Drought Resistance Comparisons Among Major Warm-Season Turfgrasses

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RESEARCH at Texas A&M University reveals substantial differences in drought resistances not only among the major warm-season turfgrass species but also among varieties within species.

Drought resistance is the term that encompasses a range of mechanisms whereby plants withstand periods of dry weather. The dimensions of drought resistance are drought escape, drought avoidance, and drought tolerance. A green turf provides an aesthetically pleasing landscape with a number of functional roles, such as evaporative cooling, soil and dust stabilization, safety, and reductions in noise, glare, and air pollution.

Water availability recently has become a major limiting factor in growing turfgrasses in many areas. Without water, turfgrasses go dormant and may eventually die. A brown turf can add an attractive dimension to landscapes, but its functional roles, such as evaporative cooling, safety, air pollutant absorption, and recuperative ability, are minimized. Furthermore, dead turf areas usually need to be replaced, probably at a higher cost. Thus, selecting the proper turfgrass species and/or cultivar is a key step towards minimizing drought damage.

Conducted under a United States Golf Association Green Section grant, research at Texas A&M University has delineated the comparative drought resistances among 11 major warm-season turfgrass species, and also among 22 bermudagrass, five St. Augustinegrass, six zoysiagrass, and four centipedegrass cultivars. The drought stress was imposed on these turfgrasses for 48 days before irrigation was reinitiated. The turfs were grown in the field on a 30-inch-deep sand root zone over eight inches of gravel in a random block design with four replications.

Researchers measured a plant's drought resistance by how well and how quickly shoots recovered after stress. Since quality is an important factor in growing functional turfs, leaf firing during moderate to severe drought conditions should be taken into consideration in selecting turfgrass species and cultivars. Significant differences in drought re-

TABLE 1
Warm-season interspecies drought resistance and leaf firing comparisons representative of the most widely used cultivars of each species.

Relative Classification	Leaf Firing	Drought Resistance (Shoot Recovery)
High	St. Augustinegrass	Zoyziagrass Bermudagrass Centipedegrass
Medium	Seashore paspalum Buffalograss Bahiagrass	Seashore paspalum Buffalograss Bahiagrass
Low	Centipedegrass Bermudagrass Zoysiagrass	St. Augustinegrass

sistance showed among turfgrasses not only in shoot recovery but also in leaf firing (Table 1). Centipedegrass showed surprisingly good drought resistance. There was an opposite relationship between leaf firing and shoot recovery for each species and cultivars. This means that those turfgrasses that turn yellow or brown earlier tend to have poorer post-drought stress shoot recovery, in other words, poor drought resistance.

Most zoysiagrasses and centipedegrasses showed good to excellent drought resistance with minor leaf firing (Table 2). However, there were very significant variations among both St. Augustinegrasses and bermudagrasses (Table 2). St. Augustinegrass is regarded as medium drought resistant. Floratam and Floralawn, however, exhibited excellent drought resistance and very little leaf firing. In contrast, bermudagrass generally has excellent drought resistance. Santa Ana, Tifway, and Tifway II have only medium drought resistance and high leaf firing.

TABLE 2
Comparative drought resistance and leaf firing among cultivars within the zoysiagrasses, centipedegrasses, and St. Augustinegrasses

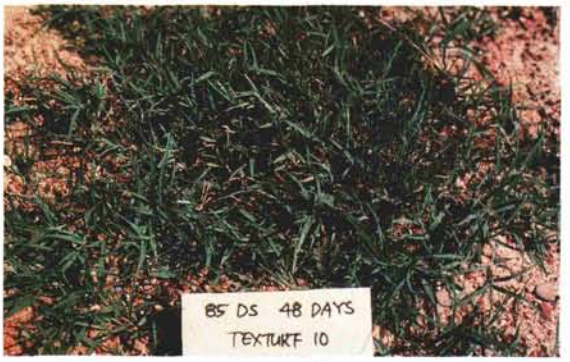
Turfgrass Species	Relative Classification	Leaf Firing	Drought Resistance (Shoot Recovery)
Zoysiagrass *(Zoysia* spp.)	High	Korean Common Belair Meyer	FC 13521 Meyer
	Medium	Emerald	El Toro Emerald
	Low	El Toro	Belair Korean Common
Centipedegrass *(Eremochloa ophiuroides)*	High	AU Centennial	Georgia Common
	Medium	Tennessee Hardy AC 26	Oklawn AC 44 Tennessee Hardy
	Low	Georgia Common AC 44 Oklawn	AC 26 AU Centennial
St. Augustinegrass *(Stenotaphrum secundatum)*	High	Texas Common Raleigh	Floralawn Floratam
	Medium	Tx 8262	Tx 8262
	Low	Floratam Floralawn	Raleigh Texas Common

Photos of comparative shoot recovery/drought resistance following 48 days of drought and a subsequent 18-day irrigated post-drought recovery period.

BERMUDAGRASS

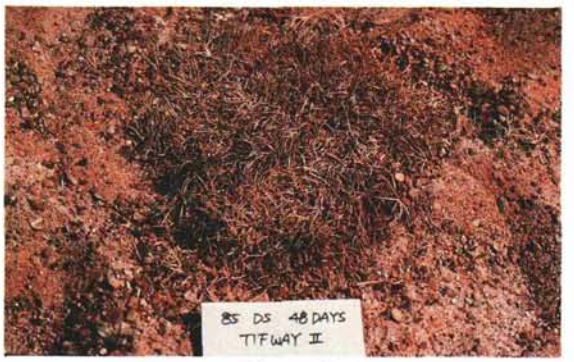
Tiffine

Tifgreen



Texturf 10

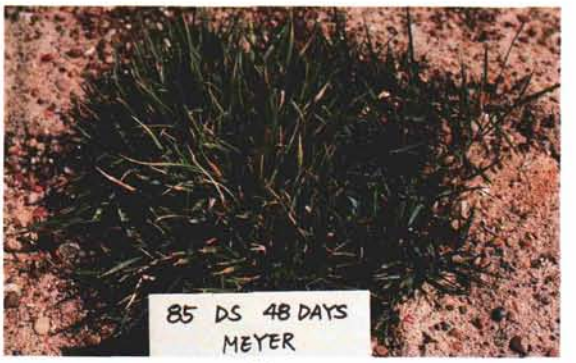
Tifway



Tifway II

ZOYSIAGRASS

Emerald



Meyer

ST. AUGUSTINEGRASS

Floralawn

Floratam

Raleigh

Texas Common

OTHER WARM-SEASON GRASSES

Centipedegrass

Buffalograss

Seashore Paspalum

Bahiagrass