



BETTER LAWNS



for Oklahoma



CIRCULAR E-703

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Better Lawns

for
Oklahoma

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A good lawn is an important segment of the complete landscape plan. Good planning, sound establishment methods, and good maintenance practices are all necessary for success. Time, effort, and expense are required; but, the work is rewarding in terms of satisfaction for the family and neighbors.

Establishing Your Lawn

Planning of the building locations on the site is necessary for a well-proportioned lawn and home grounds setting.

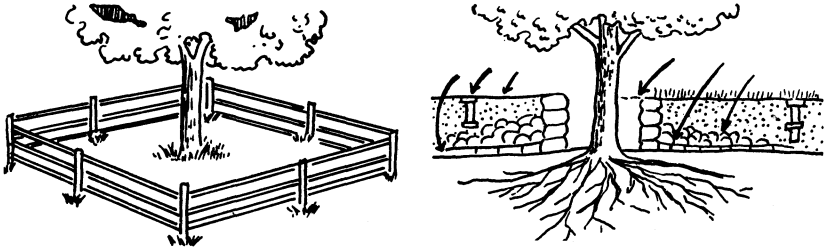
The top soil should be saved during the rough grading and excavating for construction. Do not spread low grade subsoil on the surface to cause future problems.

Have a soil test made to determine fertility needs. (Each county Extension agent's office has soil testing facilities). If phosphate and lime needs exist, be sure to work the materials into the soil four to six inches deep before planting.

Remove all building refuse such as waste plaster, lumber scraps, and paint cans. Do not permit such foreign materials to be buried on the premises to cause future problems.

Grade for drainage and appearance. Water must be carried away from buildings, but the slope should not be too noticeable. The house should look as if it "belongs" in the landscape.

Acknowledgments: Wayne W. Huffine, Associate Professor of Agronomy
Robert P. Ealy, Professor of Horticulture
Richard N. Payne, Assistant Professor of Horticulture



Fence off trees on site before construction begins, to protect from damage by trucks and machines. Tree well may be needed if grade is raised. Do not fill over roots.

Protect valuable trees during construction and permanently for the future. Avoid deep filling or extensive soil removal near the base of trees. Tree wells and crushed rock or a tile system should be installed to prevent root suffocation caused by soil filling. Use a change in grade or a retaining wall to hold soil and roots in areas of cut or removed soil.

Construct all walks, patios, curbing, and similar structures at least two inches above the finished grade. The slight elevation compensates for the future elevation of the soil from such factors as grass clippings, grass roots, and sifting soil and insures better drainage.



Deep rooted shade trees allow grass to grow under limbs. Shallow rooted varieties compete with grass for surface moisture and create lawn problems.

Plant deep rooted trees when possible such as Pecan, Thornless honey-locust, and Ash for less root competition with lawn grasses and other plants.

If a permanent lawn watering system is to be installed, do it before the finished grading and lawn grass establishment.

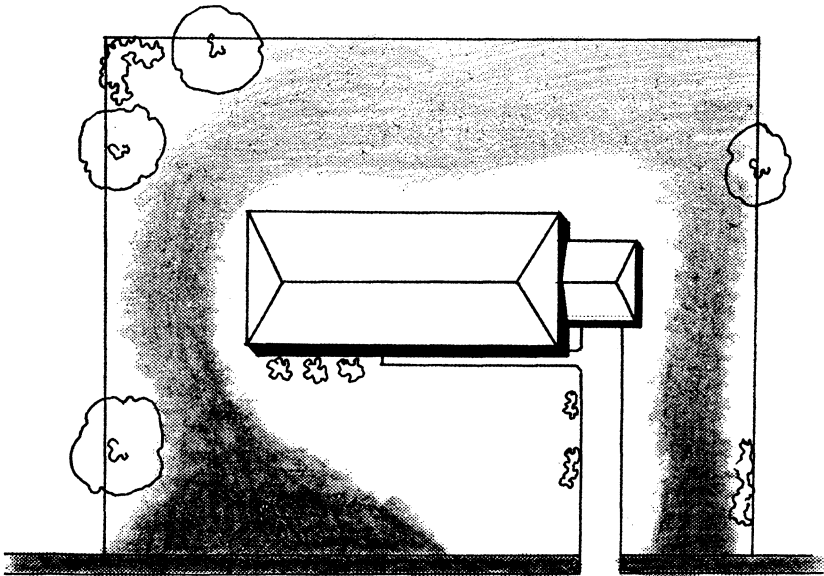
Do not plant improved grass strains in existing common strains. Chemical treatments can be used successfully to kill existing grasses but some expense and skill are involved.

