

# Breeding and Evaluation of Turf Bermudagrass Varieties



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Turfgrass and Environmental Research Online  
Volume 13, Number 3 | May—June 2014

## Objectives:

1. Assemble, evaluate and maintain *Cynodon* germplasm with potential for contributing to the breeding of improved turf cultivars.
2. Development and use of 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 seed- and vegetatively-propagated turf bermudagrass varieties.

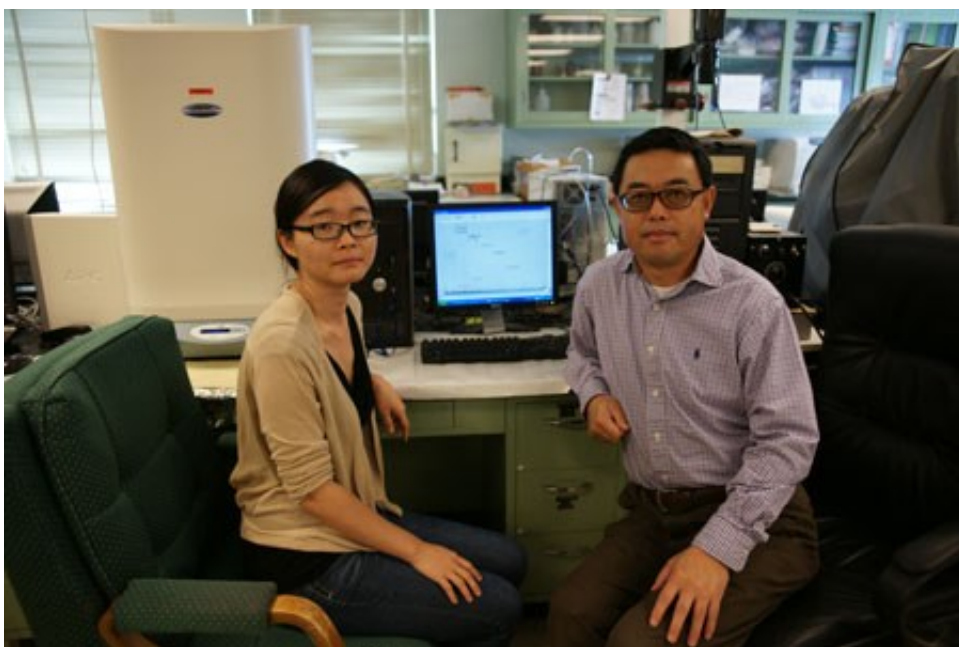
The increasing use of cold-hardy, high quality turf bermudagrass varieties in the US transition zone is an apparent trend observed in recent years. 'Latitude 36', 'NorthBridge', 'Patriot', 'Riviera', and 'Yukon' turf bermudagrass cultivars, developed and released by the Oklahoma State University breeding program, have progressively been installed on golf courses and sports fields in the zone. This is because warming-up temperatures create substantial difficulties to maintain quality cool-season turfgrasses in the summer, while the improved turf bermudagrasses have best performance in the season, requiring much less use of preventative pesticides and supplementary water as compared to cool-season turfgrasses. The OSU turf bermudagrass breeding program made substantial progress in 2013.

One experiment was carried out to develop SSR markers in African bermudagrass. Four SSR genomic libraries were enriched with core sequence motifs, [CA], [GA], [AAG], and [AAT]. More than 3,000 enriched clones were sequenced and 1795 SSR loci were identified. From the SSR sequences, 981 SSR primer pairs were effective with reliable amplifications of targeted bands. The 981 SSRs developed in the study are the first large set of co-dominant

markers in African bermudagrass, and should be highly valuable for genetic and breeding research in the species. The experiment is part of graduate student Chengcheng Tan's Ph.D. program (Figure 1) and one manuscript from the research is to be submitted for potential publication in a peer-reviewed journal.

Three common bermudagrass populations were

**Figure 1. An OSU Ph.D. graduate student, Chengcheng Tan (on the left in the image) working on the development of simple sequence repeat marker for African bermudagrass and directed by Dr. Yanqi Wu**



**Figure 2. One selection nursery of OSU turf bermudagrass breeding populations.**



continually evaluated for phenotypic traits of interest, primarily for seed yield components, i.e., seed set percentage and inflorescence prolificacy (Figure 2). Desirable plants were selected as parents in interspecific hybridizations. A nursery of about 100 cold hardy plants has been evaluated for turf performance, seed yield and related traits since 2011. Elite plants selected from the populations will be used in formation of new seed producing synthetics, which will be established in the field in 2014.

Four fairway-type bermudagrass experimental entries, three clonal (OKC 1131, OKC 1163 and OKC 1302) and one seed-propagated (OKS 2009-3), were entered in the 2013 NTEP National Bermudagrass Test. These entries were chosen on the basis of their turf

performance traits and stress resistance. In particular, drought resistance was considered in the selection of the clonal entries while seed yield was a major trait for selecting the seed producing entry.

In 2013, 'Latitude 36' was selected as a new national standard cultivar in the 2013 NTEP National Bermudagrass Test. 'Latitude 36' and 'NorthBridge' were exclusively licensed to the Sod Solutions (<http://www.sodsolutions.com/>) for marketing and production. Each of the two cultivars are currently produced by 12 sod farmers in OK, NC, IN, MD, VA, TX, MO, and TN. They are not only installed on golf facilities but also sports fields. The most recent, national highly visible installations on sports fields of the two new varieties include 'NorthBridge' at the Kansas City Royals infield and Kansas City Chief's Arrowhead stadium; Latitude 36 at the LP stadium of TN Titans, FedEx Field of the Washington Redskins, Philadelphia Eagles training facility, and Baltimore Ravens practice fields.

### Summary Points

- Development of the first large set of 981 co-dominant SSR molecular markers in African bermudagrass.
- Phenotypic evaluation and selection in four seed-producing common bermudagrass breeding populations.
- Four experimental turf bermudagrass entries were entered into the 2013 NTEP bermudagrass trials.
- 'Latitude 36' and 'NorthBridge' were installed not only on golf facilities but also highly visible sports fields.