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# GRASSES AND GROUNDCOVERS IN LAWN DESIGN

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## ABSTRACT

A lawn is an area of land planted with grasses or (rarely) other durable plants, which are maintained at a short height and used for aesthetic and recreational purposes. Common characteristics of a lawn are that it is composed only of grass species, it is subject to weed and pest control, it is subject to practices aimed at maintaining its green color, and it is regularly mowed to ensure an acceptable length, although these characteristics are not binding as a definition. The term "lawn", referring to a managed grass space, dates to no earlier than the 16th century. Tied to suburban expansion and the creation of the household aesthetic, the lawn is an important aspect of the interaction between the natural environment consisting of trees, shrubs, flowers etc. and the constructed urban and suburban space.

***Keywords-*** *Grasses, Groundcovers, Lawn Design etc.*

## I. INTRODUCTION

A striking lawn has an touching appeal that can be translated into holy comforts. Hence, the lawn usually offers peace and tranquility, and an escape from the sun's glare and paved surfaces of sidewalks. Lawns need not be, and have not always been, made up of grasses alone. Other plants for lawn-like usable garden areas are sedges, low herbs and wildflowers and groundcovers that can be walked upon. Thousands of varieties of grasses and grass like plants are used for lawns, each adapted to specific conditions of precipitation and irrigation, seasonal temperatures, and sun/shade tolerances. The three basic categories are cool season grasses, warm season grasses, and grass alternatives.

## II. LAWN PROPERTIES

**Lawn variations**

The lawns vary in look because of the different types of improved grasses that have been created by the experts in the laboratories. For instance, the bluegrasses that multiply by a type of asexual reproduction; more than 90% of the time they produce viable seeds without normal fertilization. The existence of these new varieties has diversified the landscape design of lawns to a great extent. At the same time these grasses have their own advantages and drawbacks in establishing a small portion or starting a new lawn.

**Climatic conditions**

Climate has a major influence in the selection of grass. In the north hemisphere, the lawn grasses are divided into three major categories;

- **Warm-climate grasses,**
- **Cool-climate grasses**
- **Dry-land grasses.**

With-in these three major categories, many individual species of grass have special preferences as to fertilizer and soil pH. Cool-climate grasses are usually distributed east-west on the hemisphere. However, warm climate grasses predominate in the regions close to equator. On the other hand, the dry-land grasses are usually utilized in certain areas where the lack of moisture makes it difficult or impossible to grow other strains. Moreover, the territorial imperatives of the grasses are greatly influenced by heights. While both cool- and warm-climate grasses can provide fine and soft lawns, the dry-land grasses are coarse in texture and generally grayish-green in color. Cool season grasses start growth at 5 °C (41 °F), and grow at their fastest rate when temperatures are between 10 °C (50 °F) and 25 °C (77 °F), in climates that have relatively mild/cool summers, with two periods of rapid growth in the spring and autumn. They retain their color well in extreme cold and typically grow very dense, carpet like lawns with relatively little thatch.

**Conventional selections:**

- Bluegrass
- Bentgrass
- Ryegrasses
- Fescues

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**Native plant regional selections (for taller lawns):**

- Red fescues
- Feather reed grass
- Tufted hair grass
- Cluster fescue

Regular watering and fertilizing is important to control the disease on lawns. However, the bent grass being fine and soft, is more prone to fungus attack. Usually, many of the cool climate lawns are planted in fescue and blue grass. Fescues are sturdy grasses that demand a well sharpened lawn mower. On the other hand, the blue grass is generally considered to be one of the best all purpose lawn grass because it combines both beauty and practicality. Its color is a clear, rich green and it produces a thick, soft turf that is both pleasant to walk on. Moreover, sturdy properties of blue grass are one of the choices for the turf of football fields.

