IRRIGATION AND WATER CONSERVATION ON HOME LAWNS

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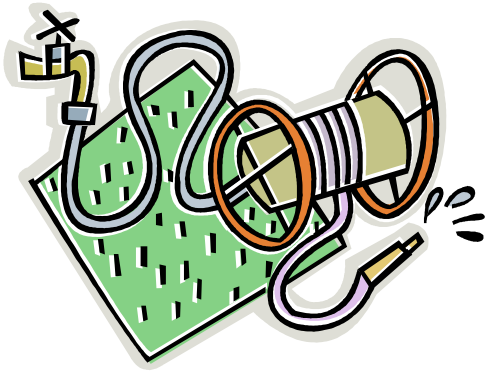
Water is critical for the growth and survival of turf, but may be expensive when used in the quantities required by home lawns. Most city dwellers pay twice for each gallon of water applied to the lawn because they are assessed a sewer charge, regardless of how and where the water is used.



Water conservation begins with proper species and cultivar selection at the time turf is established. Zoysiagrass and bermudagrass are the most heat and drought tolerant turfgrasses used in Maryland. Zoysiagrass is preferred because it is more winter hardy, requires less care, and is slower growing than bermudagrass. Both species are warm-season grasses that develop a brown color as they enter winter dormancy (generally from November to May in Maryland).

Of the cool-season species, tall fescue possesses the best combination of heat and drought resistance, and summer quality. Among fine leaf fescues, sheep and hard fescue also possess excellent summer stress resistance. Hard and sheep fescue perform well under low maintenance in sunny or shaded sites, but they do not tolerate a lot of traffic from people or vehicles. Creeping red fescue and chewings fescue, however, generally exhibit poor color and may develop an unsightly clumpy appearance in full sun during the summer.

To maintain acceptable turf quality, Kentucky bluegrass and perennial ryegrass will require more water during summer than tall fescue. Perennial ryegrass, however, should not be used for lawns in Maryland due to its high susceptibility to disease. There does not appear to be large differences in drought tolerance among recommended tall fescue cultivars.

Hard and sheep fescue tolerate heat and drought better than tall fescue, but they can be damaged severely if mowed during summer stress periods. See “TT-41: Establishing and Maintaining Fine Leaf Fescues For Low Maintenance Sites” for more information about hard and sheep fescue.

The use of sound cultural practices is critical for maximizing water conservation. Increasing mowing height during the summer and avoiding excessive use of nitrogen fertilizers during spring and summer will enhance the ability of cool-season turfgrasses to withstand summer stress.

Modest levels of nitrogen (0.5 to 1.0 lb N/1000 ft^2) applied in mid-May, however, may have a beneficial effect on turf quality. An exception is warm-season grasses like zoysiagrass and bermudagrass, which are preferably fertilized in early summer and should be maintained at 0.5 to 0.75 inch mowing height.

Tall fescue and Kentucky bluegrass lawns should be mowed to a height of 2.5 to 3.5 inches during summer months. Fine leaf fescues should be maintained at 3.5 to 4.0 inches and should not be mowed in summer during periods of heat and drought stress.

KEY POINTS

A lot of water can be saved if turf is watered by need and not by rule.

Lawns should be watered when the grass shows signs of drought stress.

When water IS needed, try to apply enough water so that the soil is wet from 4 to 6 inches below the surface.

Increase mowing height in the summer months and avoid fertilizing cool season grasses in spring and summer.

It’s best to irrigate when the air is cool- either early morning or early evening, but not at night.

Aeration and thatch removal are cultural practices that help improve soil structure and water infiltration. These practices should be performed in early autumn for cool-season grasses; the best time to perform these operations for warm-season grasses is in mid-spring after dormancy has broken.

A frequently publicized rule of thumb for irrigating lawn turf is to apply 1 to 2 inches of water per week. Although this may keep turf green during most of the summer, it may be wasteful or ineffective, particularly where thick thatch layers, heavy clay soils, or "hard pans" exist. In general, it's more effective to water turf by need and not by rule.

The best time to irrigate the lawn is when turf just begins to show signs of wilt. This, of course, is not always easy to determine. However, there are two prominent symptoms exhibited by turf as it begins to wilt: (1) foot printing, and (2) turf develops a blue-green or blue-gray leaf color. After walking across drought stressed turf, leaves of the walked upon plants remain depressed for several minutes, providing the "foot printing" effect. When turf exhibits foot printing or develops a blue-gray color, it is very important that the turf be irrigated to avoid permanent wilting of leaves, and induction of summer dormancy (i.e. browning of the turf). During periods of extreme heat and drought stress dormant plants may die. Some professional managers use instruments that measure soil moisture levels, but most rely on the visual symptoms expressed by drought stressed turf and frequent soil probing.

The lawn should be deeply watered as soon as it has been determined that turf is under drought stress. The duration and quantity of water applied should be sufficient to wet the soil to a depth of 4 to 6 inches. Deep watering encourages the roots of grass plants to grow deeper into soil. This indirectly enhances the drought resistance of turfgrasses by providing a greater reservoir of soil water for plants to draw upon.

The duration and quantity of water needed depends greatly upon soil texture, structure, and thickness of the thatch. In most housing developments, lawns are grown on heavy, clay sub-soils deposited during excavation of foundations and basements. This type of soil resists water penetration and the downward movement of water (percolation) through the soil. In many situations, it is extremely difficult to get water percolation to a 4 to 6 inch depth. Hence, on heavy, clay soils or where hard pans and dense layers of thatch exist, water must be applied slowly.

