Lawns: Maintenance

The major efforts in maintaining a healthy lawn involves adopting good mowing practices, knowing when and how much to water, fertilize, core aerate and how to assess and deal with thatch.

Mowing

During the growing season, mowing is a weekly practice required to keep control over the grass height and prevent the lawn from going to seed. When to mow depends upon the type of lawn and the growth rate. Cool season lawns have two prominent growth periods: in the spring and in the fall when daytime temperatures are consistently below 80 to 85 degrees. Warm season grasses grow best when temperatures are above 85 degrees. For either grass type during high growth periods, it may be necessary to mow more than once each week. The mowing height is critical to avoid problems due to water stress during extreme heat and in controlling weeds. The grass height should never be less than 2 to 2.5 inches in midsummer. Raising the mower height to 3 to 3.5 inches during drought periods will provide a better chance of survival. Taller grass will develop a deeper root system and tend to shade the soil surface making it cooler and preventing weed seeds from germinating. Scalped lawns develop shallow root systems and are more apt to die out during the heat of summer. They are also more prone to weed infestation and tend to grow poorly under drought stress. Never mow off more than a third of the height of the lawn as a general rule of thumb. This will go a long way to preventing weed, insect and disease problems.

It is not necessary to remove the clippings from the lawn. Leaf clippings do not contribute to thatch buildup and when left in place, will reduce fertilizer needs by about 25%. If the lawn has grown beyond the capacity of the mower to return them to the surface, plan to mow the area twice, removing smaller amounts and waiting about 48 hours between the first and second mowing. Mulching mowers can be used to efficiently return clippings to the lawn. These machines generally have increased blade speeds that chop the leaves several times before they settle down to the lawn surface. The smaller pieces will filter down and fall to the soil surface where they are quickly decomposed by soil microbes. If clippings are deposited onto the lawn surface and clump, use a rake to redistribute them or mow the clipping mounds until they disappear.

At the end of the growing season or just prior to green-up in the spring, warm season lawns are mowed to lower heights (1 to 2 inches) than cool season grasses to facilitate leaf removal, matting due to snow and quicken the spring green up. Adjust the mower to a lower setting to remove browned leaf material. Gradually raise the mower height during the summer.

Mowing Heights and Fertilizing Rates for Lawns

	Mowing Ht. (inches)	**Fertilizing Rate (lbs. Nitrogen / 1,000 sq. ft.**	
Tall Fescue	2.5-3.5	3 (May, Sept., Oct.)	cool season
		3 (Sept., Feb., May)	warm season
Ryegrass	2.0-3.0	3 (May, Sept., Oct.)	cool season

		2 (Feb - May)	warm season
Bluegrass	3.0-3.5	3-4 (May, Sept., Oct., Nov.)	cool season
		2-3 (Oct. - May)	warm season
Bentgrass	1.0-2.0	3-4 (May, Sept., Oct., Nov.)	cool season
		3-4 (Oct. - May)	warm season
Fine Fescue	2.0-3.0	1-3 (May, Sept., Oct.)	cool season
Zoysia	1.0-2.0	2 (June, July)	cool season
		3 (Apr., June, Aug.)	warm season
Bermudagrass	0.5-1.0	3-4 (May, June, July, Aug.)	cool season
		2-5 (Apr. - Aug.)	warm season
St. Augustine grass	2.0-3.0	2-5 (May - Sept.)	warm season
Centipedegrass	1.0-2.0	2-3 (May, Aug., Sept.)	warm season
Buffalograss	2.0-3.0	1-2 May, July)	cool season/warm season