GRADING should provide adequate drainage and a pleasing appearance. Two basic elevation points must be determined for rough grading:

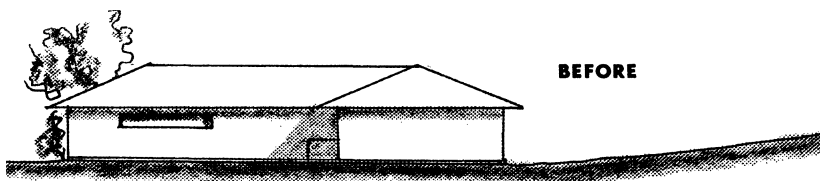
(1) The elevations at the base of buildings, (2) the lowest elevation point or points to carry the surface water away.

For ordinary conditions, a slope of one foot drop in 50 to 100 linear feet is adequate for surface drainage. A slope greater than one foot drop in 20 linear feet is considered excessive. Special treatment is needed for areas having extensive elevation changes. Such slopes might necessitate a series of grassed terraces or possibly retaining wall construction.

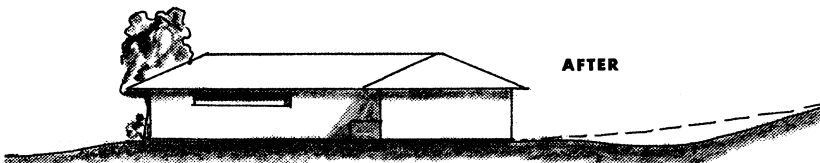
When the natural slope is upward from the building, a wide, depressed, grassed drain can be formed to correct the condition. An excessive slope might require a retaining wall and corrective grading. Size of the area and degree of slope are factors which determine the distance from the building and width of the drain. When possible, the grassed drain should be 10 to 20 feet wide and have a lateral slope of three to four inches for each 10 feet of distance. The gentle slope should seem almost level as it drops slowly to the lowest drainage point. Gradual, wide curves are more attractive and efficient than abrupt narrow changes.



White area indicates highest elevation. Light shading merging to dark areas at bottom of drawing indicate direction of drainage to lowest points on site.

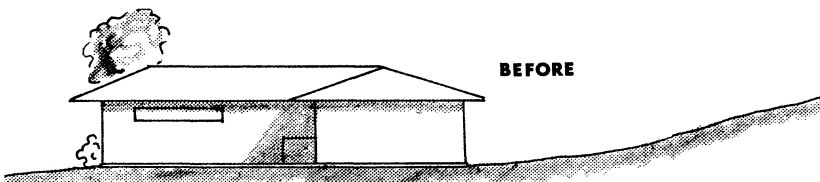


BEFORE

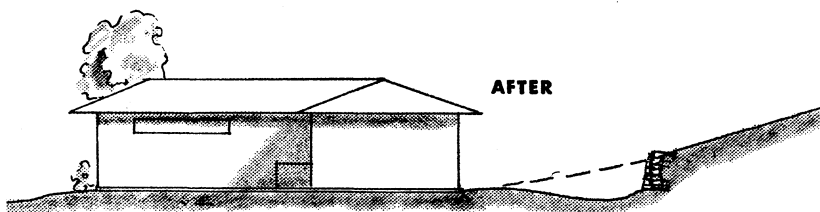


AFTER

When water drains toward house, create a grassed drain way around building. Keep slopes gentle and provide lateral fall so water doesn't stand in low spots.



BEFORE



AFTER

Slopes too steep to accommodate grassed drain way may require use of retaining wall and grading of drain way between wall and house.

Soil Improvement

The ideal soil for a good lawn is a fertile loam, neutral to slightly acid, with plenty of humus and a well drained sub-soil. Very few soils are perfectly balanced—but corrections can be made.

HEAVY, COMPACT CLAY soil needs the addition of organic matter and sharp sand. These materials can be added in layers, each one inch in thickness (four cubic yards to 1,000 square feet) and thoroughly mixed in the surface four to six inches of soil. Organic matter can be in the

form of well-rotted manure, aged sawdust, commercial materials, sewage sludge, or similar materials. Sand alone is of very little value in tight clay soils. Avoid forming definite layers of materials by thorough inter-mixing of the soil. For either a sandy or heavy soil condition, a four to six inch layer of good, loamy top soil is beneficial.

VERY SANDY or POROUS soils need organic matter and clay added to increase the water holding ability.

Gypsum mixed in the surface four to six inches of soil at the rate of 25 to 50 pounds per 1,000 square feet of area can help the general soil structure of heavy soil. This treatment would be more effective in highly alkaline soils from central to western Oklahoma, except in soils naturally high in gypsum content.

Breaking the Soil

Plowing, spading, or sub-soiling (chiseling) and disking are some of the best methods of preliminary soil preparation. Sub-soiling — if done when the soil is dry—cracks the soil to a depth of about 16 inches, which permits greater moisture absorption. The effectiveness of sub-soiling can be extended longer with the inter-mixture of organic matter in the cracked areas.

Rotary tillage, because of the beating and floating action if done repeatedly, may destroy to some extent the soil structure. More depth of soil preparation is usually needed. If a rotary tiller is used—be sure the soil is settled before planting.

