

# Breeding and Evaluation of Turf Bermudagrass Varieties

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## Objectives:

1. Assemble, evaluate, and maintain *Cynodon* germplasm with potential for contributing to the breeding of improved turf cultivars.
2. Improve bermudagrass germplasm for seed production potential, cold tolerance, leaf firing resistance, and other traits that influence turf performance.
3. Develop, evaluate, and release seed- and vegetatively-propagated turf bermudagrass varieties.

**Start Date:** 2006

**Project Duration:** three years

**Total Funding:** \$90,000

Following the retirement of Dr. Charles Taliaferro in 2006, a world-wide search to refill the Grass Breeding & Development position was conducted that culminated in Dr. Yanqi Wu joining our team on July 1 of this year. Holly Han joined our team as a full-time MS Candidate in January of 2006 studying field performance of later-stage experimental bermudagrass varieties. Otis 'J' Pye replaced Mrs. Han as the Turfgrass Research Assistant in late spring.

With these changes, the breeding program for the development of improved bermudagrass turf varieties at Oklahoma State University was continued in 2006. A progeny selection nursery of over 1000 plants was established in the field at the OSU Agronomy Farm. The progeny population resulted from *C. dactylon* and/or *C. transvaalensis* parent plants used in inter- and intra-specific hybridizations made in previous years. During the plot establishment phase in the summer of 2006, large variations were observed for seedling growth rate, foliage color, and texture in the selection nursery. Evaluation of the clonal plants will be practiced for more turf performance and adaptation descriptors over the next two years.

A new broad-based breeding population was formed using the desirable Chinese *Cynodon* germplasm accessions (4x=36), which were selected based on extensive evaluation data of chromosomal, morphological, seed yield potential, and DNA marker investigations completed in 2004. The population contains favorable traits for turf cultivar development, including darker green color, relatively fine texture, good winter hardiness, and good sod density. Five narrow-based polycross plots were established to develop new synthet-



Sod tensile strength is a critical component of sod production and handling characteristics. Show here is a machine that tests for sod tensile strength (shear strength).

ics. Over 30 inter-specific hybridization plots of Chinese *C. dactylon* accessions (4x=36 and 6x=54) with elite OSU *C. transvaalensis* (2x=18) breeding lines were field planted in 2006.

Germplasm preservation will ensure continued incremental improvement in turf bermudagrass varieties in the future. Selection of an expanded bermudagrass core collection in both species, *C. dactylon* and *C. transvaalensis*, is underway to include original accessions from geographical regions in the world, promising breeding lines, and commercially released standard cultivars to establish a new germplasm nursery.

Multi-year, field trials comparing OSU experimental entries against industry standards were continued at the Turfgrass Research Center in 2006 for turf quality, divot recovery, spring dead spot disease resistance, and sod tensile strength. Two to three entries are being selected from our material for inclusion in the 2007-2011

NTEP bermudagrass trial.

A novel study evaluating the resistance of 'Patriot', 'Tifsport', and 'Tifway' to invasion by aggressive turf-type common bermudagrass was initiated this year by MS Candidate Holly Han. On-farm testing of our experimental OKC 70-18 commenced in 2006 with an additional producer contracted to plant a test block in 2007. These on-farm tests secure sod producer input on the value and quality of the prospective new cultivars prior to our decision concerning their commercial release. A private demonstration area of OKC 70-18 bermudagrass was successfully established in Stillwater, OK. A sixth producer of 'Patriot' hybrid bermudagrass, developed with USGA support, was licensed in 2006. 'Patriot' was granted US Plant Patent PP16801 on July 11, 2006. Plans are underway for field plantings in 2007 that will allow isolation of research blocks from irrigation to allow screening bermudagrass lines under simulated fairway conditions for leaf-firing resistance during drought.

## Summary Points

- A clonal bermudagrass selection nursery was field planted to over 1,000 progeny seedlings.
- A new broad-based breeding population was formed from elite Chinese accessions. The selected plants contain desirable traits for turf cultivar breeding.
- Over 35 inter- and intra-specific crossing plots were established.
- Selection of a large core collection was initiated to establish a new germplasm nursery.
- Field screening trials of prospective new cultivars were continued with new trials initiated.
- Two to three experimental bermudagrasses are being selected for entry into the 2007-2011 NTEP bermudagrass trial to determine national adaptation.