Watering

The lawn is the largest consumer of water in and around the home. For areas where water supply is critical during summer, you should prepare your lawn for this shortage. Where water supplies are more plentiful, the cost savings can be considerable if attention is paid to the amount and time of watering. The choice of grass type affects the amount of water required for a healthy lawn. In the order of water requirements, bermudagrass and zoysia demand less water than tall fescue, bluegrass, ryegrass and bentgrass. Where water conservation is a primary concern, the warm season grasses are the most tolerant to low water supply. During drought periods in mid-summer, about 1 to 1.5 inches of water should be applied on a weekly basis. The resistance to injury due to drought is higher if lawns are encouraged to develop deeper root systems. The combination of mowing grass taller, watering deeply, reducing thatch buildup and proper fertilization will go a long way to preventing drought injury. During mid-summer when temperatures are consistently above 85 degrees, cool season lawns tend to go dormant and change to a brownish color when adequate rainfall is lacking. This summer dormancy is a tactic for cool season lawns that ensures survival until more water is available. If drought prevails for extended periods beyond 3 to 4 weeks, dormant lawns should be watered at the rate of about 1 inch per week. The supplemental water will prevent damage to the lawn by allowing the root system to maintain itself through this period. This amount of water will not necessarily be enough to promote green growth, but the growing point of each grass plant will remain alive until more rainfall comes. Mowing the lawn taller progressively up to and through mid-summer is recommended to prepare the lawn for drought periods. Taller lawns tend to develop deeper root systems and therefore, are more resistant to drought conditions.

The amount of water to apply should be limited during the spring of the year. Water-charged soils from winter and spring precipitation should be adequate for green up and early growth in most years. Supplemental watering tends to encourage top growth at the expense of root growth working against preparing the lawn for moisture deficit periods. In addition, lawn fertilizers applied in excess of 1 pound of nitrogen per 1,000 sq. ft. in the spring promotes top growth and robs stored nutrients from the roots.

Water should be applied when the grass shows the first signs of wilting. A wilted lawn will appear deeper green to blue in color, does not spring back up when walked upon and has leaves that tend to fold up slightly giving it a dull look. When this happens, water the area deeply so that moisture is present in the first 6 to 8 inches of soil depth. Frequent and shallow watering will not be beneficial. The amount and time that it takes to apply 1 to 1.5 inches of water depends upon the application rate. Each sprinkler will deliver

a certain amount of water for a specified time. The only real way to know how much water is applied is to measure it. Use an empty can and place this in the flow pattern of the sprinkler. Typical sprinklers will deliver water at the rate of 1 inch every 3 to 4 hours. If you are dealing with slopes, slower and longer watering times will help the water to penetrate. Water applied quickly will run off the slope and never reach the lower root zone. After watering, check the soil moisture by either digging into the soil profile or inserting a screwdriver. Adequate soil moisture is present when a moist, but not wet, soil ball can be formed from soil removed in the first 6 inches. Likewise, a screwdriver should be easily inserted to this depth when moisture is adequate.

The best time to water is early in the morning between 6 and 8 a.m. This time is generally cooler, reducing surface evaporation and water loss. It is also a preferred time to lessen the chance or avoid leaf and crown diseases. Prolonged periods of free water are required for most diseases. Early morning watering promotes quick drying of leaf surfaces as the sun evaporates free moisture. Some areas may need to be watered by hand when normal sprinkling patterns miss an area or for certain spots that seem hard to wet or are unusually hot due to brick, concrete or asphalt structures and paving nearby. Newly established lawns should be watered more frequently than established lawns. Shallow root systems and tender leaf growth are more subject to drought injury. Seeded areas should be covered with weed-free straw at the rate of one bale per 1,000 sq. ft. to reduce moisture loss from the soil surface. These areas should be watered twice each day in the morning and evening to meet the demand for water for at least the first two weeks. Newly sodded and plugged lawns will also need additional water on the same basic schedule as for seeded areas. However, deeper watering will be necessary for sod and plugs. The only real way to determine if enough water has been applied is to lift the sod and inspect the root system. In a matter of one to two weeks, new sod should be forming roots and be more difficult to lift. At this point, watering can be reduced.

Fertilizing

In order to maintain a healthy lawn, some fertilizer is needed from season to season. The amount of fertilizer and the timing of applications depends on the type of grass and the desired level of maintenance you wish to achieve. The best approach is to get a soil test every 3 to 5 years in order to understand the level of fertility present in the existing lawn. From there, the soil test results should direct you on how much to apply of what fertilizer or amendment. The acidity/alkalinity (pH) of the soil is very important.