Soil Fertility

The three major fertilizer elements, nitrogen (N), phosphate (P) and potash or potassium (K), are always listed on the analysis tag of a complete commercial fertilizer in this order. Thus the number 10-20-10 means 10% nitrogen, 20% phosphate and 10% potassium or potash.



Deficiencies can be determined by a soil test, available through the county agent's office. Nitrogen, phosphorus and potassium are the three basic soil elements. Inorganic nitrogen and potash fertilizers commonly used are highly soluble and can be applied by surface ap-

plication. Most phosphates are slowly available and should be worked into the top four to six inches of soil during the preparatory work. Superphosphate can be applied, as a general recommendation, at the rate of 20 to 40 pounds and potash at the rate of seven to 14 pounds per 1,000 square feet if commonly deficient in the locality. If grass planting is to be done within a few days after soil preparation, a combination fertilizer can be selected from the following recommendations for 1,000 square feet of surface area.

20 pounds 16-20-0 and 7 pounds 0-0-60 or

30 pounds 10-5-5 or

15 pounds of ammonium sulfate and 10 to 15 pounds 20% superphosphate and 5 pounds 60% muriate of potash or

10 pounds of ammonium nitrate and 10 to 15 pounds 20% superphosphate and 5 pounds 60% muriate of potash.

Distribute the fertilizers evenly and mix them in the surface four to six inches of soil.

If soil tests show a reaction of more than slightly acid—apply 30 to 50 pounds of Dolomitic limestone per 1,000 square feet with the other pre-planting fertilizers. **The eastern 1/3 of Oklahoma is more likely to benefit from lime applications than other parts of the state.**

Lawn Planting

Methods

the soil to prevent the formation of depressions and hollows.

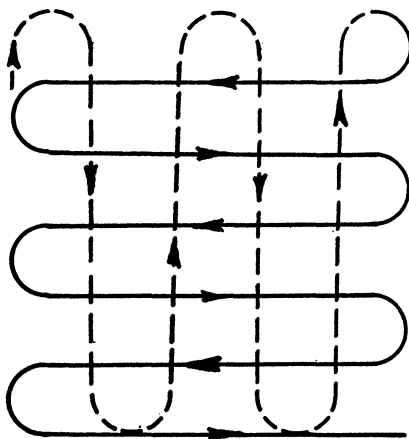
Seed-bed preparation is the last step before planting. **The final surface preparation usually needs to be finished with a hand rake.** Level

If weed seeds are present in the soil, it might be desirable to delay planting two or three weeks until the seeds have germinated—then kill the seedlings with cultivation or chemicals.

SEEDING and VEGETATIVE PLANTING: These are two methods commonly used for starting a lawn. Vegetative planting pertains to using sod pieces, roots, or runners of the original plant.

Some grasses are started only from seed, some from seed or vegetative means, and some by vegetative means only. If there is a choice, vegetative means are generally recommended over seeding for Oklahoma conditions.

Seed to be planted should be divided into two equal parts and mixed thoroughly with a fine carrier such as sand, good soil, or compost. The seed can be easily broadcast or planted with a seed or fertilizer applicator. Plant half the mixture one direction and the other half at right angles for more even distribution. (See table on Page 18 for seeding rates.) Rake the soil lightly to cover the seed 1/8 to 1/4 inch deep. Sprinkle the area slowly and evenly for firm contact of the soil with seeds. Light waterings might be necessary as often as twice daily until the seed-

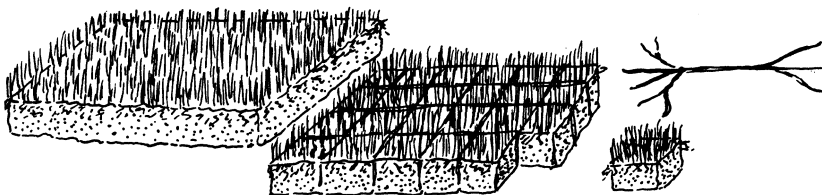


Broadcast seed by following a pattern like this for even coverage.

lings are established—**never allow the soil surface to dry out during this critical period.** A regular watering program as described under Lawn Maintenance can be followed after establishment is assured.

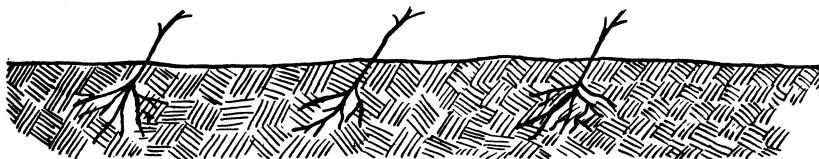
SODDING or SPRIGGING: Large sod pieces (12" x 12") or strips may be used to cover entire areas of steep slopes or small areas needing rapid coverage. Sod pieces or "plugs" cut with a plugging tool, are usually about 2 x 2 inch pieces including grass tops, roots, and soil. Sprigs consist of pieces of roots or runners without the attached soil. Alternate placement of sod pieces in a checkerboard manner gives a more desirable type coverage than opposite placement in rows or shallow furrows.

