Breeding and Evaluation of Turf Bermudagrass Varieties

Oklahoma State University

Charles M. Taliaferro

Start Date: 1998
Number of Years: 5
Total Funding: $124,978

Objectives:

1. *Assemble and evaluate cynodon germplasm accessions for important descriptors. Incorporate descriptor information and accessions into the National Plant Germplasm System. Maintain a working collection of germplasm accessions with breeding value and utilize in turf bermudagrass breeding program.*
2. *Improve bermudagrass breeding populations for seed production potential, cold tolerance, and other traits conditioning turf performance.*
3. *Identify bermudagrass parental plants with superior combining ability for use in producing inter- and intra-specific F1 hybrid.*
4. *Develop, evaluate and release seed- and vegetatively propagated turf bermudagrass varieties.*

The principal objective of the turf bermudagrass breeding program at Oklahoma State University is to develop improved seed- and vegetatively propagated cultivars for the transition zone. The development of seeded turf bermudagrass cultivars for the transition zone requires combining into breeding populations cold hardiness, economic seed yield potential and acceptable turf quality. Recurrent selection (RS) for these traits in broad genetic base *C. dactylon* population has resulted in incremental improvement with each cycle of selection.

The cold tolerant, seeded, synthetic variety OKS 91-11, was released in January 1997. Current synthetic varieties under evaluation as candidates for commercial release are OKS 91-3 and OKS 95-1. Additional plants were selected from recurrent breeding nurseries over the past year to generate new populations. The most elite of the selected plants will also serve as parents in narrow genetic base synthetic varieties. Breeding improvement in the broad base populations has now reached threshold levels that will allow more rapid progress in seeded turf bermudagrass cultivar development.

Intra- and inter-specific crosses were made to generate F_1 progeny populations for evaluation as potential vegetatively-propagated, hybrid bermudagrass cultivars. One thousand F_1 hybrid progeny from crosses made in 1997 were transplanted into field nurseries in spring 1998 for initial screening Approximately 50 select hybrid plants selected over the past 3 years are now in advanced stages of evaluation. Potentially valuable fertile hybrid plants from *C. dactylon* (2n = 6x = 54 chromosome) x *C. transvaalensis* (2n = 2x = 18 chromosome) crosses have been obtained. These tetraploid (2n = 4x = 36 chromosome) plants have one full genome (9 chromosomes) from *C. transvaalensis* and three full genomes (27 chromosomes) from *C. dactylon*. Open-pollinated and hybrid progeny from these plants have shown desirable turf characteristics. I

Breeding and Evaluation of Kentucky Bluegrass, Perennial Ryegrass, Tall Fescue, Fine Fescues, and Bentgrass for Turf

Rutgers University

Dr. Reed Funk

Start Date: 1998
Number of Years: 5
Total Funding: $40,000

Objectives:

1. *Collect and evaluate potentially useful turfgrass germplasm.*
2. *Collect and evaluate endophytes associated with cool-season turfgrass species.*
3. *Continue the breeding and development of new cool-season turfgrasses.*
4. *Develop and apply several new tools designed to improve the ability to discriminate among endophyte isolates from nature and to synthesize new grass-endophyte combinations for experimental testing and possible commercial use.*

Promising germplasm of turfgrasses and *Neotyphodium* endophytes were collected from Bulgaria, Poland, the Slovic Republic, Inner Mongolia, Uzbekistan, and the United States. This included a number of endophyte-containing bentgrasses with a very small percentage of panicles showing choke stroma.

Germplasm collections and current turf trials indicate opportunities for substantial genetic improvements in a number of grass species which have received limited attention in turfgrass breeding programs in the United States. These include velvet bentgrass, colonial bentgrass, dryland bentgrass, *Koelaria* spp., *Deschampsia* spp. and interspecific hybrids between Texas bluegrass and Kentucky bluegrass. We are also seeing continued genetic improvement in perennial ryegrass, turf-type tall fescue, fine fescues, creeping bentgrass, and Kentucky bluegrass.

Broad sense heritability of dollar spot resistance in creeping bentgrass is being studied through the evaluation of 500 creeping bentgrass clones replicated six times in two environments. This study was initiated in May of 1998 at the Horticultural Farm 11 located on Ryders Lane in North Brunswick, NJ. The clones were heavily inoculated with the dollar spot pathogen (*Sclerotinia homoeocarpa*) using infested Kentucky bluegrass seed in July of 1998. These clones were