Limestone Recommendations for Lawns
(lbs./1,000 sq. ft.)

pH	Loamy Soil	Clayey Soil
6.0 to 6.2	25	35
5.5 to 5.9	35	45
5.0 to 5.4	55	70
4.5 to 4.9	75	105

Individual applications should not exceed 50 lbs. of lime per 1,000 sq. ft. Where the organic matter content exceeds 5%, liming rates should be increased by 50%.

Sulfur Recommendations for Lawns
(lbs./1,000 sq. ft.)

pH	Loamy Soil	Clayey Soil
7.3 to 7.5	0.5 to 1.5	1.0 to 3.0
7.6 to 8.0	2.0 to 4.0	4.0 to 8.0
8.1 to 8.5	5.0 to 7.0	10 to 14

Individual applications of sulfur on established lawns should not exceed 5 lbs. per 1,000 sq. ft. Gypsum should be used in place of sulfur where the pH is in the range of 6.3 to 7.2 and sulfur levels are low.

Lawns do best when the pH is between 6.3 to 7.2 or slightly on the acid side (pH 7.0 is neutral). A pH above 7.2 or below 6.0 should be adjusted with sulfur or lime, respectively and in accordance to the soil test report.

Over liming or over acidification will cause problems with nutrient availability and result is poor growth. The amount to apply will depend upon the beginning pH value, the desired end point and the soil type. Soils that are higher in clay typically receive more lime or sulfur than sandy soils. When called for in the soil test report, lime can be applied up to a maximum of 50 pounds per 1,000 sq. ft. It will take several months for this material to affect the pH of the soil as it works down into the root zone. Therefore, if major corrections are called for, then liming should begin in the fall before the next growing season. In the spring, a soil sample should be checked to evaluate the effect of lime on raising the pH. Further additions can be made upon recalculation at this time. Likewise, sulfur applications are best made in the fall when applying amounts greater than 5 pounds per 1,000 sq. ft. During the growing season, never apply more than this amount at one time as it will burn actively growing grass. Space applications out over a period of 4 to 6 weeks.

Newly seeded and renovated lawns will need a root-promoting fertilizer incorporated or surface applied. Root-promoting fertilizers are commonly high in phosphorous and stimulate good root development. New lawns established by tilling the soil to prepare the bed should be fertilized with about 2.5 to 3.5 pounds of phosphorous per 1,000 sq. ft. during soil preparation and prior to seeding. This is equivalent to 5 to 7 pounds of triple superphosphate (0-46-0) or 12 to 15 pounds of superphosphate (0-20-0). This material should be incorporated into the top 4 to 6 inches with the tiller. If you are not planning to till the soil or are renovating an existing lawn and using a power rake for thatch removal, reduce the phosphate application to one half of this amount. After seeding, apply a general fertilizer starting with about 1 pound of nitrogen per 1,000 sq. ft., split between two half pound applications spaced 4 to 6 weeks apart. Once the newly seeded area has become established, annual fertilizer applications should be scheduled according to the type of grass that you are growing.

Existing lawns respond to fertilizers depending upon their relative growth stage. Cool season lawns will benefit from light spring applications of nitrogen fertilizer and several heavier applications later in the fall. This is a reflection of their two growth periods and an ability to develop a good root system in the latter part of the year. Warm season lawns respond to nitrogen fertilizer applications in the early part of summer just prior to their single, most active growth stage in mid-summer. Overall, warm season lawns require less fertilizer than cool season lawns and so are lower in maintenance.