Sprigs of several turfgrasses are planted slanting 1 to 3 inches deep



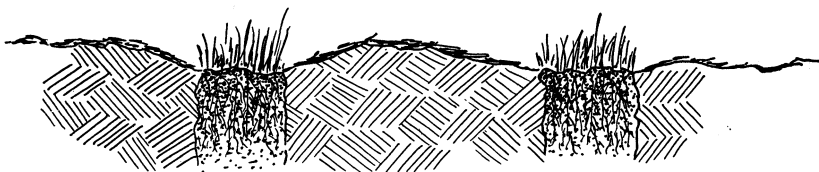
Sod may be planted in large 12 x 12 inch blocks or 2 inch square plugs. Leave tips of sprigs above ground when planting by this method.

with the surface tips exposed above ground. Shallow furrows opened with a garden plow help maintain uniformity of rows and contour planting. Row plantings will also permit crust breakage and weed control with a rotary blade garden plow until the runners are formed. Cultivation, however, should be a mere breaking of the soil surface crust without furrowing.



Plant sprigs of turfgrass 1 to 3 inches deep with tips exposed. Use garden plow to open shallow furrows either in rows or along contour of slopes.

Sod plugs are set slightly below the soil surface level to form a small basin around each piece. The lowered area tends to settle moisture near the plug and helps prevent rough, high places in the lawn. Water the area thoroughly and frequently until the roots are well established. Alternate placement of sod pieces in the rows develops a more uniformly level grass coverage than opposite placement.



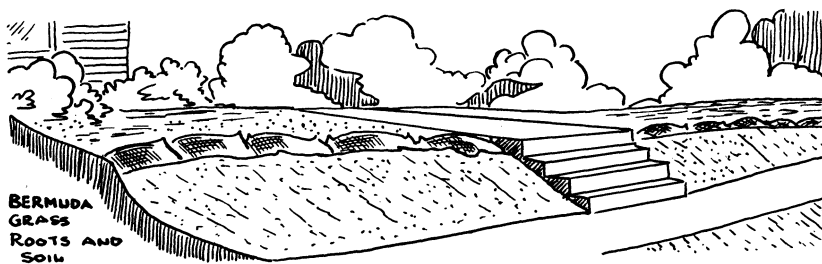
Set sod plugs slightly below surface to form water catching basin around plug and to prevent formation of high spots in lawn.

The cost of material and planting is initially greater with the sod pieces or sodding, but the quality and uniformity of grass coverage is more dependable than seeding. Spacings are discussed under specific lawn grasses.

Special machinery for sprig planting can be used for large areas. Also, a manure spreader loaded with a mixture of top soil, humus, and bermuda grass sod pieces can be used for distribution, followed by light disking. Time of planting lawn grasses is discussed in the table on Page 18.

Treatment of Slopes

Steep slopes are sometimes difficult to retain until covered with permanent lawn grasses. Retaining walls are sometimes effective and necessary, but are expensive and difficult to construct. Burlap bags containing good soil and bermuda grass pieces can be effectively used to retain and sod slopes. Fill the sacks about $\frac{3}{4}$ full of good soil containing an intermixture of bermuda sod pieces. Arrange the filled bags end to end to follow the general area contour and submerge to almost cover the bag. The filled sacks can be used anytime during the year—but the period from early April through June is more desirable. Water the retainer bags to prevent excessive drying. The soil and sod filled bags can also be used as baffles across depressions—or spot placed to speed up grass coverage on difficult areas. Bermuda grass is not recommended in heavily shaded locations.



Burlap bags filled with good soil and bermuda grass sprigs may be buried along contour line of sloping areas to prevent soil washing.

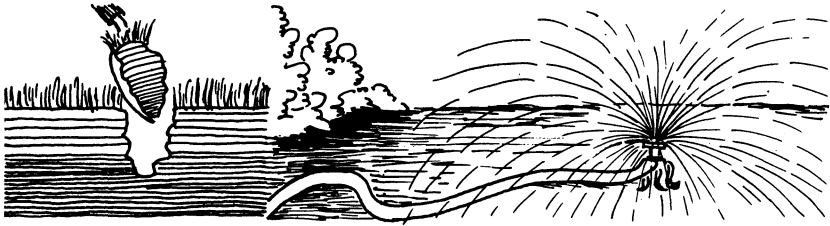
Sod pieces can be used for baffles and retainers on slopes or across waterways when strips or blocks are laid end-to-end. Small problem areas are sometimes completely covered with sod.

Burlap or similar material can be pegged on slopes over the seeded or sodded grass. Also, coarse hay, cane, corn-stalks, or similar materials can be used to help retain slopes until sodded.

Lawn Maintenance

WATERING. An established lawn having good soil preparation, and good general maintenance will need watering only during drought periods.

