

# Lawn Watering and Drought Management

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As of mid-July most of the non-irrigated turf in Iowa is either dormant (brown from lack of water) or well on its way to summer dormancy. Forty six percent of the counties in Iowa are classified D1 Drought – moderate and 37 percent are classified D0 Abnormally Dry. Some local agencies have enacted voluntary water conservation programs that limit water application to every other day based on even and odd house numbers. At this time I have not heard of any mandatory restrictions, but as the drought continues they become more likely.

Elwynn Taylor, Iowa State climatologist, reported at the annual turf conference that Iowa is long overdue for a major drought. Could this be the year? The Corn Belt is hit with a major dry spell every 19 years and as told by tree ring data and the last one was 24 years ago in 1988. The longest duration between droughts has been 23 years, so we are due. Each year the chances increase and Taylor gave a 50/50 prediction for this year that was up for a 30 percent chance the previous year. If you are not ready for it this year then you should be thinking about it for the near future. Along with historical data Taylor sites La Nina as a driving force for our impending potential for drought. La Nina — cooler than normal water temperatures near the equator in the Pacific Ocean — continues to influence weather in the Midwest. A drier-than-normal spring and summer and wild temperature swings are typically associated with the weather phenomena. As of mid-July we are experiencing root-zone (top 1-meter) soil moisture deficits from 2 to 5 inches across Iowa. The departure from normal precipitation (DNP) over the past 30 days has been 3 to 5 inches across central and eastern Iowa

During dry summers, local water authorities may cut off water for outside use or only allow watering on certain days. Both measures are necessary and effective to reduce water consumption and relieve the strain on city water supplies.

To avoid severe loss of turf and to conserve water, turf should be managed each year in anticipation of water restrictions. Here are some drought planning suggestions as well as a few things you can adjust when the drought actually hits.

## **Quick facts on lawn watering**

- Lawns in Iowa may require as much as 1 to 1 1/2 inches of water per week from irrigation or rainfall during the summer to remain green and actively growing. At one inch of water per week (624 gallons/1000 sq. ft.) an average size lawn of 8,000 sq. ft. would require about 5,000 gallons of water.
- Actively growing lawns transpire water that serves as an environmental air conditioner to reduce the heat load around the home.
- Water use on cool season grasses such as Kentucky bluegrass, perennial ryegrass, and tall fescue, can be reduced by 25 percent and still maintain adequate turf quality.

- Deeper roots draw moisture from a larger volume of soil and therefore require less supplemental irrigation.
- Taller grass has deeper roots and a lower tendency to wilt.
- Taller grass provides shading of the soil surface and reduces lethal temperatures near the base of grass plants.
- Lawns mowed weekly at a taller mowing height are less likely to be scalped. Scalped lawns lose density and have shallow root systems.
- During extended periods of summer drought, dormant lawns (browned-out leaves) containing Kentucky bluegrass, tall fescue or perennial ryegrass should receive 1 1/2 inches of irrigation every two weeks to maintain hydrated grass crowns and allow for full lawn recovery when more favorable moisture and temperature return in the fall.

### **Learn to read a lawn and know when to water**

Purple-blue wilting leaves, footprints that stay, and folded or rolled leaves are signs that lawns should be thoroughly watered if grasses are to remain green and actively growing. Turf water use rates are high during sunny and windy days with low relative humidity. In situations where lawns are not watered and rainfall is limited, grasses first show symptoms of wilt and later turn completely brown. When soil lacks moisture, grass blades first turn bluish purple, indicating plant wilt. Another early sign of insufficient water in the plant occurs when footprints remain in the lawn for several hours. Leaves with plenty of water quickly return to their rigid upright shape, while leaves lacking water will remain trampled for a period of time. Leaves also may be folded or rolled lengthwise along the blade, indicating a lack of plant water.

If high temperatures and dry conditions continue without rain or irrigation, the above-ground portion of grasses will turn entirely brown and die. Grasses are said to be dormant during this browned-out stage, since the lower portion of the plant usually remains alive but not growing. Thorough watering will bring the lawn out of dormancy and new growth will resume from the below-ground base of grass plants. Even though grasses are dormant, watering restrictions that result in extended dry periods can cause large ground cracks, severe soil drying and excessive loss of turf cover even when watering is resumed later in the summer or early fall. Summer dormancy of grasses is a mechanism that helps a lawn survive, but it does not guarantee that a lawn will fully recover from the browned-out stage. Dormant lawns should receive at least 1 inch of water every two or three weeks during summer to prevent complete turf loss. Grasses may not show a noticeable greening, but that amount of irrigation should be sufficient to hydrate the lower plant portions and increase the recovery once adequate moisture is available.

### **Prepare for a drought**

Management practices in the fall and spring determine the drought tolerance of the lawn in summer. To reduce the need for irrigation, your lawn management program should maximize root volume and depth in preparation for summer drought. By the time summer rolls around, there is little you can do to help a lawn except mow and irrigate properly.

The following lawn care tips will help reduce the need for irrigation and increase the chance of surviving summer drought.

