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## Improving Drought Tolerance in Your Florida Lawn<sup>1</sup>

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Turfgrass plants, like all green plants, require water for growth. During times of inadequate rainfall, application of supplemental irrigation water will help maintain a higher quality lawn. Although droughts are usually thought of as long periods of time, such as months or years, sandy Florida soils can experience drought conditions after only a few days without rain. Without adequate water from either rainfall or irrigation, turfgrasses will adopt a water conserving habit. Under these conditions, grasses will roll their leaf blades to stop the loss of water (known as transpiration) from the leaves, will defer any new shoot growth until conditions are more suitable for growth, and will send their roots deeper into the soil in search of water. During periods of drought, leaf tissue may die and drop from the plant, although the grasses will generally recuperate upon receiving adequate irrigation.

As grasses recover from drought, they will be more susceptible to other stresses (cold temperatures, traffic, insects, or diseases) and will not grow as vigorously as nonstressed grasses. In light of increased mandatory watering restrictions in Florida consider management practices that will help enhance the drought-tolerance of your grass.

### Objective of Drought Conditioning

The primary objective of drought conditioning is to grow a good quality lawn that will survive on little or no supplemental irrigation. A drought conditioned lawn can withstand more stress than a lawn that is not conditioned. A properly prepared lawn will have a deep and extensive root system that is better able to seek out water.

### Irrigation Practices

Proper irrigation is the first step in conditioning a lawn for drought. Many people rely on their automatic sprinkler systems to apply small amounts of water several times weekly to their lawn, regardless of any rainfall received. This practice is actually detrimental to the grass because it promotes a lawn that requires more water and one that cannot withstand tough stress. **Less frequent, longer irrigations will assist in establishing a deeper, more viable root system.**

Frequent (daily), light waterings promote shallow root systems that do not result in healthy turf. To develop a deep root system, water your lawn when the first signs of wilt occur. When the lawn needs water, you'll see spots in the lawn that turn bluish-gray, footprints that remain in the grass long

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after being made, and many leaf blades folded in half lengthwise. Apply only enough water to wet the soil in the rootzone. For Florida's sandy soils, 3/4 inch of water is generally sufficient. Do not water the lawn again until signs of wilt occur again. This technique works regardless of turfgrass species, soil type, season, or other environmental conditions. It may take up to 6 weeks to condition your turf to survive several days or more without wilting between irrigations or rainfall. During this time the root system is developing and growing deeper into the soil. In time, your lawn will establish a more uniform appearance with less thatch and a deeper root system.

### Mowing Practices

Proper mowing practices are essential for good quality and drought-tolerant turf. Every time a lawn is mowed, the metabolic activities of the grass are stressed, which reduces root growth. Mowing frequency and cutting height need to be carefully considered for a healthy lawn. Using the highest cutting height on the mower will facilitate turfgrass drought-conditioning. This will increase the grass leaf area, allowing for more photosynthesis. This results in more carbohydrates, which are then available for use in recovery from stresses such as drought. The higher the mowing height, the deeper and more extensive the root system will be. Although transpiration (water loss through leaves) will be slightly greater with higher mown turf, the expanded root system proves more advantageous.

Mowing should be done often enough to minimize the shock of cutting. Never mow off more than one-third the height of the leaf blade at any one time. If the lawn is allowed to grow to 4 inches, do not mow it lower than 3 inches. Adjust the frequency of mowing to the growth of the turf. In the summer, it may be necessary to mow more than once a week, but in the winter, once a month or less may be enough. Keeping the mower blades sharp and properly balanced is also important. A leaf cut by a sharp blade will heal over more quickly and lose less water than a leaf blade shredded by a dull mower blade.

### Fertilization Practices

Fertilization practices can enhance drought tolerance of turfgrasses, if properly done. Understanding plant responses to nitrogen and potassium fertilization is helpful in developing a beneficial program as well as providing a well-balanced nutritional program. All of the drought conditioning accomplished by proper irrigation and mowing practices can be defeated by excessive nitrogen fertilization. Excessive nitrogen enhances shoot growth but root growth is reduced. Leaf blades become more lush as nitrogen fertilization increases. Drought conditioning can only be accomplished by applying just enough nitrogen to obtain a small but continuous amount of growth.

Potassium fertilization, however, can help turfgrasses increase their tolerance to many stresses, including drought. Potassium promotes increased root growth and thicker cell walls. Turfgrasses require potassium in nearly the same amount as nitrogen, especially in sandy soils where both can readily leach out.

Other macro and micronutrients, as well as the soil pH, should be kept at recommended levels for optimal growth. Supplemental iron applications can provide desirable green turf without promoting succulent shoot growth. Iron applications have also been shown to increase turfgrass rooting. Soil testing is helpful in monitoring nutrient levels and determining turfgrass fertility requirements. Contact your local Cooperative Extension Office for more information on this.

### Pest Control

Pesticide chemicals should be applied to lawns with a great deal of care because they can add the extra stress of phytotoxicity (chemical damage to plants). A healthy, vigorously growing turfgrass is the best defense against weeds, insects, and diseases. The irrigation, mowing, and fertility practices outlined above will promote a healthy, dense turf and reduce the need for pest control measures. However, if a pest problem has been diagnosed, it should be promptly treated following recommendations from your local Cooperative Extension office. Spot treatment of a pest problem is usually as effective as

treating the whole lawn. Be particularly watchful for insects and diseases that attack turfgrass root systems.

### **Turfgrass Species**

Drought tolerance varies greatly with turfgrass species and cultivars. Bermudagrass, zoysiagrass, bahiagrass, seashore paspalum, and centipedegrass have the best drought tolerance of the southern turfgrasses, followed by St. Augustinegrass and carpetgrass. Under severe drought conditions with no supplemental irrigation, turfgrasses will go dormant, cease to grow, and drop leaves. After soil moisture becomes adequate, new growth will emerge from buds on rhizomes (underground stems) or stolons (aboveground stems). Bermudagrass, zoysiagrass, seashore paspalum and bahiagrass can usually recover from drought-induced dormancy because they have rhizomes that are protected from drying out in the soil. St. Augustinegrass and centipedegrass do not have rhizomes, which decreases their ability to recover from stresses such as drought. Deep root systems, which enhance recovery from drought, are found in bermudagrass, centipedegrass, and seashore paspalum.

Choosing a grass that is drought tolerant is complicated because each species has particular pest problems. Bermudagrass and zoysiagrass tend to have trouble with nematodes (soil-borne, minute, worm-like animals that feed on plant roots), although both provide good quality turf when nematodes are controlled. Bahiagrass is susceptible to mole crickets, but these insects are easier to control than nematodes. If a person can accept an open growth habit and not overmanage the turf, then bahiagrass may be the best selection. Bahiagrass is adapted to a wide range of soils and can survive under minimum management. Centipedegrass has a slow growth habit, and low water and nutrient requirements, but has a light green color that is objectionable to some people. Seashore paspalum has good tolerance to drought, salinity, insects, and diseases and provides an attractive, high-quality turfgrass.

### **Alternatives to Turfgrass**

People often attempt to grow turf where it will not survive without extraordinary care. High-quality turf cannot be maintained without supplemental irrigation, although a lower-quality turf may persist. In landscapes where unsightly turf may detract from the design, alternatives to turf should be considered. Mulched bed or groundcovers may be more suitable. Plant materials that do not require supplemental irrigation should be chosen. Consult your local Cooperative Extension office for the plants that grow best in your area.