To determine the need for water, examine the soil to a depth of 3 to 4 inches. If the area is dry, water thoroughly to a depth of 5 to 6



Remove soil plug to check need for water. If soil is dry below root depth, soak to a depth of 3 or 4 inches with a fine mist spray.

inches. One inch of water will wet average soil, if applied slowly, three to four inches deep. With a spray from an ordinary hose and average pressure, 30 to 60 minutes are required to soak an area 10 x 10 feet to a depth of 3 to 4 inches. Light frequent waterings encourage shallow grass root growth and consequently more weed problems, drought damage, and freeze damage.

Early morning watering is preferred over mid-day or evening applications. During the heat of the day there is more evaporation loss, and evening waterings tend to encourage more plant disease problems. Winter watering is sometimes needed during extended dry periods.

MOWING: The newly established lawn should be permitted to grow to a height of about three inches to insure better establishment before clipping to the desired height. Mow the lawn frequently, so that no more than 1/4 inch is removed at one time. Clippings, if left on the lawn, provide organic matter and insulating protection for the grass roots during periods of excessive heat or cold. However, if grass clippings are allowed to accumulate too much—they may inhibit the penetration of water, air, and encourage diseases. **Too much time between mowings necessitates the cutting of grass stems instead of leaf blades with shock to the plant and unsightly discoloration resulting.**

Most warm season grasses can be mowed close during the spring. During mid-summer and fall, the lawn mower should be set to cut warm season and cool season grasses higher. Close mowing in hot weather can weaken or kill most cool season grasses (Bluegrass, Fescues, etc.)

Mowing heights are discussed under Grasses and Ground Covers.

The lawn mower should always be sharp enough to cut the grass cleanly without tearing or bruising the leaves. Rotary blades need frequent sharpening.

Adjust the cutting height, reel or rotary mower, on a flat surface such as concrete walk or floor. Be sure the cutting blades and height are uniformly adjusted for an even lawn surface.

FERTILIZATION: Low soil fertility is probably one of the most common causes of lawn failure. Nitrogen, the foliage growth stimulator, is usually the most deficient of the three basic elements. However, if deficiencies of phosphate and/or potash exist in the general area, nitrogen will not be as effective.

The following annual fertilizer schedule for each 1,000 square feet of lawn is recommended for bermuda grass lawns unless a soil test shows other fertility needs:

FIRST APPLICATION: April 1 to May 1

25 pounds 10-5-5 if phosphate and potash are needed, or

20 pounds 16-20-0 if phosphate is needed plus 5 pounds 0-0-60, or

12 pounds of ammonium sulfate (20%) if phosphorus and potassium are adequate in the soil, or

7 1/2 pounds of ammonium nitrate (33 1/3%) if phosphorus and potassium are adequate in the soil, or

20 pounds of commercial organic fertilizer plus 5 pounds ammonium sulfate or 3 1/2 pounds ammonium nitrate.

SECOND APPLICATION: May 15 to June 15 (or 4 to 6 weeks after first application).

35 pounds commercial organic fertilizer, or

12 pounds ammonium sulfate if phosphorus and potassium are not deficient, or 7 1/2 pounds ammonium nitrate if phosphorus and potassium are not deficient.

THIRD APPLICATION: 4 to 6 weeks after second application.

Same materials and amounts. Time the last nitrogen application to be applied not later than one month before the average killing frost date for the area.

Buffalo grass, a native grass frequently used for lawns in the western half of the state, would need only about ½ or less of the fertilizer amounts recommended for bermuda grass. For cool season grasses such as Bluegrass, Fescues, and Ryegrasses—the first application can be made September 1 to October 1 and the second application 6 to 8 weeks later. Centipede grass has a low fertility requirement. St. Augustine and Zoysias are intermediate in their fertility requirements.

All fertilizers should be evenly distributed. **Do not apply inorganic** (ammonium nitrate, etc.) **materials when the grass leaves are wet.** Water the lawn immediately after applying fertilizer (even if the soil seems moist) to prevent “burning” of the grass foliage.

Lawn Grasses

and underground rootstalks. It is very aggressive in its invasion habits, therefore, constant edging is required to keep it out of flower and other plant beds. Once established in other plantings—eradication is quite difficult.

BERMUDA: Common Bermuda is the most widely used lawn grass in Oklahoma. It grows vigorously — spreading by above-ground runners

Bermuda grass does not thrive in conditions of heavy shade, poor drainage, high acidity or low fertility. Frequent applications of nitrogen are necessary for maintaining a desirable lawn turf. (See Fertilizer recommendations under Lawn Maintenance).

Although drought resistant, watering is needed during extended dry periods to maintain a good appearance. Close frequent mowing, 1/2 to 1 1/ inches is needed for a dense turf.

Bermuda grass is persistent and exceptionally wear resistant.

Sodding or sprigging from fine leaf, winter hardy types from local sources are preferred over seeding. The grass from seed frequently suffers severe heat and/or winter damage during the first season—and there is no assurance of uniformity of color, texture, or hardness. Sod or sprigs spacings are usually 12 x 12 inches. Closer spacings will reduce the time required for coverage. Plantings made during May and June are usually more satisfactory than earlier or later plantings.

