

Breeding and Evaluation of Kentucky Bluegrass, Tall Fescue, Perennial Ryegrass and Bentgrass for Turf

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Objectives:

1. Collect and evaluate potentially useful turfgrass germplasm.
2. Collect and evaluate endophytes associated with cool-season turfgrass species.
3. Continue the breeding and development of new cool-season turfgrasses.
4. Develop and apply several new tools designed to improve the ability to discriminate among endophyte isolates from nature and to synthesize new grass-endophyte combinations for experimental testing and possible commercial use.

Start Date: 1982

Project Duration: Continuous

Total Funding: \$10,000 per year

Starting in 1962, Rutgers University has attempted to assemble, evaluate, and enhance the world's largest and most useful collection of germplasm of cool-season turfgrasses. Over 2,000 promising turfgrasses and associated endophytes were collected from old turfs in Uzbekistan, Kyrgyzstan, Portugal, Sweden, Germany, Austria, and United States. In 2002, 9,400 new turfgrass evaluation plots, 130,000 plants in spaced-plant nurseries, and 2,700 single-clone tiller plots were established.

Perennial ryegrass progenies with resistance to gray leaf spot caused by *Pyricularis grisea* in our 2000 and 2001 tests continue to perform well in a test seeded August, 2002. Resistance shows high heritability.

Strong creeping red fescues containing the Rose City endophyte continued to demonstrate considerable enhancement of red thread resistance in field trials. Other endophytes failed to produce enhanced resistance.



Picture illustrating the effect of endophyte (Rose City) on red thread resistance in strong creeping red fescue (right).

Over 1,000 collections of *Deschampsia* are being evaluated in full sun field trials. A small percentage show improved summer performance with some resistance or tolerance to billbugs. Extensive shade trials were seeded in September, 2002.

Many promising interspecific hybrids between Texas bluegrass x Kentucky bluegrass display much of the heat and drought tolerance of Texas bluegrass and the improved density and lower growth habit of Kentucky bluegrass in both field and greenhouse tests. Improvements in seed yield and seed quality are also evident. Promising plants from backcrossing Kentucky bluegrass as the recurrent parent with these hybrids have been selected and established in spaced-plant nurseries and low-maintenance turf trials.

Promising hybrids were selected from progenies obtained from controlled intra- and interspecific *Poa* crosses totaling over 350,000 seedlings. These hybrids were transferred to a spaced-plant nursery and will be selected for turf and seed production potential. The best will be harvested and seeded in single-plant progeny turf trials. Significant progress is being made in the discovery and utilization of new sources of resistance to the dollar spot disease caused by *Sclerotinia homeocarpa* in creeping and colonial bentgrasses.

The Rutgers turfgrass improvement program participated in the development of the following varieties: a) 'Bedazzled', 'Moon Shadow', 'Mallard', 'Blue Ridge' and 'Royale' Kentucky bluegrasses; b) 'Charismatic', 'Seville II', 'Cabo', 'Pacesetter' and 'Manhattan 4' perennial ryegrasses; c) 'Finesse II', 'Greystone', 'Forte', 'Justice', and '2nd Millennium' tall fescues; d) 'SR 5210' strong creeping red



Picture showing gray leaf spot resistant vs. susceptible perennial ryegrass selections.

fescue; e) 'Silhouette' Chewings fescue; and f) 'Independence' creeping bentgrass.

Hundreds of somoclonal variants of Kentucky bluegrasses were evaluated in field nurseries. A few showed sufficient improvement in seed yield, vigor, and resistance to stripe rust to warrant additional testing. Screening of cultures for improved salt tolerance was effective in producing somoclonal variants with substantial increases in tolerance to salt and drought stress in greenhouse tests.

Summary Points

- Participated in the development of eighteen cool-season turfgrasses.
- Turfgrass and endophyte collections were made in Portugal, Sweden, Austria, Germany, Uzbekistan, Kyrgyzstan and United States.
- Somoclonal variation can be used as a breeding method to improve Kentucky bluegrass.
- Substantial progress is being made in developing perennial ryegrass varieties with significantly improved genetic resistance to gray leaf spot.
- Good progress was made in developing superior varieties from hybridization of Texas bluegrass and Kentucky bluegrass.