

# 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

As of October 2007, substantial progress was made in the breeding program for the development of improved bermudagrass turf varieties at Oklahoma State University. A progeny selection nursery of over 1,000 plants (established in 2006) was assessed for seedling growth rate, spring greenup, winterkill, foliage color, texture, sod density, seedhead abundance, and winter color retention.

The progeny population was developed from *C. dactylon* and/or *C. transvaalensis* parent plants in inter- and intra-specific hybridizations made in previous years. Large variations were observed for many turf performance and adaptation trait descriptors. Evaluation of the clonal plants will continue for one more year to select about 1-2% plants for the next stage of in-house evaluation.

A turf germplasm nursery was established on the OSU Research Agronomy Farm in 2007. The bermudagrass nursery included approximately 300 genotypes consisting of original accessions from geographical regions in the world, promising breeding lines, and commercial

ly released standard cultivars in *C. dactylon* and *C. transvaalensis* and their hybrids. A new broad-based breeding population was formed using tetraploid and desirable Chinese *Cynodon* germplasm accessions.

The Chinese accessions were selected based on extensive evaluation data of chromosomal, morphological, seed yield potential, and DNA marker investigations. 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 synthetics. 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. Harvesting seed from the population and crosses are going on. A new polycross nursery was established with hexaploid bermudagrass accessions to develop a hexaploid breeding population in 2007.

Three OSU bermudagrass experimental entries, two clonal (OKC 1119 and OKC 1134) and one seed-propagated (OKS 2004-2) have been selected and submitted to the 2007-2011 NTEP bermudagrass trial.

The selections were made on the basis of multi-year, field trials comparing OSU experimental entries against industry standards conducted at the Turfgrass Research Center for turf quality, divot recovery,

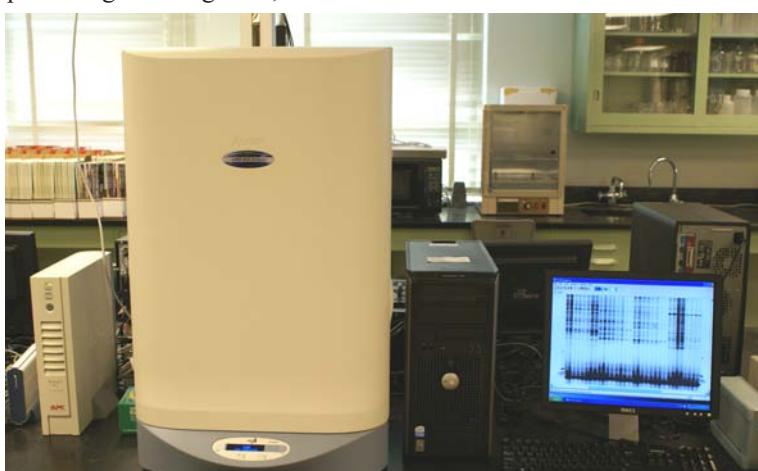


Sod tensile strength is a critical component of sod production and handling characteristics. Show here is a machine that tests for sod tensile strength (shear strength).

spring dead spot disease resistance and sod tensile strength. A Li-Cor DNA analyzer from other funding sources was added to the breeding program to conduct molecular marker analyses and to generate fingerprints in bermudagrass .

## Summary Points

- A clonal bermudagrass selection nursery was evaluated and screened for turf performance and adaptation traits.
- A new broad-based breeding population was initiated from elite Chinese accessions. Seed is being harvested in 2007.
- Seed harvests for over 35 inter- and intra-specific crossing plots are going on.
- A new hexaploid bermudagrass population was field established in 2007.
- A new turf bermudagrass germplasm nursery was established.
- Three experimental bermudagrasses have been selected and submitted for entry into the 2007-2011 NTEP bermudagrass trial to determine national adaptation and performance.



A DNA analyzer is used to generate DNA fingerprints for bermudagrass at Oklahoma State University.