Warm season grasses only start growth at temperatures above 10 °C (50 °F), and grow fastest when temperatures are between 25 °C (77 °F) and 35 °C (95 °F), with one long growth period over the spring and summer (Huxley 1992). They often go dormant in cooler months, turning shades of tan or brown. Many warm season grasses are quite drought tolerant, and can handle very high summer temperatures, although temperatures below −15 °C (5 °F) can kill most southern ecotype warm season grasses. The northern varieties, such as buffalograss and blue grama, are hardy to 45 °C (113 °F).

- Zoysiagrass
- Bermudagrass
- St. Augustine grass
- Bahiagrass
- Centipedegrass
- Carpetgrass
- Buffalograss
- Grama grass

(Source : Wikipedia)

Of these Bermuda grass is most widely used because it spread very rapidly in a year.

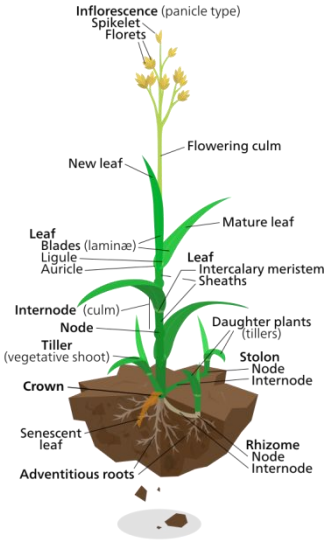


**Diagram of a typical lawn grass plant**

**Selection of grasses for mixture**

A good lawn is possible when you plant a proper mix of grasses. Most lawns are combinations of Kentucky bluegrass, creeping red fescue, and perennial ryegrass. A mixture of three different grass species provides the maximum amount of pest resistance and environmental adaptability. Kentucky bluegrass is the most common lawn grass. Blends of Kentucky bluegrass cultivars can provide a very high quality lawn, but such lawns usually require above average maintenance levels. The spreading growth habit helps fill in bare spots, but the grass goes dormant during hot, dry, summer weather.

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Creeping red fescue has thread-like leaves and is the most shade-tolerant of lawn grasses. This does not mean the grass grows only in shade or that it will tolerate total shade. It grows well in full sun and, in fact, requires some sun during the day. Only named cultivars of perennial ryegrass should be used in lawns. Common perennial ryegrass often dies during the winter and does not mow well. A fairly adaptable mix consists of 50 percent creeping red fescue, 30 percent Kentucky bluegrass, and 20 percent named perennial ryegrass. This mix, along with similar mixes, will provide a good quality lawn suitable for sun or partial shade that requires below average to average care.

Try to avoid "problem grasses" such as annual ryegrass that is often sold as the major component of some very low priced grass seed. It will die out during the winter so essentially forms a lawn that lasts for a single season. Rough bluegrass is often found in shady grass mixes. It has a light green color and does not blend well with other lawn type grasses. It does, however, do well in moist, shaded sites. Tall fescue is one of the two worst lawn weeds. Yet seed is available in most stores. The grass blades always seem to stay taller than the rest of the lawn. No selective control exists for this grass as the chemicals that kill tall fescue also kill other lawn grasses. Pure stands of this wear-tolerant grass are often used on playgrounds or roadsides. Zoysia is a warm season grass that turns brown early in the fall and stays brown until late spring. It is no better than the cool season grasses more commonly used in Vermont. Finally, for sloping areas, you may want to purchase "conservation mix." This mix contains deep-rooted grasses that will aid in erosion control and prevent heavy rains from washing away soil on the slope.)

**Selection and blending of Groundcovers in lawns**

These are plants which spread across the ground but do not grow tall, so no cutting is required. Areas planted in groundcover need little to no maintenance. For an average-size home a low-growing cover might be anything up to 30 cm high; for a small one it would probably not exceed 7 cm. Groundcovers are usually chosen for texture, density and how well they spread and choke out the weeds. They enhance the soil by acting as a mulch, and some groundcovers are nitrogen-fixing. Many varieties are available, including flowering groundcovers which offer color and add emphasis to the seasons. Although groundcovers are usually perennials and evergreens, annuals make excellent groundcovers as well, but do require more work each spring.

