

# Development of Seeded Zoysiagrass Cultivars with Improved Turf Quality and High Seed Yields

A. Dennis Genovesi and Ambika Chandra  
Texas A&M University

## Objectives:

1. Develop seeded type zoysiagrass germplasm/cultivar(s) with high seed yields that offer an economical alternative to vegetative types with the potential for rapid turf establishment.
2. Breed improved characteristics such as turf quality, competitive ability, and persistence under biotic and abiotic stresses.

**Start Date:** 2010

**Project Duration:** 3 years

**Total Funding:** \$89,434

Zoysiagrass is most often vegetatively propagated since it produces a higher quality turf. Marketing and distribution are, however, easier with seeded cultivars. Cost to establish one acre of fairway with sod, not including preparation, is between \$12,000 and \$15,000 while seeding costs only around \$870. Moreover, the number of weeks needed to achieve established zoysiagrass fairways with seed is 16 versus 24 weeks with sprigs and 4 weeks with sod. Our current research focuses on the development of seeded cultivars that are genetically stable with improved turf quality, high seed yields, persistence, and competitive ability.

The seeded type zoysiagrass breeding effort here at Texas AgriLife Research Center – Dallas began in 2000-2002 when interspecific hybrids between *Zoysia japonica* and *Z. matrella* were made yielding 1,600 progeny. After a two-year grow-in period, 53 advanced lines were selected based on high seed yield potential and turf quality. Current funding support is directed towards the evaluation of these selected experimental lines for possible commercialization, as well as the initiation of additional breeding cycles of



Seed scarification involves soaking in 40% KOH for 20 minutes, then rinsing three times with deionized water.

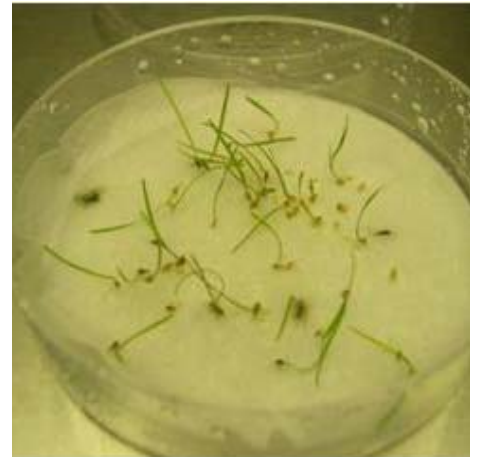
recombination and selection of germplasm to generate new seeded families.

Due to limited resources, we have targeted our breeding efforts to work solely on the fine texture class (19 out of 53 selected lines) and place seed from the medium coarse and coarse texture classes into cold storage. Our breeding approach focuses on recurrent selection with alternating between Spaced Plant Nurseries (SPN) in 2011 and isolation blocks in 2013. As experimental lines develop in the 2011 SPN, we will focus on the following traits: fine texture, seedhead production (density and height), turf quality, flowering time, and nicking between families.

When selecting potential seed parents they should represent different pedigrees, but have approximately the same flowering time in order to enable cross pollination. Recurrent selection targets population improvement by stacking genes for seed yield and moving the population mean. Replicated field trials planted in 2011 with experimental seed lots will evaluate turf quality according to NTEP protocols.

During the spring of 2011, we have focused our efforts on the germination of seed harvested from the 2009 isolation block nurseries. Seed from 15 of 19 fine textured genotypes were germinated this spring in both the lab as well as the greenhouse. Since zoysia has hard seeds, it was necessary to scarify it to enable quick germination (4). The protocol developed in our program for scarifying zoysia seed is chemically using a strong base (40% KOH).

Three reps of 50 seeds each were scarified before germinating on moistened filter paper in Petri plates to determine percent germination for each genotype. This effort has produced a population of 684 progeny, which was planted on 4-ft. centers in the 2011 SPN on September 23, 2011. The progeny population will be evaluated for seedhead production and turf



In vitro germination of seed on moist filter paper.

quality characteristics in 2012 and 2013. The best seed parents will be selected for another cycle of cross pollination in isolation blocks in 2013.

At the same time, we will introgress new germplasm identified from other sources with the potential for good seed production into the 2013 isolation block to insure a broad genetic base thus minimize inbreeding. A replicated field trial with 3 ft. x 3 ft. test plots was planted on August 26, 2011 for all 15 fine textured seeded families in order to evaluate their turf quality in 2012.

## Summary Points

- Fifteen fine textured parental lines with the potential for good seed production were allowed to open pollinate in isolation blocks (planted in 2009) and seed harvested in 2010.
- Seed lots were tested from each seed parent to determine % germination and seedling vigor and the resulting progeny (684) were planted in a SPN for the next cycle of seed parent selection. ‘Zenith’ was included as a check.
- Field trials were planted using the experimental seed lots of fine textured zoysias to evaluate turf quality. Seed was scarified and planted according to NTEP specifications of 1 lb./1,000 sq. ft.