

PLANT STRESS MECHANISMS

TEXAS A&M UNIVERSITY
College Station, Texas

Dr. James B. Beard
Principal Investigator

1988 Research Grant: \$55,000
(sixth year of support)

Climatic conditions in College Station, Texas during 1988 were exceptional for an intense assessment of drought resistance and its components avoidance and tolerance among 65 commercially available turfgrass species and varieties including 55 warm-season turfgrasses. Four replications of each individual turfgrass were allowed to grow in a deep sand root zone for 158 days without significant rainfall or supplemental irrigation. Included in the assessments were 26 bermudagrasses, 9 zoysiagrasses, 8 St. Augustinegrasses, 6 centipedegrasses, 2 seashore paspalums and 2 buffalograsses; also, two heat tolerant varieties each of creeping bentgrass, Kentucky bluegrass, tall fescue, perennial ryegrass and fine fescue.

In terms of the greatest ability to retain green color throughout the 158 days of drought, there were 5 bermudagrasses that retained 83 - 88% green leaves. These varieties included Ormond, Midiron, and FB 119 and two Mexico State University selections developed via the USGA grant program, including the recently released Nu Mex Sahara.

Perhaps most surprising were 4 St. Augustinegrass varieties that ranked with the bermudagrasses in ability to retain green color throughout the 158 days of drought stress. All four varieties exhibited more than 90% green leaf color retention. Top ranked were Floratam and Floralawn and two selections from the turfgrass breeding program of Texas A&M University at Dallas.

Ranking next in drought avoidance was one variety of seashore paspalum, specifically Adalayd, with 82% green color retention after 158 days of drought.

Among the buffalograss and centipedegrass varieties, none retained any significant level of color retention during the 158 days of drought stress. Buffalograss discolored and entered dormancy the earliest of all the species. In the case of centipedegrass, leaf color was retained somewhat longer but recovered from the extended period of water stress with great difficulty. All the cool-season turfgrasses were dead within the first month of drought stress--May.

The most striking finding from these data is that a number of varieties exist among the warm-season turfgrasses that possess a superior ability to maintain green color over a period of five months under severe drought stress. These varieties, representing 4 different species, offer superior germ plasma resources to be used in breeding programs to select for improved water conserving turfgrasses.