Some groundcovers are edible, such as strawberries or low-growing herbs. Ever-bearing strawberries produce fruit most of the summer and tolerate marginal soils and light shade. Dwarf dogwood (also called bunchberry), and herbs like thyme and oregano work as groundcovers for limited areas.

During the first year, new plantings of groundcover will require weeding and mulching, but once established, little care is needed.

Groundcovers need an edge barrier to contain them. A low brick or wood edging, or any lawn edging which cuts down a few inches into the soil will usually be sufficient. Your garden center can recommend local groundcover varieties and their characteristics.

Perennials groundcovers : Alyssum,Tapien (Verbena), Cotoneaster, Bishops Weed, Juniper.

One of the major advantages of many ground covers over grass is that they are colorful and decorative. The varied ornamental qualities of ground covers offer pleasing contrasts in texture and color. And they have added advantage of lasting longer than flowers. Evergreen ground covers are not only ornamental in areas where a lawn has turned brown for the winter, but their bright berries add color at the time is most welcome. As aesthetic considerations help in the selection and matching of ground covers. Boxwood and periwinkle, for example, blend naturally and have been used together. In choosing a ground cover, it should be considering first the effect it may produce; then, among the plants that can achieve the effect. Evergreen ground covers such as ground covers that are herbaceous perennials-non woody plants die in the ground in late fall and reappear the following spring. Moreover, their foliage may range in color from the dark green through the gray green and in shape from smooth edged to serrate. Each of them does an outstanding function under the conditions for which it is best suited and each of them also deserves to be appreciated for its beauty as well as its utility.

If ground covers are chosen with well planned way, the opportunities for enriching grounds with beauty and interest are limitless. Hence, ground covers usually make a well contribution to the overall design of the landscape than grass can. A slope might look well if planted in green plants or yellow blossoms. A hot, dry area carpeted in any one of a number of plants that are capable of turning this garden liability. However, ground covers can lighten the burden of lawn on step slopes and rocky terrain, where mowing is sometimes dangerous and where a lot of hand clipping is generally required. Hence, ground covers need to be groomed less frequently than grass needs to be mowed.

The planting procedures for ground covers are more less the same as those for grass. However, the following issues should be handled with care;

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- **Irrigation,**
- **Drainage,**
- **Soil preparation.**

There might be fewer opportunities to alter them after the ground cover is in place. In Figure 2, typical well organized lawn in selected area and effects value of its environments.

## III. MAINTENANCE OF LAWN & GROUND COVER

Seasonal lawn establishment and care varies depending on the climate zone and type of lawn grown. Maintaining a lawn involves using well planned approaches throughout the growing season. The following things should be considered for a dense, healthy, good quality lawn.

- Mowing,
- Fertilizing,
- Irrigation,
- Thatch control,
- Over seeding and timing
- Weed management
- Insect management

Although there are a few ground covers that can grow in wet or soggy soil, the majority of them prefers well drained soil. Hence, the ground covers need frequent and regular supplemental moisture and good drainage. However, with the sprinklers, the drainage should be considered when the grading is done, particularly if water does not drain off from the site naturally. For supplemental moisture, the spray heads can be set to the proper height and should be 7- 10 cm above the height of the ground cover at maturity and there should be enough spray heads to cover the whole bed evenly. From time to time most ground covers develop one or two stem that must be clipped off, and occasionally a rambling branch can fail to come through the winter. However, pruning unwanted stems and branches is a regular routine of ground cover care and should be performed early in the spring. Low-growing ground covers like dichondra, which do not decay easily and are common grass substitutes in hot climate regions, can be cut with a rotary lawn mower.

**Mowing**

The importance of good mowing practices is often overlooked. Mowing has a major influence on the turf density, uniformity and aesthetic quality of a home lawn. It is also the most repetitious and time-consuming maintenance practice and is often done incorrectly.

