

Germplasm Development and Management of Buffalograss Varieties

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Objectives:

1. Acquire additional germplasm through collection and recombination of germplasm already in our collection.
2. Evaluate germplasm with superior turfgrass characteristics including mowing tolerance, color, length of growing season, insect resistance, establishment and recovery of vigor, sod strength, combining ability, and seed production.
3. Obtain inheritance data on important traits, conduct genome size and molecular marker analyses, and evaluate the impact of inbreeding and genetic diversity on variety development.

Start Date: 1998

Project Duration: 5 years

Total Funding: \$200,000

Native Turf Group (NTG) initiated production (40 acres) of 'Bowie' buffalograss (a PVP has been prepared and submitted). They have also made a decision to increase production of 'Cody' (25 acres).

Todd Valley Farms began marketing 'Legacy' nationwide as plugs in 2001. Legacy has performed well and has been well received in the marketplace. It has a darker color, improved density and better quality than other buffalograss cultivars. This plug product, which was selected as "mail order plant of the year" by a major mail order trade organization, can be ordered on Monday and delivered nationwide by Thursday. This product and distribution system provides high economic value and sales approaching \$1,000,000 in 2001.

Sales of '609' declined again in 2001, even though demand for buffalograss has been relatively good. Our primary licensee (due to corporate mergers) has little interest in buffalograss and they just take orders and do no marketing. As sales and interest decrease for '609', total sales will more



Improved collection of buffalograss genotypes mowed at fairway cutting height.

than be made up for by increases in 'Legacy' sales.

The major effort of our project in 2001 was to transform buffalograss using biolistic bombardment with the goal of making buffalograss Roundup-resistant. Three genotypes were selected for this effort, Legacy, '609' and experimental variety 91-118. Each of these genotypes is a female and there is no pollen shed; therefore, reducing the chance of outcrossing by a great degree. These genotypes would be planted, propagated and marketed vegetatively, further reducing the potential of gene movement.

This three-year project has allowed us to develop procedures for transforming callus lines and for regenerating plants. However, to date we have been unable to regenerate a live transformed buffalograss genotype. After the plants begin to develop, they turn dark brown and die. It is thought that there is either a genetic problem or the medium is lacking something that is required for the seedling to mature. Major efforts are being made to solve this problem. We are developing new, younger callus lines and exploring new media for regeneration.

Although major emphasis has been placed on the biotech phase of our project, traditional breeding research continues. In the breeding area efforts continue in selecting outstanding vegetative genotypes. However, the release and marketing of Legacy (northern adapted) and 91-118 (southern adapted), probably position us well until the release of biotech plants.

For seeded buffalograss, two agreements are in progress to develop proprietary cultivars for seed companies. One new vegetative selection, 91-114, will be entered

into the NTEP buffalograss trial.

The buffalograss management study is evaluating the effects of nitrogen rate, aeration, verticutting, and wear on eight buffalograss cultivars. Four seeded and four vegetative cultivars were planted June 23, 1998, and the study is being mowed at 1.4 cm (5/8"). Observations in 2001 indicate that the best vegetative cultivars can be maintained at fairway mowing heights and still tolerate normal traffic, as long as conditions are dry. To date, nitrogen application rate is not a major factor.

A new student was recruited in 2001 to work on the potential for using buffalograss and fine fescue together to extend the growing season. This fall overseeding of buffalograss was done in a rate-species study and a time-of-seeding study. Next spring, experiments using buffalograss-fine fescue mixtures will be carried out.

There are significant changes taking place in our research program, but the overall goal of our team is to enhance the future efforts on the breeding and management of buffalograss.

Summary Points

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- Observations in 2001 indicate that the best vegetative cultivars can be maintained at fairway mowing heights and still tolerate normal traffic, as long as conditions are dry. To date, nitrogen application rate is not a major factor.