Fertilizing Cool Season Lawns

Different approaches are taken with regard to fertilizing cool season lawns. Soil types, the expectation for a perfect or not-so-prefect lawn and the type of grass determine how much is applied and when. The main nutrient that requires replacement each year is nitrogen. Bluegrass is the highest consumer of nitrogen fertilizer followed by bentgrass, tall fescue, ryegrass and fine fescue. Commonly, spring time fertilization is over-done. Adding too much nitrogen fertilizer at this time promotes luxuriant growth and dark green color at expense of the root system development and disease resistance. If you desire a low maintenance cool season lawn, then fall is the time to fertilize. Low maintenance cool season lawns should receive a total of 1 to 2 pounds of nitrogen per 1,000 sq. ft. applied in early September and October. Fall is the time when top growth begins to slow and root growth continues on. If other fertilizer applications are needed or desired, then the next best time to do this is in May just after the spring flush of new growth is winding down. The rate of application at this time should be about 0.5 to 1 pound of nitrogen per 1,000 sq. ft. It is desirable to mix one half of this amount as soluble and one half as time-release or slow release fertilizer. The soluble form will be available for root uptake within a few days. The slow release form will supply nutrients over a period of about 6 weeks and the combined application of both will reduce losses due to

leaching and avoid growth spurts. For high maintenance lawns, a third application of nitrogen fertilizer should be made in October or November at the rate of 1 pound per 1,000 sq. ft.

Fertilizing Warm Season Lawns

Warm season lawns like bermudagrass, zoysia, St. Augustine grass, centipedegrass and buffalograss are fertilized according to how fast they grow and the period of most active growth. Bermudagrass is considered a heavy feeder and can be fertilized at the rate of 1 pound of nitrogen each month of its active growth period starting in May. Zoysia is not a heavy feeder and can be fertilized in May through July starting with a half pound of nitrogen in mid-May followed by 1 pound of nitrogen in early June and an optional 1 pound of nitrogen in July. Applications should be spaced about 4 to 6 weeks apart. Fertilizing later on in the season will not be beneficial and may delay dormancy. St. Augustine grass can be fertilized at the rate of one half to 1 pound of nitrogen for each growing month starting in May and going through August. Centipedegrass is a light feeder and low maintenance grass that should be fertilized at the rate of 0.25 pounds of nitrogen for each growing month. Buffalograss is native prairie grass that can be adopted for a low maintenance home lawn area. Fertilization should be minimal with about 1 pound of nitrogen per 1,000 sq. ft. applied in mid-May to early June. A second application may applied in late July or early August at the rate of one half pound per 1,000 sq. ft. Use less nitrogen in shady and naturalized areas.

Core Aeration

Lawn areas that are subject to considerable traffic and have high clay soil content are likely to become compacted. Compacted soils do not drain well and are devoid of soil air space for good root development. In these problem spots, a recommended technique is to core aerate. Core aeration is done either by hand with a specialized tool or, more efficiently by powered equipment. The objective with core aeration is to cut small cores of soil, two to three inches deep and three to four inches apart. These are lifted out onto the surface of the lawn. The core openings provide access for entry of water and air down into the soil. This alleviates some compaction and brings up thatch which will decompose more readily on the soil surface.

Core aeration should be done just before the most active growth period depending upon the type of grass being grown. For cool season grasses, core aeration can be done in early spring or preferably, early fall. Warm season grasses should be aerated in late May to early June. When done during an inactive period of growth, core aeration may contribute to weed problems by opening up new sites. One of the best uses of core aeration is to introduce new seed and fertilizer. The holes provide a moist environment protected from afternoon sun and this is an ideal spot for grass seed to germinate. In addition, these holes provide a channel for fertilizers to be placed closer to the root system of existing grasses. This is especially important for phosphate fertilizers that are otherwise difficult to work down into the root zone when surface applied.

Core aeration can be quite beneficial when done each year, especially in compacted areas, it may be impractical to perform each year as part of normal maintenance on an existing lawn, but should be considered common practice every 3 to 4 years in lawns planted on heavy clay and silt soils.

Thatch Removal

Thatch is a build up of undecomposed plant parts that largely come from the crowns and lower portions of grass plants. Leaf tissue does not contribute greatly to the thatch layer. As the layer of thatch becomes greater than one half inch thick, it will affect the penetration of water and air and cause grass plants to become shallower rooted with a resulting inability to withstand periods of drought. The amount of thatch can be checked by peeling back a layer of sod and examining the base of grass plants where they interface with the soil line. This layer will appear light in color and fibrous. Thatch development is increased on heavily fertilized and watered lawns and should be removed just prior to the most active growth period.

