Experimental bermudagrasses show varied drought response

July 3 2024, by Jane Cerza

Credit: Pixabay/CC0 Public Domain

In a new study, researchers at Oklahoma State University have unveiled significant variations in drought response among advanced turf-type Bermudagrass experimental genotypes. The study aimed to evaluate the drought tolerance of various Bermudagrass genotypes under controlled conditions. The results revealed substantial differences in the ability of these genotypes to withstand prolonged periods of water scarcity,

providing valuable insights for turfgrass breeders, landscapers, and environmental managers.

There are more than 31 million acres of irrigated turfgrass, making it the largest irrigated crop in the United States. Bermudagrass (Cynodon spp.) is widely used on athletic fields, golf courses, lawns, and roadsides in the southern regions and the transition zone of the United States. Water scarcity is one of the major issues for turf management worldwide. Selecting drought-resistance turfgrass species and cultivars is one of the primary strategies in water conservation to meet the needs of the growing human population.

Sufficient soil moisture is essential for turfgrass growth, shoot density, and acceptable turf quality (TQ). Insufficient moisture in the root zone disrupts turfgrass physiological and biochemical processes, leading to wilting, osmotic adjustment, and production of abscisic acid, heat shock proteins, or dehydrins. Prolonged drought stress, lasting from days to weeks depending on soil type, can cause leaf firing (LF), where leaves brown and die starting from the tips and margins, eventually leading to turfgrass dormancy.

Researchers evaluated the drought response of Bermudagrass under acute drought conditions in Stillwater, OK, driven by increasing water demands and frequent droughts. Experimental selection OSU1221 and "TifTuf" showed superior drought performance, with OSU1221 excelling in both experiments except for "DT-1" ("TifTuf").

"TifTuf" had higher evapotranspiration and water usage than "Tifway," along with greater total root biomass, root diameter, root-to-shoot ratio, and root dry weight. This suggests "TifTuf" draws more water from deeper soil layers, aiding its drought resilience.

The study found strong correlations between volumetric soil water

content (VSWC) and drought stress indicators, noting that deeper soil moisture data could enhance future research. Developing Bermudagrass genotypes with extensive root systems and higher root-to-shoot ratios is recommended for improved drought performance. Both "TifTuf" and OSU1221 adapted well to prolonged drought stress.

This discovery promises to transform turf management practices, offering new solutions for drought-prone regions and sustainable landscaping. The identification of superior drought resistance experimental genotypes is expected to provide useful information to breeders on cultivar release.

The findings are published in the journal *HortScience*.

More information: Shuhao Yu et al, Advanced Turf-type Bermudagrass Experimental Genotypes Show Marked Variation in Drought Response, *HortScience* (2023). DOI: 10.21273/HORTSCI17085-23

Provided by American Society for Horticultural Science