**1. Avoid the temptation to irrigate in the spring just to get grass growing.** Allow it to green up naturally. Mow frequently and avoid scalping. Do not begin to irrigate until dry conditions of early summer cause obvious turf wilt that lasts for more than one day. In the spring, atmospheric water demands are low and moderate wilting of turf does not damage the lawn. If in the spring the soil is allowed to dry slightly and the grass to wilt some, a deeper and hardier root system will develop. Such a root system will be necessary to reduce the need for summer irrigation and to survive drought conditions or when city water restrictions are imposed.

**2. Mow grass as tall and as frequently as possible** with a properly sharpened blade to produce a dense cover with a deep root system. Taller grass has a deeper root system that draws moisture from a larger volume of soil and results in less need for irrigation. A good mowing height for home lawns is 2.5 inches. Grass height should never be less than 2 inches after mowing. Mow frequently enough so that clippings are 1 to 1 1/2 inches long. Raise the mower height if grass has grown too tall since the previous mowing. A lawn mowed at heights of 3 to 3 1/2 inches will have a better chance of surviving prolonged drought and water restrictions. Most homeowners mow lawns once a week regardless of the mowing height. Taller mowing heights are less likely to cause turf scalping, especially when grass leaves are rapidly growing in the spring. Dull mower blades and scalped turf result in an unattractive lawn that too many homeowners try to correct with over-irrigation.

**3. Apply nitrogen fertilizer to cool-season grasses** (Kentucky bluegrass, tall fescue, and perennial ryegrass) primarily in the fall. Some nitrogen may be applied in the spring if the lawn is sparse and bare soil is visible. Avoid summer application of nitrogen. Nitrogen fertilizer applied in the spring and summer causes additional leaf growth, which uses stored plant energy that normally would be used to produce roots needed for water uptake during summer.

**4. Test the soil to ensure an adequate amount of phosphorus and potassium.** Additional applications of potassium — 1 pound of K<sub>2</sub>O per 1,000 square feet — in April and again in May or June will also improve the summer performance of lawns.

**5. Core aerify tight soils and thatched turf in the fall or spring to increase water and air movement into the soil.** This builds better root systems. Avoid summer coring in the absence of water, since it may cause excessive drying and drought stress.

**6. Limit thatch removal by power raking or verticutting to autumn or early spring** since water demands are low and turf recovery is rapid. Do not severely power-rake lawns in the late spring or summer or they will require excessive irrigation to remain alive. When necessary, severe power raking and seeding should be done in September.

**7. Select grasses that require less summertime irrigation to remain attractive.** Zoysia is a warm-season grass and tall fescue is a cool-season grass. Both are noted for the ability to make an attractive summer lawn with less irrigation.

#### **Conserve water by knowing when to water**

- The best time to water a lawn is from 6 to 8 a.m. when disruption of the water pattern from wind is low and water lost to the atmosphere by evaporation is negligible. Watering

early in the morning also has the advantage of reducing the chance of turf diseases that require extended periods of leaf moisture. Avoid irrigation during midday and windy conditions.

- Move sprinklers frequently enough to avoid puddles and runoff. Difficult-to-wet areas such as slopes, thatched turf and hard soils may benefit from application of a wetting agent to improve surface penetration of water.
- Water only when the plant tells you to. Become familiar with areas of the lawn that wilt first (blue/purple leaves, rolled leaves, foot printing). Water within a day of observing these symptoms.
- Water problem areas by hand to postpone the need for irrigation of the entire lawn. Some areas of a lawn usually wilt before others. These areas, or “hot spots”, may be caused by hard soils that take up water slowly, slopes, southern exposures, and warmer areas next to drives and walks. Lawns that have unusual shapes also may require some hand watering to avoid unnecessary watering of paved surfaces, mulched beds and buildings. Soaker hoses that have a narrow pattern and supply water at a slow rate may be useful in these areas.

Once the decision has been made to irrigate, then water the lawn thoroughly. Should puddles or runoff occur before the total amount of water is applied, stop irrigating and resume only after the ground has absorbed the free moisture. Lawn areas that are moist, firm, and have no visible water are ready for a repeat irrigation cycle. Areas that are soft and produce squashy footprints when walked on are not ready to receive additional irrigation.

A day after watering, check a few different locations in the yard to determine how well your irrigation program is distributing water in the root zone. With a shovel, cut a slender 2-inch wedge 6 to 8 inches deep. This wedge of soil, roots and turf can be replaced easily without damage to the lawn after inspection.

Estimate the moisture content at different depths in the soil profile by pressing together a golf-ball-sized amount of soil. If drops of water can be squeezed from the soil ball, you may be irrigating too much or too often. Soils that hold together without crumbling and appear moist have been irrigated properly. Soils that appear dry, dusty and do not form a ball when squeezed have not received enough irrigation or the water is running off the surface of the lawn and not into the root zone.

