

TEXAS A&M UNIVERSITY

Breeding and Development of Zoysiagrass

1990 Research Grant: \$45,000
(Eighth year of support)

Dr. M.C. Engelke
Principal Investigator

A major redirection within the zoysiagrass program occurred in 1989 and 1990 with the addition of Dr. Richard H. White, as Assistant Research Scientist specializing in turfgrass physiology, and Dr. Bridget Ruemmele in turfgrass breeding. The combined efforts of the group have been directed specifically to the assessment of germplasm relative to stress tolerance mechanisms and the specific hybridization of selected accessions in order to study the relative heritabilities of such traits and to combine desirable traits into new varieties. Considerable progress has been made in the area of developing seeded zoysiagrasses.

Maintenance of the zoysiagrass germplasm nurseries will receive considerable attention during the next few years due to the reduction in turfgrass research efforts on the part of the United States Department of Agriculture. Due to Federal budget problems, the Oriental zoysiagrass collection will be preserved vegetatively at TAES-Dallas. However, no funds are available to complete the documentation or to develop the CORE collection for entry into the Plant Introduction (PI) System, or for increase and distribution. Regardless, vegetative maintenance and production of these accessions has become streamlined and more expedient with the use of thin-layer sod production techniques developed at TAES-Dallas. Once entered into the PI system, the CORE collection will be available to requesting agencies as prescribed by the rules and regulations of the USDA Plant Introduction system.

Numerous elite accessions of zoysiagrasses have been evaluated for water-use requirements under field conditions using the Linear Gradient Irrigation System (LGIS). Major separations occurred for plant growth response and survival among zoysiagrass cultivars and accessions. Of the commercial cultivars, El Toro and Belair required less water than Meyer or FC13521. A number of the DALZ lines have remarkable potential to recover from drought stress. The Turfgrass Root Investigation Facility (TRIF) has provided considerable information on the rooting characters of many of the elite lines. The shade trials continue with marked separation of plant materials in their ability to persist and grow under limited light. The combined testing facilities suggest considerable genetic variability exists within the elite accessions (DALZ lines) as well as the Oriental collection. Of greatest promise is the variation noted for water-use, canopy temperature, growth response, growth habit, texture and turf quality. Regional trials suggest good variability exists among the lines under evaluation for cold hardiness, rate of spread, texture and turf quality.

Results from 11 regional field trials continue to provide excellent information on area of adaptation and potential utility of the elite accessions under development. Regional field trials are located in Missouri, Illinois, Arizona, California, Oklahoma and Florida, as well as several locations in Texas. Electrophoresis has been

completed on 23 DALZ lines by Dr. Lin Wu, University of California, Davis. DNA finger printing of five elite lines in comparison to Meyer zoysiagrass has been completed by Dr. Lloyd Callahan and Dr. Peter Gresshoff of the University of Tennessee.

The National Turf Evaluation Program will sponsor a zoysiagrass trial to be planted in the spring of 1991. A total of 23 entries, including four commercial varieties, will be established at approximately 30 locations across the United States. The TAES-Dallas project will enter approximately ten elite accessions. Data from these national tests are invaluable in defining adaptive characters as well as potential uses of newly developed varieties. TAES-Dallas will assume the responsibility for increasing all of the entries for these trials, with distribution anticipated in mid-May 1991.

Numerous selections have been identified in the Oriental collection for turf quality, color retention, green up, drought hardiness, seed production potential, and several desirable agronomic traits. Approximately 1,500 progeny are under field evaluation for turf performance and seed production potential. Heritability studies and parent-progeny populations are included for seed production, drought resistance, root characteristics and general turf performance.