For cool season grasses, this time is in the fall. For warm season grasses, this should he done in the early summer.

Removal of thatch can be done by hand using a dethatching tool or with power equipment like a power rake or vertical slicer. The lawn area should be mowed down to about 1 inch prior to dethatching and watered lightly to facilitate the process. Power dethatchers should be moved across the area in two directions perpendicular to each other to get the best results. The material that is scraped on top of the surface should be removed from the site and either composted or used as a 1-inch surface mulch around shrubs, or buried. After dethatching, new seed can be broadcast over the surface to establish a new stand and fill in void spots. At the same time, apply a high phosphorous fertilizer (0-46-0) to stimulate root development of seedlings and promote renewed growth of existing grass. Follow this with an additional application of fertilizer at the rate of 1 pound of nitrogen per 1,000 sq. ft.

Weed Control

The best defense against weeds is a thick, well established, healthy stand of grass. The shade cast onto the soil surface prevents weed seed from germinating. Cultural practices that encourage good lawn growth, watering properly, timely fertilization practices and mowing to the proper height for the season will allow the grass to out compete developing weeds. Relying only upon herbicides to control weeds is not the best strategy. However, periodically a herbicide is necessary to gain some control over a situation where the grass has become thin due to climate extremes, insect infestation or disease.

Should weeds become a problem, the first step in their management is to identify the problem. Trying to identify why the lawn is not doing well may be difficult especially when that involves diagnosing an insect or disease problem. Soils may not be uniform from one area to another and high clay spots that are less favorable to lawn growth could present problems. Shade underneath trees or around structures may limit grass growth. Choosing the right type of grass to grow in shady and wet areas is important to preventing weed development. Whatever the problem that reduces lawn growth, it should be corrected prior to any herbicide application to control the weeds.

The second step to weed control is to identify the weed. Weeds can be classified as summer annuals, winter annuals or perennials. Summer annual weeds like knotweed and purslane germinate from seed early in the spring and set seed in mid-summer or fall. The seed carries over until the next spring when it will again germinate under favorable conditions. Winter annuals like henbit, common chickweed and Shepherd's purse germinate in the fall and mature in the spring, setting seed that carries over until the fall when conditions are right for germination. Other weeds are considered perennials. These live from year to year from well established root systems and may produce seeds each year.

Summer annuals and winter annuals can be controlled with pre-emergence herbicides. These chemicals are spread over the lawn area 2 to 4 weeks prior to weed seed germination. For summer annuals that germinate in the spring, the pre-emergent herbicide must he applied in the early spring. For winter annuals, this herbicide must be applied in the early fall. Perennial weeds will also be controlled by pre-emergence herbicides, however, they are more commonly treated with post-emergence chemicals. These herbicides are used after the weed has germinated and produced leafy growth. Post-emergence herbicides should be applied while the weed is actively growing and at a time when the air temperature is above 60 degrees, but not greater that 80 degrees. Injury to other plants in the area can occur if air temperatures are too high. Late fall is a good time to concentrate on weed control; less damage will occur to desirable plants. Winter and summer annual weeds are more easily controlled, perennial weeds are more susceptible and cool season grasses can be seeded to re-establish a stand of grass. For weed control in warm season lawns, the herbicide control must be maintained through spring until early summer when seed is spread and more favorable conditions exist for germination.

Most weeds, whether they are summer or winter annuals or perennials, are broadleaf types. Broadleaf plants are sensitive to 2,4-D types herbicides. Many formulations of 2,4-D herbicides are available including pre-emergent and post-emergent granular products as well as ready-to-use and water-soluble spray concentrates. Weed and feed herbicides are commonly purchased to both control broadleaf weeds and supply nutrients. Before using these products, you should make sure that weed control and fertilization are the two objectives. Fertilization or weed control alone wastes one or the other. Read all product label information before purchasing. Some granular herbicides should be applied when the foliage is wet so that herbicide-containing granules stick to the weed leaves. This facilitates absorption and movement of the herbicide down to the root system.