Chemicals can be used to kill bermuda grass when it is not desired in an area, but caution must be exercised to prevent damage to other plantings.

U-3 BERMUDA is an improved strain of common bermuda grass. It has finer leaves and stems than common and produces an excellent turf. Usually, it "greens-up" earlier in the spring and stays green longer in the fall than common bermuda. Its many, slender runners have leaves distributed along their entire length. The grass is very winter hardy and resistant to diseases usually found on common bermuda.

U-3 is always started from sod, sprigs, or roots—no seed is produced which will give the desired uniformity. Growth is, initially, somewhat slower than common bermuda and vegetative pieces should be spaced about 12 x 12 inches or closer.

Mowing should be frequent— $\frac{1}{2}$ inch to $1\frac{1}{4}$ inch high. Other characteristics pertaining to shade and general maintenance are the same as common bermuda.

SUNTURF BERMUDA is a selected strain with many desirable characteristics. In comparison with U-3 bermuda grass—it has finer texture and darker green color. The grass spreads only by above ground runners—which reduces its encroaching habits. The extent of drought tolerance has not been fully determined, but perhaps will be somewhat less than U-3.

Plantings are made from vegetative means only—viable seed is not produced.

Other general characteristics and maintenance factors are similar to common and U-3 bermuda grass.

BUFFALO grass is common in western Oklahoma. It is one of the best native lawn grasses for the sunny locations and the heavy clay soils of that area.

The grass is very drought tolerant, requires less frequent mowing than bermuda grasses and does not invade plant beds nearly so aggressively. The sod produced does not have the density of bermuda grasses. Buffalo grass usually turns partly or completely brown during mid-summer.

Buffalo grass can be started from sod or seed. Select the female sod pieces because male plants have flag-like, unsightly, flower heads that extend above the level of the grass leaves. Its runner spread is slower than common bermuda grass and sod pieces should be placed about 12 x 12 inches or closer. Seed, if used, should be hulled or treated before planting. The planting depth should not be more than $\frac{1}{4}$ inch.

About one half the nitrogen fertilizer recommended for bermuda grass is sufficient for buffalo grass. Mowing at a height of about 1¼ inches will produce the most desirable sod.

BLUE GRAMA is similar to buffalo grass in many respects relative to hardiness and drought resistance. It thrives on sandy-type soils or clay soils. The mowing height should be about two inches. Since blue grama grass does not spread by runners, a heavy rate of seeding is required to help prevent a rough, clumpy growth.

ST. AUGUSTINE and CENTIPEDE grass from common sources are not too well adapted to general Oklahoma conditions. At present their use is mainly within the confines of the southeast corner of the state.

They are shade tolerant, require only moderate amounts of nitrogen, and are tolerant of low organic content soils. Their leaves are coarser than bermuda grass. The mowing height is 1¼ to 2 inches. Plantings at present are made from sod or sod pieces.

ZOYSIA grasses generally require two years or more for establishment in Oklahoma. Planting is from sod with 12 x 12 inch or closer spacings. Zoysia grasses are adapted to moderate shade or full sun.

COOL SEASON grasses are used mainly for shaded lawn conditions or temporary cover when construction work and grading is completed too late in the fall for establishment of a permanent type lawn grass. Cool season cover crops should be completely killed by disking or chemicals and the soil worked prior to sodding or seeding the permanent lawn grass. Otherwise, temporary grasses may have a tendency to grow until late spring and early summer which would retard establishment of the permanent grasses. Organic matter is also added to the soil by turning the cover crops under.

KENTUCKY BLUEGRASS grows fairly well in the shade if plenty of fertility, organic matter and good drainage are provided. A neutral to slightly acid soil reaction is preferred. The mowing height should not be shorter than 1½ inches. Bluegrass has a tendency towards semi-dormancy in mid-summer. Merion is a selected strain of Kentucky Bluegrass, but its comparative qualities do not merit paying the much higher price for seed than common bluegrass. Bluegrass is used mainly for shaded lawn conditions in northern Oklahoma.

RYEGRASS can be overseeded on bermuda grass lawns in the fall. It can be seeded in the fall to provide cover for new lawns until permanent

warm season grasses can be planted. Before planting the permanent lawn in the spring, be sure to completely kill the ryegrass by repeated disking or chemicals.

FESCUES, Alta or Kentucky 31, can be used for permanent shaded lawn conditions if proper culture is practiced. The grass is green most of the year except for some browning during extended hot or extremely cold periods. Thick seeding, adequate fertilizing and watering, and frequent mowing to a height of about two inches are essential for the best turf. Clumpy growth results if the seeding rate is not heavy.