Adequate soil moisture at 6 to 8 inches deep is sufficient to maintain grasses during the summer. A foot-long slender screwdriver pushed into the ground in several locations can also give a quick assessment of the moisture condition of the soil. The screwdriver will easily penetrate to the soil depth that has received sufficient water. The screwdriver test can also be used to help determine where and when there is a need for irrigation.

### **Watering new lawns**

Newly seeded or sodded lawns require special irrigation. A newly seeded lawn should be watered daily and may need as many as four light waterings in a single day. Keep the seedbed

moist, but not saturated, to a depth of 1 to 2 inches until germination occurs (green cast to lawn and seedlings are 1/4 to 1/2 inch tall).

Seedlings of a new lawn must not be stressed to the point of wilt. Continue with light applications of water — 1/8 to 1/4 inch — one to four times a day.

Apply straw (one bale per 1,000 square feet) at time of seeding to help shade the ground and prevent rapid drying of the soil surface. Straw also will reduce seedling damage from the force of large sprinkler drops. Watering with a light mist is best for establishing new lawns. As seedlings reach 2 inches in height, gradually reduce the frequency of watering and water more deeply. After the new lawn has been mowed two or three times, deep, infrequent waterings are the best.

Newly sodded lawns require watering one or two times a day. Begin irrigation immediately after laying sod. Plan your sodding operation so that a section of laid sod can be watered immediately, while other areas are being sodded.

Sod should be watered so that the sod strip is wet as well as the top inch of soil below the sod. The first irrigation will take about an inch of water to achieve complete wetting of the sod. After watering, lift up pieces of sod at several locations to determine if it has been adequately irrigated. Continue watering one to two times a day with light irrigation to prevent wilting and to ensure a moist soil just below the sod layer.

As sod becomes established and roots penetrate and grow in the soil, gradually reduce the frequency of watering but wet the soil deeper. After sod has been mowed two or three times, deep, infrequent watering should be practiced. During hot, windy conditions, establishing sod may require several light applications of water per day to prevent wilt and potentially high lethal temperatures. In this case, light misting, just to wet the leaf surface and not to supply water to the soil, cools the grass plant as water is evaporated from the leaves.

Do not over-irrigate (saturate) the soil because that will inhibit sod roots from growing into the soil. If the sod cannot be watered on a daily basis, thoroughly water the sod and soil to a depth of 6 inches. This will delay the rooting time of sod but will reduce the chance of rapid drying and severe loss of grass.

Sod laid June through August should be watered as described above for proper establishment and should not have water restricted to cause browning and summer dormancy. Sod laid March through May has a better chance of withstanding summer water restrictions, especially if roots have developed to a minimum of six inches deep. Sod that is less than one year old may not be fully rooted and is more susceptible to drought injury. During severe drought sod that is less than one year old, and has been allowed to enter summer dormancy, would benefit from some irrigation just to keep the surface plant crowns from completely dehydrating.

### **Drought and water restrictions**

Each year parts of Iowa are affected by dry conditions. Thunderstorms occur sporadically throughout the state to give local and temporary relief from dry conditions. A good soaking rain that slowly delivers at least one inch of water over the course of a few days is always welcomed

to recharge deeper soil moisture reserves. Non-irrigated turf in one county may thrive while the next county may already be experiencing summer dormancy from complete lack of rainfall. The “luck of the draw” concerning rainfall can seem very unfair, but the reality is that you need to prepare each year as if you will be experiencing annual drought and possible water restrictions.

The State Water Plan of 1985 sets forth guidelines for dealing with water shortage in Iowa. Unfortunately, water use by the turfgrass industry has a low priority. Typically water will be restricted for home lawns before it is restricted for golf courses and athletic fields. As drought conditions escalate here are some of the difficulties that Iowa lawns will face.

- There is the misconception that lawns can turn brown (go summer dormant) when dry and then return to the same level of turf performance when water and weather conditions improve. The reality is that that summer dormancy helps Kentucky bluegrass survive, but under extended periods of severe drought even Kentucky bluegrass can die. Perennial ryegrass and fine fescue often comprise 40 percent of the home lawn and these grasses are even less drought tolerant than Kentucky bluegrass. When the lawn turns completely brown it is likely that some of the perennial ryegrass and fine fescue will completely die.
- Dormant lawns quickly lose their competitive edge of density and are easily invaded by weeds, especially summer annual weeds like spurge and crabgrass.
- Post emergence summer weed control of crabgrass and broadleaf weeds will be diminished during drought.
- During extended dry conditions the degradation of pre-emergence herbicides is slowed and their activity may extend into the late summer period for reestablishing turfgrass from seed.
- Avoid fertilizer and weed control applications on dormant lawns, especially when temperature exceeds 85° F.
- Turf loss from white grubs is more severe during dry periods because these insects attack the root system.

It is very likely that some parts of Iowa are beginning to experience dry conditions, severely wilted turf and even brown dormant grass. Local agencies may have enacted voluntary water conservation programs or even mandatory water restrictions. Two or three well timed rains can keep the lawns alive and ease the restrictions on outdoor water use. In the mean time, have you prepared your lawn for drought?