

OKLAHOMA STATE UNIVERSITY

**Breeding and Evaluation of Cold-tolerant Bermudagrass Varieties and
Bermudagrass Varieties for Golf Course Putting Greens**

1991 Research Grant: \$75,000
(Sixth year of support)

Dr. Charles M. Taliaferro
Principal Investigator

Objectives of the Oklahoma State University bermudagrass breeding program are to develop: 1) seed-propagated, cold-tolerant, fine-textured varieties for the transition zone; and 2) improved varieties for golf course putting greens, with emphasis on adaptation to southern coastal states.

Beginning in the mid-1980's, cold tolerant bermudagrass germplasm populations with moderate seed production potential were subjected to recurrent selection for increased basic fertility (seed set). Three selection cycles resulted in a threefold increase in fertility. Four seeded experimental varieties synthesized from these populations in 1989 and planted in field tests in 1990 survived the 1990-91 winter without significant injury at Ft. Collins, CO; Columbia, MO; and Stillwater, OK. All of the varieties suffered severe injury at Ames, IA where cold injury to all plants was above average. These varieties appear to have good cold tolerance, but are coarser in texture than desired. In the past two years, the breeding populations from which these varieties were synthesized have undergone intense selection for characters affecting turf quality and seed production. New experimental varieties were synthesized in 1991 from these populations for comprehensive and intensive evaluation as potential new varieties. One or more experimental seeded varieties will be entered in the National Turfgrass Evaluation Program bermudagrass test scheduled for 1992.

A laboratory procedure for mass-screening bermudagrass plants for cold-tolerance has been developed. The procedure has been used during the past two years to screen plant populations (totalling over 3,000 plants) with excellent seed production capability and good turf quality, but poor cold-tolerance. Selected plants have been polycrossed for progeny testing and renewed selection. A summer 1991 experiment, in which previously selected plants were cloned and retested along with unselected progeny plants from the same source population, provided evidence that the mass screening procedure effectively selects for greater cold-tolerance.

Thirty-three hundred *C. transvaalensis* progeny plants are being evaluated in nurseries at Stillwater, OK. Five hundred eighty-nine of the 3,300 plants were established in nurseries on golf courses in Georgia and Florida under putting green management. Superior plants from these nurseries will be selected over the next few months as they begin to "sort out". Wide variation among the *C. transvaalensis* progenies for important turf performance traits exists and indicates significant potential for improved cultivar development within the species.

Several vegetatively-propagated *C. transvaalensis* intraspecific, and *C. transvaalensis* x *C. dactylon* interspecific, hybrids were tested during 1991 and performed well in comparison to check varieties. Additional intra- and inter-specific crosses were made among selected parental plants in 1991. Resulting hybrid progenies will be field-planted in spring 1992.

Evaluation of 11 seeded and 16 vegetatively-propagated experimental bermudagrasses by Dr. Ronnie Duncan, Georgia Experiment Station, Griffin, GA, indicated that several have excellent tolerance to low soil pH.