**Frequency and Height**

Turf can be mowed frequently, provided no more than one-third of the grass blade is removed in a single mowing. Mow as high as possible. Lower mowing produces a shallow root system. Shallow grass roots cannot take up enough water and nutrients, making the lawn susceptible to drought stress. Low mowing encourages broadleaf weed invasion and invasion from grassy weeds such as creeping bentgrass and annual blue-grass. It is best to mow a lawn when the leaves are dry. Dry grass cuts cleanly, and clippings distribute more evenly.

**Clippings**

Leave clippings on the lawn. If they are excessively heavy, rake them up and remove them. Clippings contain nutrients and water, breakdown rapidly and do not contribute significantly to thatch. You can cut down your fertilizer (especially nitrogen) by 20%-35% by leaving the clippings on.

**Mowers**

Mowers need the capacity and power to handle the area being mowed. Consider weight, ease in starting, maneuverability, ease of adjustment of height of cut and safety features. Keep mower blades sharp for a good quality cut. Select mulching-type mowers that recycle grass clippings.

New to the market are electric cordless rotary and reel mowers. They are a quieter, cleaner, low-maintenance alternative to a gas-powered lawn mower.

**Fertilizing**

Understanding and implementing a well-balanced fertilizer program is one of the most important factors in maintaining an attractive healthy lawn. The three main nutrients required by lawns are:

- nitrogen (N)
- phosphorus (P)
- potassium (K)

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Nitrogen promotes dark green colour, leaf and blade development, and density of the turf. Phosphorus is important for good root and rhizome development and promotes plant maturity. Potassium contributes to the general vigour of the plant and promotes wear, drought tolerance and winter hardiness.

**Amount of Nutrients**

The amount of nutrients required by a home lawn is best determined by soil testing. A soil test will provide the amount of phosphorus, potassium, sulphur or lime required. There is no soil test for nitrogen. Generally, 1.5-2 kg/100 m2 of actual nitrogen can be applied throughout the season, split into 2-4 applications. In the absence of a soil test, a 4-1-2 ratio (N-P-K) such as 20-5-10 is recommended. The three numbers on the fertilizer bag represent the amount of N, P and K, in that order. For example, the 20-5-10 fertilizer ratio listed above contains 20% N, 5% P2O5 and 10% K2O. Nitrogen has to be applied every year, while phosphorus and potassium are relatively stable in the soil. If the lawn is on sandy soil, higher potash or more frequent applications may be required because it may leach. On newly established lawns, higher levels of phosphorus and potash may be required.

**Table 1. Common turf nitrogen fertilizers and their properties.**

| Type | Examples | Response | Water Solubility |
|---|---|---|---|
| Inorganic | • ammonium nitrate<br>• ammonium sulfate | • immediately available<br>• quick green-up | • high |
| Organic | • activated sewage sludge<br>• animal by-products | • slow release | • low |
| Synthetic | • IBDU<br>• urea formaldehyde<br>• sulfur-coated urea | • slow release | • low |

**Table 2. Common turf nitrogen fertilizers and their properties.**

| Type | Problems | Water Solubility | Potential for burn |
|---|---|---|---|
| Inorganic | • readily leeches<br>• causes lush growth | • high | • high to very high |
| Organic | • low leaching<br>• more expensive than inorganic forms | • low | • low |
| Synthetic | • low leaching<br>• release rate is dependent on temperature or moisture levels depending on the source | • low | • low to very low |

**Fertilizers**

Common turf nitrogen fertilizers and their properties are listed in **Table 1**.

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**Timing**
The timing of fertilizer application is determined by the total amount of fertilizer you wish to apply to your lawn. **Table 2** has some suggested timing of fertilizer applications based on the number of yearly applications.
Late-fall fertilization with a quick-release nitrogen fertilizer is beneficial for home lawns. Apply when the lawn has stopped growing but is still green. It:

- increases fall and spring root growth
- promotes a thicker lawn
- results in an early spring green-up

The lawn will green up earlier in the spring and will not give the rapid flush of shoot growth that occurs with spring-applied nitrogen.

