing injures bluegrass. The leaves not only provide the attractive green cover for which grass is grown in lawns, but they also manufacture carbohydrates on which the plants depend for nutrition. Close mowing starves the roots, and thereby retards their growth. Shallow rooted grass suffers more from dry weather than deep rooted grass, and must draw its mineral plant foods from a more restricted soil mass. Grass weakened by too close mowing is unable to compete successfully with crabgrass and other weedy grasses.

Bluegrass should never be mowed shorter than 1½ inches, and a minimum cutting height of 2 inches would be better for the grass, although the lawn cannot be cut as evenly when clipped high as when mowed short. Where shade limits the growth of bluegrass and tends to thin the stand, a minimum cutting height of 2½ inches is advisable. New grass should not be cut until it has reached a length that will not stand upright.

During May, when bluegrass grows most vigorously, the lawn may have to be mowed at weekly intervals to keep the grass at uniform height, to prevent heading, and to avoid having to rake off a heavy accumulation of cut grass. As the season progresses, the interval between mowings lengthens. Good bluegrass need not and should not be mowed frequently during summer and fall.

Bent grass not only withstands close mowing better than bluegrass, but it requires close and frequent mowing to keep it in satisfactory condition. The bent grass lawn should be mowed every other day during the growing season and never higher than $\frac{1}{2}$ inch.

Bermuda grass withstands close mowing better than bluegrass but it need not be mowed as closely nor as frequently as bent grass.

Red fescue, Chewings fescue, and redtop should not be cut shorter than recommended for bluegrass.

Grass Clippings and Leaves

The clippings should not be removed from the lawn unless heavy enough to damage the grass, or to detract from the appearance of the lawn, except during wet, humid weather when unraked clippings sometimes increase certain fungus diseases that infect grass. Clippings are valuable as a mulch about the crowns of the grass plants. The light mulch holds and conserves moisture, and upon decay returns to the soil plant foods previously absorbed. Tree leaves in sufficient quantity to produce a smothering effect are, however, injurious to grass and should not be allowed to accumulate for long periods.

Weed Control

The shortened name for 2, 4-Dichlorophenoxyacetic acid is 2, 4-D. It is one of a group of plant growth regulators or hormones and is selective in action. That is, it does not kill all plants and it is most effective on broad-leaf ones. As a result, 2, 4-D may be used to kill most weeds in lawns without injury to grass.

After 2, 4-D is applied, the leaves curl up and turn yellow, the stems twist as if in convulsions. Finally the affected weeds dry up and die.

Most clovers are injured or killed by 2, 4-D, especially when growth is rapid. If lawns are treated early, white clover may not be completely killed, and may recover.

Study and observations indicate that soil micro-organisms and plant pathogens in the soil are not destroyed. Furthermore, the soil is not made unfit for the growing of other plants. Reports also indicate that animals grazing grass sprayed with 2, 4-D are not likely to be injured.

Precaution must be observed to avoid applying 2, 4-D to plants which are not to be destroyed such as flowers, shrubs, trees, and vegetables.

Another precaution is that the sprayer or sprinkling can used in making applications of 2, 4-D should not be used for other spraying without cleaning thoroughly. Moreover, since it is so difficult to

remove the weed killer from containers, it is suggested that a separate outfit be kept for use of 2, 4-D only.

2, 4-D applied any time from spring to fall, when the ground is moist and weeds are growing rapidly is effective. In general, the poorest results are secured in July, August and September. The chemical is more effective on young plants or seedlings than on mature or dormant plants.

In most cases one good spraying is sufficient. Some weeds, however, may survive. A follow-up application about 3 to 4 weeks later may be needed.

If properly applied, 2, 4-D is effective against such common weeds as dandelion, plantains, chickweed, wild parsnip and many others. However, for best results, the directions on containers should be followed carefully.

2, 4-D is not effective against crabgrass. This pest is best controlled by: (a) stimulating the early growth of bluegrass with nitrogenous fertilizer; (b) not mowing bluegrass too close; and (c) not watering the lawn during the summer. Crabgrass seedlings, which emerge in late May or early June, are injured, and may be killed by shade and competition offered by a dense, vigorous stand of bluegrass 2 to 4 inches tall. Summer watering is much more beneficial to crabgrass, which thrives at high temperatures, than to bluegrass.

SUMMARY OF SUGGESTIONS

1. The new lawn area should be well graded, smoothed, and covered with a few inches of fertile topsoil before seeding. See page 2.

2. A few days before sowing the new lawn, work into the top 3 or 4 inches of soil 25 pounds of 4-12-4 (or similar fertilizer) per 1,000 square feet. See page 3.

3. High quality bluegrass, or a mixture of 20 pounds bluegrass, 4 pounds redtop, and 1 pound white clover (making a total of 25 pounds) may be used. Sow evenly and at the rate of 1 to 2 pounds per 1,000 square feet. See page 4.

4. In general, the best seeding dates are August 20 to September 5 for the northern one-third of the state, August 25 to September 10 for the central one-third, and September 1 to 15 for the southern one-third. See page 5.

5. A regular fertilizing schedule should be followed every year. Apply 10 pounds of 10-6-4, or 4 pounds of ammonium nitrate or similar fertilizer annually in late March or early April. Fall and early spring fertilization with nitrogen stimulates bluegrass during periods unfavorable to crabgrass. See page 7.

6. A better lawn will result if the lawn mower is adjusted to cut the grass at least 2 inches high. See page 9.

7. Applications of 2, 4-D well timed and properly made will control dandelion, plantain and other lawn weeds. See page 10.

8. Heavy shade and tree roots may starve out lawn grasses. See page 9.

9. Leaves and other litter, if thick enough to smother the grass, should be removed. See page 10.

10. Watering or sprinkling the lawn is of doubtful value, especially during July and August. See page 8. Summer watering is more beneficial to crabgrass, which thrives at high temperatures, than to bluegrass. See page 11.