*Evaluating Poverty Grass (*Danthonia spicata *L.) for Use in Tees, Fairways, or Rough Areas in Golf Courses in the Midwest*

Nadia E. Navarrete-Tindall, Brad Fresenburg, and J.W. Van Sambeek
University of Missouri

Objectives:

1. Identify practices to optimize seed germination, field seeding rates, and best planting times for poverty grass.
2. Determine tolerance for nutrient-poor soils, competition, shade, drought, insects, and diseases.
3. Evaluate tolerance to periodic mowing at different heights, traffic, herbicides, and competition when used as a monoculture or in native-plant mixes.

Start Date: 2007
Project Duration: two years
Total Funding: $20,000

Poverty grass (*Danthonia spicata* L.), a native, cool-season perennial bunchgrass with wide distribution in the United States, is being evaluated for its suitability for use on golf courses. The goal is to identify practices to improve seed germination and successfully establish field plots as monocultures or with other native species to mimic natural stands with no use of chemicals and irrigation.

Seed was collected from different natural stands in Missouri in 2005, 2006, and 2007 in cooperation with Mervin Wallace of Missouri Wildflowers nursery. Although this grass is found growing in most prairies, savannas, and open woods throughout Missouri, we did not find any records that poverty grass seed had been collected commercially in Missouri before this study. It is offered commercially in Minnesota in limited quantities by Prairie Moon Nursery and Boreal Natives.

Untreated seed collected in Missouri in 2006 was 89% dormant with less than 5% germination at 25^{o}C. Seed averaged 400,000 PLS/pound. Different combinations of stratification (moist storage), scarification (mechanical disruption of seed coat), light, and temperature were evaluated in replicated experiments under laboratory conditions to break seed dormancy and improve germination.
Light improved germination of scarified seed (63 % vs. 46% in dark) and non-scarified seed (30 % vs. 4 % in dark). Germination after 40 days at 25^{o}C for scarified seed exposed to cold, moist stratification (5^{o}C) for 10, 20, 30, and 40 days averaged 64, 66, 62, and 59%, respectively, in contrast to 35, 36, 53, and 59%, respectively, for non-scarified seed. Seed treated with potassium nitrate at 0, 1, 2, and 3 g/1000 ml failed to improve germination.

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Approximately 4,000 seedlings were started in June, 2006 from scarified seed sown in trays filled with a commercial soil mix or a silt loam soil. When seedling trays were set on outside benches, *Dreschslera* leaf spot infected the one to two-month-old seedlings from Minnesota seed sources but not Missouri seed sources. We successfully established seed production plots on a Mexico silt loam soil at the UMC South Farm in fall, 2006 using three or 4-month old seedlings and at the UMC Bradford Research and Education Center in May 2007.

We also established 6 x 6 foot plots with scarified seed to evaluate three sowing rates (1,000, 2,000, and 3,000 PLS/sq. ft.) at both research centers. Plots were treated with a broad spectrum herbicide and cleaned of dead vegetation before broadcast seeding and lightly raking to incorporate seed. When June temperatures averaged 23^{o}C, seed started germinating within 10 days after planting. In contrast, when October temperatures averaged 14^{o}C, germination occurred within 15 days after planting.

Forty days after seeding, percent cover by poverty grass when irrigated was 32, 29, and 49 % for seeding rates of 1000, 2000, and 3000 PLS/sq. ft., respectively. Native forbs from the seedbank were controlled using hand weeding and 2,4-D applications. At low concentrations, 2,4-D did not visibly affect growth of 4-month-old poverty grass seedlings. Seeding density plots will be used in summer 2008 to evaluate nutrient requirements and tolerance to different shade levels, drought, insects, and diseases.

Summary Points

- Although we will continue collecting seed to evaluate for ecotype differences, enough seed was available to conduct germination studies and establish field experiments.
- Mechanical scarification increased seed germination more than potassium nitrate treatments.
- Stratification and mechanical scarification affected seed germination similarly in growth chambers under controlled conditions. Percent germination was the highest with mechanical scarification (63%) and with moist-stratification for 20 days (66%) of untreated seed from Missouri when grown for 30 days at 25^{o}C.
- *Dreschslera* leaf spot fungus was a problem on potted seedlings grown from Minnesota seed sources but not Missouri seed sources.