Weedy grass control in lawns needs special consideration when choosing a herbicide. Broadleaf herbicides alone do not control grasses; only grass herbicides are effective and these are available in either pre-emergent or post-emergent formulations. Crabgrass is the most common grass weed that causes problems in lawns. Crabgrass is an annual grass that reproduces each year in the early spring from seed generated the preceding year. Pre-emergent applications of grass herbicide should occur at least 2 to 4 weeks ahead of the expected germination of crabgrass seed. Post-emergent grass herbicides should be applied when the plants are small, but have at least 3 leaves and are actively growing. Perennial grasses like quackgrass, nimblewill and bermudagrass should be spot sprayed with a nonselective herbicide like Roundup. This will kill both weedy grasses and any desirable grass in the spray zone. It will be necessary to follow this up with an overseeding of lawn grass about 10 days after the herbicide was applied. Nutsedge, violets and wild garlic are difficult to control and require specific herbicides, application rates and repeated applications to eliminate them from lawns.

Moss and algae can sometimes dominate lawn areas, notably under medium to deep shade conditions and where soil drainage is poor. Under these conditions lawn grasses selected for full sun will not compete well and give way to moss and/or algae. The strategies to control moss and algae are to increase the exposure to light (i.e. thinning or removing trees) and correct for poor soil drainage (i.e. core aeration, regrading). Chemical control of moss and algae is only temporary without improving the light conditions and drainage. However, moss may begin to decline if sprayed with 4 to 6 ounces of ferrous sulfate or 10 ounces of ferrous ammonium sulfate per 1,000 sq. ft. Copper sulfate is sometimes used to control algae at the rate of 2 to 3 ounces per 1,000 sq. ft. The pH of the soil should be checked prior to any chemical application and corrected with lime or sulfur into a range more favorable for lawn grass (6.2 to 6.8). In addition, you should choose a shade tolerant type grass to reestablish the lawn.

Mushrooms are fungi and not considered weeds, but nevertheless may arise in the lawn either in the spring or fall and be unsightly. Mushrooms are more common in areas that receive some shade, are moderately moist and in soils containing high amounts of decaying organic matter or wood left from preexisting tree roots or construction. There are no chemical controls for mushrooms. Generally, mushroom growth is periodic and may occur one year and not the next. Repeated development of mushrooms in a lawn may be managed by removing the above ground mushroom caps, improve drainage and air flow and increase the sun exposure by thinning trees. Persistent development may require tilling the soil, removing buried organic matter debris, regrading and replanting. These steps may not be effective, so some tolerance may be necessary to live through the episodes of mushroom development in a lawn.

Insect and Disease Problems

Areas of an otherwise well-cared lawn that seem to decline and dieback for reasons that are unknown may be due to an insect pest or a disease. It is sometimes hard to determine the nature of the problem and may require close inspection of the leafy growth or root system for signs of a pest or symptoms of disease. When in doubt, expert advice should be sought. Indiscriminate spraying is not the best approach since insecticides will not control disease problems and vice versa. Insecticide combinations with fungicides lead to overuse of pesticides and may not result in improvement. Understanding the nature of the problem is

the first step. Proceed by cutting out a piece of the affected area to inspect the roots. If the sod can be simply pulled up with little effort, then this indicates a root problem. Insect feeding grubs, ground pearls and mole crickets will feed on underground roots. Pulling back the sod in an affected area should reveal the larvae of these insects. Other insects like billbugs, chinch bugs, aphids and sod webworms feed on above ground stems and leaves. Close inspection of areas in various stages of decline may reveal these insects. Dead areas will not be infested since these insects move along to healthy lawn sections as they feed.

Once an insect has been identified as the problem, whether to treat with an insecticide or not depends upon the extent of the damage and the insect population density. Counting the number of insects in a square foot area is helpful to generate threshold values above which insecticide treatment is advised. For example, chemical treatments are warranted when white grub populations reach about 10 per square foot. Threshold values and recommendations for treatment may differ depending upon the type of grass you are growing and the geographical area you are in. More specific information on a particular pest and insecticide choice should be sought before treating.