**Application**
An even application of lawn fertilizers is very important for achieving a uniform green lawn. If using a drop-type spreader, operate it the long way of the lawn. First apply header strips at each end of the lawn to provide room for turning. Overlap one wheel's width when spreading the fertilizer and shut off the spreader when reaching the header strips.
With a centrifugal type spreader, make two split applications (half rate each) at right angles to each other. Always make sure the spreader is properly adjusted, to avoid striping or uneven colour.
**Irrigation**

When normal rainfall does not provide enough moisture during the growing season, grass goes dormant and turns brown. To ensure a high-quality lawn, the lawn must be watered. Signs that a lawn needs water include:

- footprints remain while walking across the lawn
- a slight change in colour to dark blue-green
- grass blades folding inward

**Frequency and Timing**
Water in the early morning when there is little or no wind. This provides more even water distribution. Water before midday, when the evaporation rate is the lowest. Watering can be done in the evening, but this may encourage disease development. Most disease-causing fungi require several hours of leaf wetness for infections and disease to occur.

**Amount of Water**
Too much water can cause thatch, fertilizer leaching, increased disease or grassy weed problems such as creeping bentgrass, annual bluegrass or rough bluegrass. Too little water applied frequently can cause shallow rooting of the turf, which makes the lawn susceptible to disease, drought stress or winter injury. Infrequent, thorough watering is best. When the lawn wilts, wet the entire area to a depth of 10-20 cm. The amount of water required to achieve this depends on soil characteristics. To measure how much water has been applied, place a straight-sided can or jar in the area being watered, and run the irrigation or sprinkler for 15 minutes. Check the water level in the can or jar. Approximately 2.5-4 cm of water in the can corresponds to an adequate irrigation of the lawn. If the sprinkler delivered 0.5 cm in 15 minutes, you will need to water for 1.25 hours to get the required 2.5 cm. Areas of the lawn needing more water include slopes, areas near buildings, curbs, sidewalks and light soils. Low-lying areas, shaded areas and heavy soils may not need as frequent irrigation.

**Irrigation Equipment**
Hose watering is suitable for small areas only. A sprinkler attachment provides adequate coverage for an average-size lawn despite the inconvenience of moving the sprinkler and how much water may be wasted. An underground irrigation system is the most expensive, but also the most efficient method, and may be considered for very large lawns or industrial properties.
Dormant Lawns
During extended dry periods, a lawn may turn brown and go dormant. A lawn can survive from 4-6 weeks in a dormant state during summer dry periods. Once the rains return, the lawn will green up in 7-10 days. If the lawn is dormant:

- Keep traffic off.
- Stop mowing.
- Do not fertilize.

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**Thatch control**
Thatch is a layer of organic matter made up of decaying grass leaves, stems and roots that build up in between the lawn and soil surface. It is a common problem on Kentucky bluegrass lawns, that have been established for several years and over-watered and over-fertilized.

**Identification**
A thatchy lawn feels very spongy when walked on. Cut a triangular patch of lawn with a sharp knife and lift it back to measure the thickness of the thatch layer. More than 2.5 cm of thatch is too much.

**Why Is Thatch a Problem?**
Thatch harbours insects and diseases. Thatch can restrict grass roots from growing into the soil root zone, resulting in a shallow rooted lawn. Thatch interferes with water infiltration.

**Minimizing Thatch**
Cultural practices that minimize thatch development:
frequent mowing
proper watering
proper fertilization
Remove excess thatch by vertical mowing or core aerating. Core aerate using a hollow steel tine core aerator, which removes cores of soil. This physically breaks up the thatch, brings up beneficial soil microorganisms that help break down the thatch and alleviates compaction.
**Timing**
Dethatch or aerate in spring and fall during periods of good growth, allowing for quick lawn recovery.

**Over seeding and Timing**
Over seeding is a method of thickening up a lawn that has become thin or damaged by insects, diseases, weeds, drought, excessive traffic or other types of damage. To ensure success, add compost, peat or topsoil before over seeding. Over seed at double the seeding rate for establishing a new lawn. The best time to over seed a lawn is in the fall (mid-August to mid-September). Keep the over seeded area moist by watering several times a day.