If the rate of water applied exceeds the rate at which water infiltrates soil, water will run-off and be wasted. The sprinkler, therefore, will have to be moved as water begins to run-off onto sidewalks or the driveway. The sprinkler must be continually moved back and forth on rapid run-off areas at 30 to 60 minute intervals or as needed until water has penetrated to the desired depth. The same principles and practices apply to irrigating turf on slopes or other rapid run-off areas. Probing the soil will enable an individual to determine soil moisture depth. This is best achieved with a probe that removes soil plugs, but a screwdriver also provides a good indication of depth of soil wetness.

Night irrigation is discouraged because it may encourage diseases, particularly when night temperatures exceed 68°F. Night irrigation, however, is a standard practice on golf courses and other large recreational turfs. Night irrigation is preferred in the aforementioned situations because it does not interfere with daily management operations or recreational activities, and it reduces the potential for soil compaction in turf areas with heavy traffic.

The best time to irrigate lawns is during the coolest part of the day when there is no wind. These conditions usually occur during early morning or late afternoon, and help conserve water by reducing evaporation. Conversely, mid-day irrigation during hot, sunny or windy days should be avoided because of increased evaporative losses of water. Furthermore, water that collects in low areas and inundates the turf for an extended period may cause scald injury during sunny, hot periods. Contrary to a popular misconception, scald will not occur if water is applied properly on hot days when turf is under heat and drought stress.

Excessive or frequent irrigation can be just as detrimental to turf as inadequate watering. Turfgrass plants that are subjected to frequent irrigation become lush and succulent. These lush plant tissues are more susceptible to injury from heat, drought, and wear stress, and are more prone to disease injury. Frequent irrigation also discourages roots from growing deeper into soil, thereby limiting the soil volume from which plants obtain water and nutrients.

Excessively irrigated turf is more prone to invasion by moss and algae, and wet soils are more easily compacted by traffic. Soil compaction is common on home lawns, particularly those lawns where children play frequently. Turf growing in compacted areas will have restricted root systems, and lose vigor as a result of poor aeration. Because of the harmful effects of compaction, turf growing in these areas has a tendency to wilt more rapidly during dry periods, and normally thins-out, allowing crabgrass, knotweed and other weeds to invade the area. Compaction can

be minimized by not subjecting turf to traffic, and other heavy uses when soil is wet. Compaction can be alleviated by aeration, but only roto-tilling, adding soil amendments (if necessary), and re-seeding or sodding the area will correct the problem.

Light and frequent irrigation also restricts rooting, reduces stress tolerance, enhances germination of weed seed (especially crabgrass, goosegrass and white clover seed), and encourages diseases. Many homeowners get into the habit of applying small amounts of water to their lawns on a frequent basis. These homeowners often return to a brown lawn after taking a one or two week vacation during hot, summer months. Grasses in these brown lawns are usually not dead, but in a state of dormancy.

However, in extreme cases of drought coupled with a past history of light and frequent irrigations, large areas of the lawn may die. Homeowners who are likely to take vacations longer than one week in the summer are best advised to begin restrictive, deep and infrequent irrigation several weeks in advance of their vacation. Light and frequent, or excessive watering prior to leaving on vacation is likely to cause more severe injury than not applying any water at all. This is particularly true for Kentucky bluegrass lawns.

Sprinkler head and hose diameter selection also are important. Sprinkler heads that deliver large water drops will water a lawn more rapidly and with less evaporative losses than those heads that deliver a mist. The "frog eye" type of sprinkler, which has no moving parts, delivers water very effectively, particularly on areas subject to rapid run-off. The "frog eye" sprinkler, however, covers only a small area, and must be moved more frequently than most other sprinklers.

The rotating, pulsating or impact sprinkler heads deliver relatively large drops of water, and cover a large area at one time. The diameter of the hose also is important. Small hose diameters will create more friction, which reduces the amount of water that can be delivered. Hose diameters above 5/8 inch, and preferably 3/4 to 1.0 inch, are best suited for lawn irrigation. It should be noted that long hoses are subjected to greater friction and lower pressure. Procedures and tips for conserving water for home lawn irrigation are given below.

Tips For Minimizing Water Use on Lawn Turf

1. Select drought resistant species and cultivars before establishing a lawn. Plant only certified seed or sod of adapted cultivars (see TT-77 "Turfgrass Cultivar Recommendations for Maryland").

2. During the late spring increase the mowing height of cool-season turfgrasses. Control thatch, verticut, aerate and apply nitrogen fertilizers at the recommended time of year (i.e. beginning early autumn for Kentucky bluegrass and fescues, and early summer for zoysiagrass and bermudagrass).

3. Irrigate established turf by wetting soil to a depth of 4 to 6 inches during the early stages of wilting (i.e., when turf exhibits foot printing and/or when turf develops a blue-gray leaf color). Watering turf deeply on an as needed basis will increase the ability of turf to withstand environmental stress and will conserve water in the long run.

4. Monitor moisture depth by soil probing. Ensure that the rate of water movement into soil does not exceed the rate of delivery to prevent run-off and wasted water. Water around sunrise if possible.

5. Select a sprinkler head that delivers large water droplets and use a hose with a diameter of 0.75 in. or greater.

6. Avoid the application of excessive amounts of nitrogen fertilizer to cool-season grasses in spring and summer.