GRASS SPECIES PLANTING RATE AND TIME

GRASS	Pounds of Seed Per 1,000 sq. ft.	Amount Plant Material Per 1,000 sq. ft.	Time of Planting
Bermuda Grass			
Common	2 to 3	10 sq. ft. sod or 1 bu. roots or sprigs (12" x 12" spacing)	April, May,* June
U-3	-----	Same	Same
Sunturf	-----	Same	Same
Buffalo Grass (Treated)	1/2 to 1	25 to 30 sq. ft. sod (12" x 12" spacing)	Same
Blue Grama Grass (Unhulled)	1 to 1 1/2	-----	Same
Kentucky Bluegrass,			
Common	2 to 3	-----	Sept., Oct.
Merion	2 to 3	-----	Same
Tall Fescue (Alta, Ky. 31)	6 to 8	-----	Sept., Oct.
Centipede	-----	8 to 10 sq. ft.	April, May, June
Rye Grass (Domestic and Perennial)	6 to 8	-----	Sept., Oct.
Zoysia			
	-----	30 sq. ft. sod-ded (2" x 2" plug)	April, May, June
	-----	6 sq. ft. sod sprigged	
Rye, Wheat, Barley, Oats	5 to 8		Sept., Oct.

* Later plantings are more subject to heat and winter damage but can be successfully made with extra effort and maintenance.

RYE, WHEAT, BARLEY, and OATS are good cover crops to hold the soil during fall, winter, and early spring months. Seed at the rate of five to eight pounds per 1,000 square feet. After seedlings are well established and the top growth is about three inches, mow to a two inch height.

Four to six weeks prior to permanent lawn planting, a gradual lowering of the cutting height $\frac{1}{4}$ inch per week, will gradually kill the cover crop especially if permitted to grow tall between cuttings. Maintenance of a close clipped sod will tend to extend its growth later into the spring. The remaining stubble will help to hold the soil until the permanent lawn grass is established. Heavy or compacted soils might need cultivation before sodding, sprigging, or seeding.

GROUND COVER PLANTS are sometimes necessarily used on areas on which it is too difficult to establish or maintain a grass cover. Heavily shaded areas, steep banks, rough and rocky areas, and similar conditions might be factors necessitating the use of ground cover plants. Landscape designers frequently employ the use of ground covers for a change of texture or general effect. Some of the common plants used are:

Common Periwinkle (*Vinca minor*); English Ivy (*Hedera helix*); and Japanese Honeysuckle Vine (*Lonicera japonica*); Creeping Junipers (*Juniperus horizontalis plumosa*) are used on rough, sunny areas. Many low growing annuals such as Portulaca and Small-leaved Sedum can be used.

Lawn

Renovation

The methods used and extensiveness of reworking depends on the condition and cause of a poor lawn.

Faults that can usually be corrected and the original planting retained are: Low soil fertility; soil reaction; slight soil surface compaction; too much shade; and general neglect. The cause must be determined before corrections can be made.

If the entire lawn area is not covered with desirable grasses—complete renovation with a new seedbed preparation may be needed. Follow the procedure discussed under Establishing Your Lawn.

Bermuda grass has the ability to spread rapidly when only a few runners remain in a planting. Most other grasses need reseeding or resodding. Improved grass strains such as U-3 or Sunturf Bermuda grass should not be planted in partly established common Bermuda grass stock. Undesirable grass strains can be killed chemically, but the pro-

cesses require a degree of skill and at the present are fairly expensive for large areas.

Lawn renovation for Bermuda grass is most successfully accomplished during the spring and early summer months. Cool season lawns should be renovated during late summer and early fall.

Lawn Problems

SHADE: It is hard to maintain a good stand of grass under trees—especially shallow-rooted types such as elms and maples. The following

suggestions might help to produce a better lawn under trees:

1. Fertilize the grass twice as frequently at the normal rate. Early spring applications help the grass start growth before trees develop new leaves.
2. Fertilize the trees to help prevent competition with the grass for nutrients. Use punched or augered holes for deeper fertilizer placement.
3. Remove fallen leaves and other debris frequently.
4. Remove unnecessary trees. Prune the remaining trees to remove dead or low branches to reduce shading of the grass.
5. When watering, wet the soil to a depth of at least 6 inches.
6. Use shade tolerant grasses if ordinary lawn grasses cannot thrive. See Lawn Grasses.
7. In some cases, a ground cover planting might be more desirable than lawn grasses.

SOIL COMPACTION: Compaction is a packing of the surface few inches of the soil which generally causes difficulty in water absorption, aeration and root growth. The condition can be caused by heavy foot traffic; vehicles or machinery; or poor soil preparation from the beginning. Wet soil compacts more readily than dry soil.

Aeration can be accomplished by the use of machinery or hand tools. Equipment dealers, nurserymen and other commercial concerns sometimes have the equipment for rent—or the work can be done on contract.