One week after seeding, reduce watering to twice a day until new seedlings emerge.
Sodding is another method of repairing damaged lawns. Cut out dead or damaged areas to a depth of roughly 4 cm. Rake the soil, add fertilizer and place the sod on top of the soil. Insure good sod/soil contact by stepping on the sod or rolling it. For the best results, sod should be watered within an hour of being laid. Water sod frequently and make sure it does not dry out until it is fully rooted. Newly sodded areas will be rooted in 10 days to 2 weeks.

**Weed Management**
A thick, vigorous lawn is the best prevention against weed invasion. A dense stand of turf can compete successfully with weed seedlings for light and nutrients. Low mowing encourages broadleaf weed invasion and invasion from grassy weeds such as creeping bentgrass and annual bluegrass. Provided that a lawn is mowed in a timely fashion, at the proper mowing height, fertilized regularly and irrigated properly, weed invasion can be kept to a minimum.
Problem weeds include both broad-leaved and grassy weeds. They may occur when there are thin or damaged areas or heavily trafficked areas.

**Control**
Control problem weeds by:

- hand-pulling
- hand-raking
- mowing to prevent seed formation
- applying corn gluten meal product for pre-emergence control of crabgrass

**Insect Management**
A healthy, well-maintained lawn is the best defense against insect invasion. Insect damage is usually less severe on well-watered lawns. Insects that infest home lawns are generally difficult to notice and their presence goes undetected until significant damage has been done. Insect damage can often be mistaken for drought damage. If the lawn remains brown or shows signs of thinning out despite watering, try closer examination for insects. Regular inspection of the lawn including leaves, stems, roots, thatch and soil will help to determine if the problem is insect-related. The most common lawn insect pests are:

- hairy chinch bugs

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- grubs
- sod webworms
- European crane fly
- bluegrass billbug
- turfgrass scale

## IV. PLANTING A NEW LAWN

Establishing a new lawn takes advance planning and work. Sowing seed or laying sod is only the final step. Start by determining what type of lawn is needed. Will it be heavily used for group sports, play by children, or exercise for dogs? Or is it intended not for foot traffic, but simply as a lush, fine-textured green plot in the overall landscape? Once you've made these decisions, choose the appropriate cool-season or warm-season grasses that can provide the characteristics you need. The most appropriate choices will probably be those stocked by local nurseries or lawn specialists. Read grass-seed package labels and descriptive information; ask for flyers or brochures that describe the grasses in various sods.

**Starting from seed**

Seeding applies primarily to cool-season grasses; most warm-season kinds are started from sprigs or plugs. Lawns started from seed are best planted in fall, early enough in the season to give the grass time to establish before cold weather comes. The next best time is spring, after all danger of frost is past and before weather turns hot. When you prepare the soil, don't cultivate it too finely - it may crust, forming a hard surface which emerging seedlings cannot penetrate. Ideally, aim for pea-size to marble-size soil particles. Do final leveling with a garden rake.

**Pick a windless day and sow seed evenly,** using a drop or rotary spreader.

**Apply a complete dry granular fertilizer,** also using a spreader. Several manufacturers offer fertilizers formulated especially for starting new lawns.

**Cover seeds** by dragging the back of a lightweight leaf rake over the area or applying a thin (1-inch) mulch. Mulching is the better option if you expect hot, dry weather or drying winds. Use organic mulch, but not peat moss or sawdust--both of these tend to crust over, making it hard for seedlings to penetrate them. Note that it's not necessary to roll the new lawn's surface with a water-filled roller. Doing so can actually inhibit germination, since the roller packs down the soil surface and causes it to crust over.

**Water thoroughly,** taking care not to wash away the seed. Then keep the seeded area moist for about 3 weeks or until all grass is sprouted, watering briefly (in 5- to 10-minute spells) and frequently. You may need to water 3, 4, or more times a day during warm periods.

