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

C. Reed Funk and William A. Meyer
Rutgers University

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 commer cial use.

Start Date: 1982
Project Duration: 5 years
Total Funding: $40,000

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. Recurrent population improvement programs and a continuing worldwide collection effort are constantly adding to the value of these collections as a diverse genetic resource and a source for the development of new varieties.

During the past year, 28 new, improved cool-season turfgrass varieties were released using germplasm screened from these populations, often with cooperation of plant breeders in major seed production regions. They include Pinnacle II, Integra, Stellar, Gator HI, All*Star H, SR 4801, SR 4820, and Kokomo perennial ryegrasses; Rebel Exeda, Sigma, Shenandoah H, Prospect, and Biltmore tall fescues; Eureka III, and Chariot hard fescues; Rose, Jasper III, Cindy Lou, Navigator, and Badger strong creeping red fescues; and Vesper, and Greenwich velvet bentgrasses.

Population improvement techniques including phenotypic and genotypic recurrent selection and population backcrossing continue to show excellent progress in the genetic improvement of perennial ryegrass, tall fescue, Chewings fescue, hard fescue, blue fescue, strong creeping red fescue, creeping bentgrass, and colonial bentgrass. Promising turfgrass and endophyte germplasm was collected from Portugal, Uzbekistan, Kyrgyzstan, and the USA.

The initial harvests of certified seed were made from Pinnacle II Integra, Stella, Gator HI, A11*Star 2, SR 4801, SR 4820, Brightstar SLT, Citation Fore, Pacesetter, SR 4500, and Kokomo perennial ryegrasses; Rebel Exeda, Sigma, Shenandoah II Prospect, and Biltmore tall fescues. Eureka II and Chariot hard fescues; Rose, Jasper U, Cindy Lou, Navigator, and Badger strong creeping red fescues; Lakeshore and Monte Carlo Kentucky bluegrasses; and Vesper and Greenwich velvet bentgrasses.

Dr. Reed Funk discusses one of several breeding projects at Rutgers University with USGA research committee members.

Dr. Bill Meyer has created a traffic machine with spikeless golf shoe soles for screening cool-season grasses at Rutgers University.

Perennial ryegrasses with genetic resistance to gray leaf spot were confined in a second field test at Adelphia, NJ. A vigorous program to develop resistant varieties is in progress. A *Neotyphodium* endophyte designated "Rose City" showed the ability to strongly enhance field resistance to red thread in a number of fine fescue entries.

Many hundreds of somoclonal variants of Kentucky bluegrass have been transferred to field nurseries to assess this technique for the genetic improvement of Kentucky bluegrass.

Summary Points

- Twenty-eight cool-season turfgrasses were released.
- Turfgrass and endophyte collections were made in Portugal, Kyrgyzstan, Uzebekistan, and USA
- Extensive breeding programs are in progress to develop perennial ryegrasses with genetic resistance to gray leaf spot.
- An endophyte was discovered to enhance red thread resistance in fine fescue.
- Somoclonal variation is being investigated as a genetic improvement technique in apomictic bluegrasses.