

Evaluation of the New England Velvet Bentgrass Collection

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Objectives:

1. Collect velvet bentgrass (*Agrostis canina* L.) germplasm accessions.
2. Identify and group accessions based on their genetic similarities for analysis and breeding.
3. Evaluate accessions for improved resistance to biotic and abiotic stresses.

Start Date: 2007

Project Duration: three years

Total Funding: \$90,217

The New England Velvet Bentgrass germplasm collection is a collaborative effort by researchers at the University of Rhode Island and the University of Massachusetts. More than 250 accessions have been collected from old golf courses throughout New England. In 2008, more than 750 individuals were evaluated in the field at UMass for turf quality and resistance to brown patch and dollar spot. The entire collection was screened for resistance to copper spot in the greenhouse at URI.

Velvet bentgrass (*Agrostis canina*) has excellent tolerance to lower levels of sunlight, nitrogen, and water. Velvet bentgrass is considered native to New England and coastal regions as far south as Maryland. Many of the old velvet greens have been regrassed with modern creeping bentgrass varieties due to over management, high thatch layer production, and lack of available velvet bentgrass commercial seed. The stress tolerance genes found in velvet bentgrass need to be preserved as potentially irreplaceable genetic resources.

The identification and genetic diversity of the collection are being measured with molecular markers and flow cytometry to confirm that accessions are



Planting plugs of velvet bentgrass.



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diploid *Agrostis canina*. Fingerprinting the accessions will permit them to be grouped based on genetic identity, subdividing the collection into groups which can be converted to seed populations for genebank storage. The groups can be represented by a subset of the clones for more efficient screening.

Screening for copper spot resistance was done in the greenhouse using clones grown in a sand-peat mix, clipped to fairway height, and fertilized with excess nitrogen. The plants were inoculated using copper spot (*Gloeocercospora sorghi*) isolates and maintained under appropriate conditions to promote disease. Disease severity was evaluated on a 0-10 scale with 0 indicating complete loss of foliage and 10 indicating no damage. The varieties 'SR7200' and 'Greenwich' were used as standards for comparison.

Sixty-two percent of the accessions were effectively defoliated by copper spot. Both 'SR7200' and 'Greenwich' show some resistance to copper spot; 30% of the accessions tested were at least as resistant. The germplasm collection is being evaluated in the field for turfgrass quality and genetic color. Velvet bentgrass has a tendency to be lighter green than other bentgrasses. The identification of velvet bent-

grass which is genetically darker green may make turfgrass managers more comfortable applying less nitrogen.

The core collection is being evaluated for wear tolerance, a common abiotic stress on highly utilized turfgrass. Golf course putting greens, tees, and fairways are particularly susceptible to wear injury due to the funneling of intense and frequent traffic onto a relatively small surface area.



The velvet bentgrass collection at the University of Rhode Island.

Summary Points

- Collaborative studies continue with several researchers in New England.
- Significant progress has been made to identify germplasm that have enhanced resistance to biotic and abiotic stresses.