**Mow for the first time when the grass is one-third taller than its optimum height.** Mow slowly to keep from disturbing the barely set roots. After the initial mowing, continue to water frequently; the top inch of soil should not be allowed to dry out until the lawn is well established (this usually takes about 6 weeks and 4 mowings).

**If weeds emerge, don't attempt to control them until the young lawn has been mowed 4 times.** By this stage, many weeds will have been killed by mowing or crowded out by the growing lawn. If weeds are still a problem after 4 mowings, many gardeners prefer to treat the lawn with an herbicide; unlike hand pulling, it kills weeds without the risk of disturbing the root systems of the grass.

Try to avoid walking on the lawn too much during the initial 4 to 6 weeks.

**Starting from sod**

Sod lawns can be started almost any time of year, except when weather is very cold. It's also best to avoid installation during a summer heat wave.

**Water the planting area thoroughly the day before the sod is delivered.**

**Time the delivery of sod so you can sod the area in a single day,** beginning early in the morning.

**When you lay out strips, stagger them so ends aren't adjacent;** butt sides tightly together. Use a sharp knife to cut sod to fit it into odd-shaped areas.

**Roll the entire lawn with a roller half-filled with water** to smooth out rough spots and press the roots of the sod firmly against the soil. (Rollers can be rented at garden and tool supply centers.)

**Water once a day** (more often if the weather is hot), keeping the area thoroughly moist for at least 6 weeks.

**Mow for the first time when the grass is one-third taller than its optimum height.** When mowing during the initial 6 weeks, be very careful not to disturb the seams. Also try to avoid walking on the lawn too much during the initial 4 to 6 weeks.

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**Starting from sprigs or plugs**

Many warm-season grasses are sold as sprigs or plugs. A sprig is a piece of grass stem with roots and blades. A plug is a small square or circle cut from sod. Early spring is the best time to plant sprigs and plugs. Sprigs are usually sold by the bushel; the supplier can tell you how much area a bushel will cover. The fastest way to plant them is to scatter them evenly by hand over the prepared area, then roll them with a cleated roller (this tool is usually available for rent from nurseries that sell sprigs). Plugs are usually 2 to 3 inches across and are often sold 18 to a tray - enough to plant 50 square feet. Plant the plugs in the prepared area, spacing them 8 to 12 inches apart.

## V. LAWN SHAPE

When planning how to reduce the size of your lawn, lawn shape should be considered. Maintenance can be reduced and simplified by designing the lawn areas in continuous, easy-to-mow swaths. By eliminating corners, mowing becomes quicker and easier because you don't have to back-up and go forward repeatedly. Corner areas can be replaced with shrub or flower plantings which bring visual appeal while helping reduce maintenance. "Islands" in the lawn, such as trees or flower beds will slow down the mowing; better to have one or two large islands than a number of smaller ones. Trees will do better with bark mulch or ground cover planted beneath, as grass will compete with the tree roots for nutrients. Trees with low-lying branches can have ground cover planted beneath, so the person mowing doesn't have to duck below the branches. Tree rings are available which separate the mulched area from the lawn and add visual appeal. Trees in the lawn can have a wide skirting surrounding the base, using mulch, groundcover or native plants. A flagstone or brick border can be used to define the edge; set this border below the level of the lawn, so mowing is easy and no other trimming is required. This looks attractive and cuts down considerably on maintenance. Edges of the lawn can also be defined with inset flagstone, landscaping brick or slate. Set the edging below the level of the grass so the mower can go right over. This eliminates the need for edging. With careful planning, you can do without a weedeater for edging.

**Large Lawns and Golf Courses**

Large lawns, and especially golf courses, require large amount of herbicides and chemical fertilizers to maintain their condition and appearance. The impact on the environment is considerable. Recent experiments using organic compost have shown this method to be very promising. Generally, researchers and practitioners recognize that incorporating high-quality compost does several things:

- Adds food and nutrients for plants and organisms,
- Adds a diversity of organisms to the soil,
- Encourages plant growth promoting substances in soils.

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