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

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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 by plugging, sprigging, or solid sodding. Vegetatively produced grasses provide considerably higher quality turf, however, marketing and distribution is easier with seeded cultivars. Our research focuses on the development of seeded cultivars of zoysiagrass that are genetically stable with improved turf quality, high seed yields, persistence, and competitive ability.

Initial breeding efforts to develop seeded type zoysiagrass were carried out at Texas AgriLife Research Center – Dallas from 2000 to 2002. Preliminary breeding work utilized cycles of genetic recombination followed by selection of 53 out of approximately 1,600 experimental lines that exhibited high seed-yield potential and turf quality. This group of 53 advanced lines includes interspecific hybrids resulting from crosses between *Zoysia japonica* and Z. *matrella*.

Current funding is directed toward the evaluation of these selected experimental lines for possible commercialization, as well as the initiation of additional breeding cycles of recombination and selection of germplasm to generate new seeded families. Evaluation of the 53 selected experimental lines will be performed through a series of isolation/crossing blocks, spaced-plant nurseries (SPN), and replicated field trials. Isolation blocks will promote open pollination and recombination among entries and SPN will allow selection of individuals with the best seed production potential. Selected individuals from a SPN cycle will be allowed to recombine the following year in a crossing block cycle for further population improvement by stacking genes that enhance seed yields. In addition to scoring for seedhead production in the SPN, we will also evaluate each seeded family for turf quality and performance characteristics in a replicated field trial.

Fine-textured isolation block planted on July 2, 2009 and photographed May 24, 2010 just prior to seed harvest.

In 2009, 19 of the 53 selected experimental lines were classified as fine textured, 18 as medium coarse, and 16 as coarse. Three isolation blocks were planted representing each texture class on July 2, 2009. A total of 17 clones of each entry were planted in a randomized manner within their respective crossing block. The intent was to maximize open pollination among members of the same texture class. Seed was collected during late May and early June, 2010 from each individual entry.

This winter, we will focus on the germination of seed harvested from the isolation block nurseries. Because resources are limited, we are going to focus solely on the fine texture class and place seed from the medium coarse and coarse texture classes into cold storage. Seed from 15 of 19 fine-textured genotypes will be germinated in the greenhouse during the winter with the goal of producing around 54 progeny per genotype.

Since zoysiagrass has hard seeds, it must be scarified to enable quick germination. The preferred way to scarify zoysia seed is chemically with a strong base (40% KOH). Three reps of 50 seeds each will be chemically treated and germinated on filter paper in petri plates to determine percent germination for each genotype. Another three reps of 50 seeds each will be planted directly into potting mix to score for seedling vigor.

The resulting seedlings will be transplanted to 4-inch pots for grow-out prior to field planting in 2011. This effort should produce a population of more than 1,000 progeny which will be planted on 4-ft centers in the 2011 SPN. The progeny population will be evaluated for seedhead production and turf-quality characteristics in 2011 and 2012. The best seed parents will be selected for another cycle of cross pollination in isolation blocks in 2013.

We will introgress new germplasm identified from other sources with the potential for good seed production in the 2013 isolation block to ensure a broad genetic base and minimize inbreeding. A replicated field trial with will be planted in 2011 for all 15 fine-textured, seeded families to determine their turf quality.

Summary Points

- Fifty-three advanced lines with the potential for good seed production were planted in field isolation blocks July 2, 2009 in order to allow open pollination within texture classes.
- Seed was harvested from the isolation blocks which represent each of three texture classes in late May and early June of 2010.
- This winter, seed harvested from 15 fine-textured entries will be germinated in the greenhouse to generate a progeny population of over 1,000 individuals and planted in a spaced-plant nursery in 2011.