

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. Develop and use simple sequence repeat molecular markers.
3. Improve bermudagrass germplasm for seed production potential, cold tolerance, leaf-firing resistance, and other traits that influence turf performance.
4. Develop, evaluate, and release seeded and vegetatively propagated turf bermudagrass varieties.

Start Date: 2010 (current cycle)

Project Duration: 3 years

Total Funding: \$90,000

A large clonal selection nursery of about 1,500 putative F1 progeny plants (*Cynodon dactylon* x *C. transvaalensis*) was established at the Agronomy Research Station of OSU in the summer of 2011. The clonal progeny were derived from 15 interspecific crosses between selected parental plants of common bermudagrass (*C. dactylon* var. *dactylon*) genotypes and African bermudagrass (*C. transvaalensis*). Seed of the crosses was harvested in 2010. Seedlings prepared in a greenhouse were individually spaced on 7-foot centers. Plants in the nursery will be evaluated for establishment, winter color retention, spring greenup, winterkill, foliage color, texture, sod density, seedhead abundance, and overall turf quality for two years.

Several common bermudagrass populations were subject to phenotypic selection. Two populations established at the Agronomy Research Station of OSU were evaluated primarily for seed yield components, i.e., seed set percentage and inflorescence prolificacy. Some plants in the two nurseries had an exceptional seed set in 2011. This was probably in part due to the weather conditions during bermudagrass flowering and seed maturing stages in June and July of last summer.

Two OSU bermudagrass populations established in 2009 at the turf research center of University Illinois, Urbana-Champaign, IL were evaluated for winter survival. Some plants in the nurseries survived the last two winters. Approximately 100 selections from the best of the survival plants were selected and brought back to be planted in a replicated nursery for further evaluation for turf performance, seed yield and related traits. This characterization research has been designed to be part of a graduate thesis of

Ms. Yuanwen Guo.

Two superior clones, OKC 1119 and OKC 1134, were released as new cultivars in 2010 and were licensed to Sod Solutions, Inc. in 2011. Sod Solutions in close cooperation with OSU have named these cultivars 'Latitude 36' and 'NorthBridge', respectively. The two cultivars are clonally propagated F1 hybrids of *Cynodon dactylon* x *C. transvaalensis*. Last year data published online in the 2007-2012 NTEP National Bermudagrass Test (<http://www.ntep.org/>) indicated the two new cultivars continued to demonstrate exceptional turf quality and many other desirable traits. As of October 2011, six sod producers have been licensed by Sod Solutions, Inc. to produce sod of the two new cultivars.

One experiment was conducted to develop and characterize genomic SSR markers in bermudagrass. Five libraries enriched in core SSR CA-, GA-, ATG-, AAC- and CAG-sequences were constructed using the pUC19 plasmid. The SSR-enriched DNA inserts were sequenced at the Oklahoma State University Core Facility. The software program 'SSR Locator' was used to identify SSR sequences and to design SSR primers. The total of non-redundant highly amplified markers from all 5 libraries was 1,003.

Twenty-five high quality experimental interspecific hybrid bermudagrass lines planted in 2010 were evaluated for sod tensile strength and handling quality in October 2011. Nineteen of the 25 genotypes scored very good (rating 4) to excellent (rating 5) for handling quality where 3 is minimally commercially acceptable. These 19 clones will undergo more intensive field testing by MS candidate Chrissie



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Segars for visual performance traits as well as divot recovery and traffic tolerance/recovery rate in 2012.

Following eight years of low maintenance on a sand putting green at 0.188 to 0.25 inches, six interspecific hybrid plants from a total of 30 candidates were selected for intense final stage testing at 0.125 and 0.156 inches of mowing height, beginning in summer 2012 by MS Candidate Wenwen Liu. All final stage selections had survived winters at Stillwater, OK without greens covers, under conditions that eliminated 'Tifgreen', 'Champion', and 'TifEagle' bermudagrasses on the trial putting green during the period 2003- 2011.

Summary Points

- OKC 1119 and OKC 1134 were released as new clonal turf bermudagrass cultivars by OAES in 2010.
- A set of 10 superior clonal bermudagrass putative hybrids were selected in 2010 from a screening nursery for next-step in-house comprehensive evaluation.
- A large set of SSR markers were developed from bermudagrass EST sequences and pre-existing sorghum SSR markers.
- Eleven polymorphic SSR markers were selected to amplify 32 clonal turf bermudagrass cultivars.