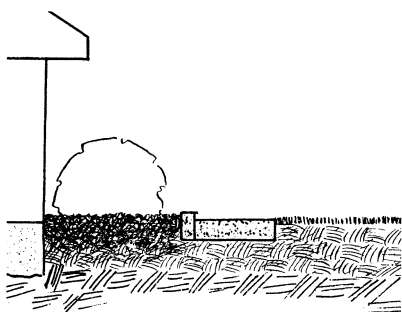
Sub-soiling is another means of helping overcome the problem of compaction. A tractor drawn sub-soiler penetrates to a depth of about 16 inches and causes cracking of the soil in many directions—unless the soil is too wet. Sloping areas should be sub-soiled on the contour. Underground pipes and wires are limiting factors with sub-soiling—caution should be exercised.

WEEDS: Good maintenance, to the extent of having a dense healthy sod, is the best protection against weeds in the lawn. Since the lawns in most neighborhoods are usually not perfectly maintained, it is often necessary to use chemicals to help kill weeds.

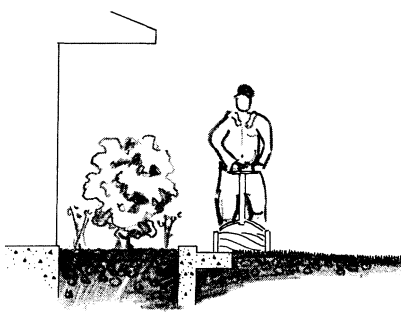
There are many weed killing chemicals (herbicides) on the market—and research workers are constantly adding new ones to the list. All chemicals should be used with caution for human safety and for the benefit of the landscape surroundings. Always follow the instructions carefully.

The washing of herbicides from sprayers is usually not sufficient. To help prevent damage to valuable plants—separate sprayers should be used for pest control and weed control. Cans with sprinkler nozzles can be effectively used for small area herbicide distribution instead of expensive sprayers.

Encroaching habits of bermuda grasses necessitates the use of physical barriers to control spreading into other plantings. Be sure plant beds are completely free of the grass roots or stems before making plantings.

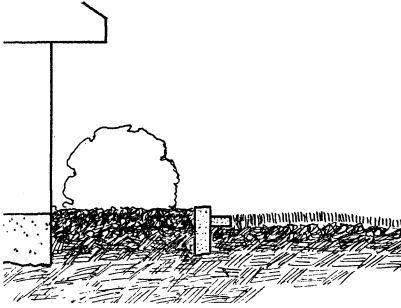


Sidewalk with plant bed curb holds soil above sidewalk level.

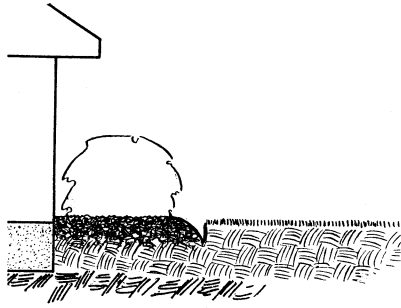


Plant bed curb with ledge guides lawn-mower for easy trimming.

Curbs and walks are commonly used for barriers. Curbings should extend to a depth of at least 6 inches in heavy soil or as much as 12 inches in light sandy soil to be effective. Brick or similar masonry



Brick or cement blocks laid along curb simplifies grass trimming.



Heavy soils may be trenched around plant beds but must be maintained.

materials should have the joints closed with mortar. The height of curbs should conform to the cutting height of the grass so one wheel of the lawn mower can be run on top of the curb allowing a cut that reduces hand trimming. If the top of the curb or retainer is higher, bricks laid flat and mortared or an extension of formed concrete can be used the same as the grass level curb top.

Metal barriers can be purchased—but the effective depth and durability should be considered. With all physical barriers—avoid creating a poor drainage condition for other plantings.

Modified soil trenches can be effectively used if started before encroachment begins and if they are properly maintained. A sharp, 4 to 5 inch vertical wall is cut on the grass side with the soil sloped towards the plant bed to form a trench. The wall must be re-formed periodically with an edging tool or square-ended spade.

Regardless of barrier type used, grass runners must not be permitted to extend to the plant bed soil and take root. Once bermuda grass becomes established in other plantings, eradication is almost impossible without damage to the plants.

Chemical barriers have been tried with varying degrees of success. The principal problems encountered are the possible damage to other plants, difficulty of maintaining definite edging lines and, usually, several applications must be made annually.

Dyes can be used for green winter coloring of dormant grasses, such as bermuda. Follow the manufacturer's instructions carefully for best results.

Other Extension publications pertaining to Landscape Design; Starting A Landscape Plan; Trees, Shrubs and Vines; Better Lawns for Oklahoma; Lawn Weed and Pest Control; Care of Landscape Plantings and other related information are available from your county agents.

Some books recommended for additional information are:

Garden Design, Rose

Gardens Are For People, Church

Illustrated Guide to Trees and Shrubs, Graves

Grounds Maintenance Handbook, Conover

Care and Feeding of Garden Plants, Aldrich, et. al.

Art of Home Landscaping, Eckbo

Complete Home Landscaping and Garden Guide, Korbobo

Tree Care, Haller

Shrubs and Vines for American Gardens, D. Wyman

Consult a competent, professional worker for additional guidance and planting assistance.

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