Breeding and Evaluation of Turf Bermudagrass Varieties

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Objectives:

1. Collect and evaluate *Cynodon* germplasm accessions for important performance traits.
2. Maintain a working collection of *Cynodon* germplasm accessions with breeding value and utilize it in turf bermudagrass breeding.
3. Develop seed- and clonally-propagated turf bermudagrass cultivars for transition zone climates.

Start Date: 1998
Project Duration: 5 years
Total Funding: $124,978

Turf bermudagrass breeding at Oklahoma State University is aimed at developing improved seeded-and clonally-propagated cultivars for the U.S. transition zone. Progressive improvement of turf bermudagrass breeding populations is achieved by recurrent selection, a powerful breeding procedure for improving traits such as turf quality and cold tolerance, each controlled by many genes.

The breeding of clonally propagated turf cultivars is accomplished by hybridizing elite *C. dactylon* and *C. transvaalensis* plants and identifying superior F_1 hybrid plants. The *C. dactylon* and *C. transvaalensis* plants used as parents to produce F_1 hybrids are products of the breeding program or the germplasm acquisition effort, or both.

Evaluations of cytological, morphological, and other performance traits were completed for 127 *Cynodon* accessions from China. Much variation existed among the accessions for most of the traits measured including winter hardiness, fertility, and factors influencing turf quality (e.g. color, texture, density).

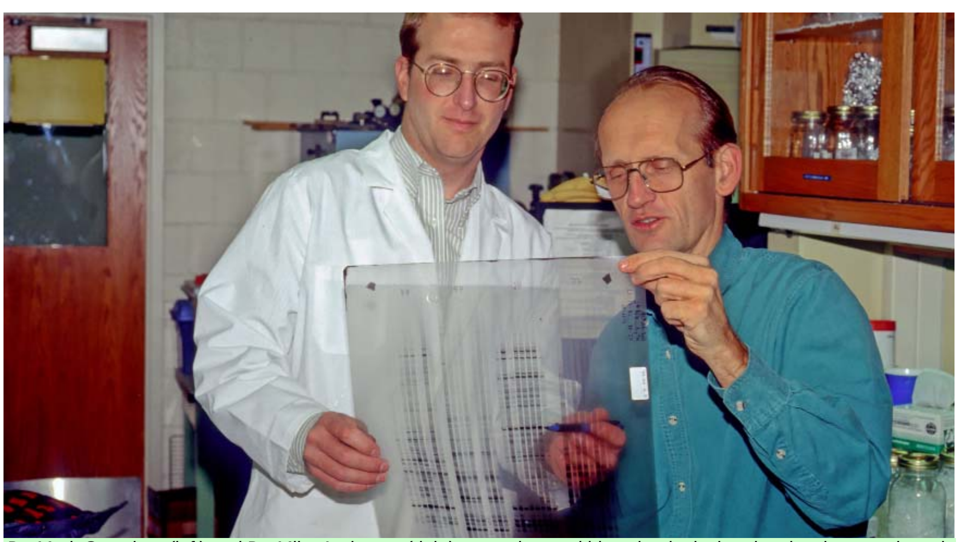
The research better characterized patterns of distribution and variation of *Cynodon* in China. Included in the group of accessions are heritable traits and trait combinations that will significantly enhance the value of the working *Cynodon* germplasm collection used in the breeding program at Oklahoma State University.

Recurrent selection within breeding populations, the development and evaluation of new experimental synthetic cultivars, and the development and evaluation of interspecific (*C. dactylon* x *C. transvaalensis)* F_1 hybrid plants are ongoing components of the breeding program. In 2004, two seed-propagated bermudagrass selection nurseries of approximately 1,000 plants each were established to advance cyclic selection for seed production and turf performance.

The production of eight new seed-propagated synthetic cultivars was initiated by planting clones of parent plants in respective field plots isolated from other bermudagrass. The parents used in the synthetics were elite plants selected from cyclic breeding nurseries grown in recent years. New interspecific F_1 hybrids were produced using selected *C. dactylon* and *C. transvaalensis* parent plants.

Thirty clonally-propagated interspecific (*C. dactylon* x *C. transvaalensis*) hybrid plants and two seeded experimental synthetic lines were included in a new replicated test at the OSU Turf Research Center to evaluate performance management protocols for golf course fairways. Evaluation of plants in nurseries planted prior to 2004 is ongoing.

Developing bermudagrass culitvars with increased resistance to spring dead spot (SDS) requires field testing. Field inoculation techniques using inoculum from SDS causal organisms ensures that selections are exposed to these potentially devasting pathogens in order to assess their inherent resistance. Dr. Dennis Martin (left), Dr. Ned Tisserat (center), and a graduate student assistant (right) are shown artificially inoculating bermudagrass plots to evaluate for resistance to SDS.



Dr. Mark Gatschett (left) and Dr. Mike Anderson (right) use advanced biotechnological and molecular genetic tools to understand the genetic control of how bermudagrass responds to two major stresses: infection by a causal organism of spring dead spot and cold.

Summary Points

- The working *Cynodon* germplasm collection used in bermudagrass breeding at Oklahoma State University is significantly improved by the addition of 127 accessions from China, some with uniquely desirable trait or trait combinations related to turf performance.
- The breeding process included the production of new seed- and vegetatively-propagated cultivars in 2004 and various stages of evaluation of breeding products.