Disease problems can be even harder to diagnose in lawns. This is because they are all microscopic and require inspection with a magnifying glass or microscope and a trained eye to interpret the symptoms on leaves, stems and roots. Because diseases infest grass plant tissue, sometimes samples are further examined by culturing out the disease organism for correct identification. Above-ground symptoms can be confusing and should never be the sole source of information on which a chemical treatment is based. Certain diseases only infest certain types of grass making the diagnosis even more complicated. The combination of symptoms, known problems on the type of grass you are growing, history of cultural treatment (fertilizer, watering etc.) and time of year all assist with making a correct diagnosis. Some of the more common diseases of lawns include brown patch, dollar spot, Fusarium and summer patch, leaf spot and powdery mildew. Many other diseases are possible and the fungicides used will differ in their effectiveness depending upon what disease is present.

Cultural Problems

Not all problems on lawns are associated with insects and disease. Sometimes the problems are related to cultural conditions imposed. Spilled or over application of fertilizers can burn plants. Nitrogen in fertilizer mixes may be applied in excessive amounts. Likewise, potassium may burn plants when over-applied. Follow label rates and soil test recommendations to avoid over-application problems. Make sure that the lawn is dry when spreading fertilizers. These materials will stick to wet leaves and cause localized burning. Other causes for yellowing or browning may occur due to animal urine, gas or oil spills, herbicide over-application or improper use during temperature extremes. Overall, when the lawn has totally been killed, soil replacement for spilled or over-applied materials will be necessary and the area will require overseeding.

Poorly drained areas are commonly the source of problems causing the grass to die out. Wet sites are typically low and may need to be regraded in order to drain properly. The easiest and quickest way to correct for poor drainage is to poke holes into the wet area and attempt to break through the barrier down in the soil preventing water from percolating. This can be done with a pipe or drill bit. In extreme cases, the whole area might require excavation and installation of a drainage system. Where subsurface water or a high water table is the problem, select a type of grass that can withstand prolonged periods of wetness like bluegrass, perennial ryegrass, fine fescue or consider planting another type of ground cover instead.

Lawn mower injury to grass results when the setting is too low and the top portion is shaved off leaving a brown patch. This is common at the edge of a garden bed or where high spots occur in the lawn area. Set the mower to the proper height to accommodate these irregularities. Scalped areas will grow back, but it may take some time. Weed growth is typically favored in closely mowed areas and this will be a symptom that the mower is set too low. In addition, a sharp mower blade is essential to maintain a uniform lawn

area. Dull blades tear the tips of leaves and expose them to disease organisms. The lawn is more susceptible to a dull mower blade when it is dry. Water a day to two prior to mowing and keep the blade sharp.

Shade from trees and other structures can present problems in growing grass. Selecting a shade-tolerant grass will go a long way to solving this problem. However in the case of trees, some trimming may be necessary to increase the amount of light reaching the area. If the shade is deep and no further correction is possible, then consider planting another type of ground cover like ivy, periwinkle, pachysandra, euonymous or ajuga. In addition to the problems of shade, trees can be heavy consumers of water and deplete the soil during drought periods. The dryness of the lawn will begin to show up as a dull green color underneath the tree canopy of leaves. Extra water should be applied during mid-summer to keep both the tree and lawn healthy. Sloping sites should be watered with a soaker hose or a method that allows slow watering to keep the water going down into the soil and not roll off of the slope.

Tree roots that emerge through the lawn surface may result in scalping as the mower moves over the surface. Small roots (1 to 2 inches) can be cut back with a little excavation. Larger roots should not be removed. Consider mulching these areas with bark chips or leaf mold instead of growing grass. Alternatively, plant a different type of ground cover as mentioned before. Fallen leaves from the tree can smother the grass in the fall. These should be removed on a weekly basis to prevent injury to the lawn.