

# 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 and associated endophytes.
2. Continue population improvement programs to develop improved cool-season turfgrass cultivars and breeding synthetics.
3. Develop and utilize advanced technologies to make current breeding programs more effective.

**Start Date:** 1982

**Project Duration:** Continuous

**Total Funding:** \$10,000 per year

As of October 30, 2007, over 2,000 promising turfgrasses and associated endophytes were collected in southern Sardinia, Corsica, Lithuania, Hungary, and New England, USA. Many of these associated endophytes should be new and unique and should have properties to enhance turfgrass performance. Over 9,865 new turf evaluation plots, 92,000 plants in spaced-plant nurseries, and 30,000 mowed single-clone selections were established in 2007.

Over 154,000 seedlings from intra- and inter-specific crosses of Kentucky bluegrass were screened for promising hybrids under winter greenhouse conditions of short daylengths and cool temperatures. Over 48,000 tall fescues, 17,000 perennial ryegrasses, 9,000 bentgrasses, and 48,000 fine fescues were also screened during the winter in greenhouses. The progenies of 200 new hybrid Kentucky bluegrasses were screened in spaced-plant nurseries to determine apomixis levels and other important turf and seed production characteristics.

The following crossing blocks were moved in the spring of 2007: 622 hard fescues, 422 strong creeping red fescues, 213, Chewings fescues, 585 perennial ryegrasses, 831 tall fescues. There were



A wear simulator was developed to identify improved wear tolerance in Kentucky bluegrass and bentgrasses.

12 velvet bentgrasses, 100 colonial, and 75 creeping bentgrasses moved into crossing blocks. The 30 new perennial ryegrasses identified in two different locations of the 2004 National Turfgrass Evaluation Trial in New Jersey have continued to display resistance to gray leaf spot (*Pyricularia grisea*) through 2007. These were developed in collaboration with other organizations since the fall of 2000 when the first severe epidemic occurred at Adelphia, New Jersey.

We are making continuous progress with annual cycles of recurrent selection in perennial ryegrass for gray leaf spot, dollar spot (*Sclerotinia homocarpa*), red thread (*Latisaria fusiformis*) and crown rust (*Puccinia coronata*). Some of the newly released perennial ryegrasses released this year are 'Calypso III', 'Stellar GL', 'Buena Vista', 'Soprano', 'Fiesta 4', 'Dasher 3', 'Attribute', 'Zoom', 'SR-4600', 'Integra II', 'Regal 5', 'Pacesetter', 'Keystone 2', 'Palmer V', 'Prelude GLS', 'Gator 3', 'Arrival', and 'Primary'.

New promising Kentucky bluegrasses and Texas x Kentucky bluegrass hybrids are 'Avid', 'Blueberry', 'Blue Note', 'Volt', 'Spitfire', 'Starburst', 'Concerto', 'Touché', 'Baroness', and 'Barnique'.

Continued developments of turf-type tall fescue are being released with improved brown patch resistance. They include 'Traverse', 'Millennium SRP', 'Houndog '6', 'Fidelity', 'Rhambler', 'Coyote II', 'Finelawn Express', 'Falcon V', 'Shenandoah III', 'Monet', 'Cezanne', 'Van Gogh', 'Beagle I' 'Virtuoso', and 'SR-8650'.

New fine fescue cultivars include 'Gotham Hard', 'Compass Chewings', 'Foxfire Chewings', 'Cardinal Chewings', 'SR-5130 Chewings', 'Spartan II' hard, SR-5250' strong creeping, and SR-3150 hard.

In the bentgrass project, we are concentrating on identifying new sources of disease resistance. Approximately 32 creeping bentgrass clones were identified with improved dollar spot resistance.

These clones will be utilized to develop new synthetic selections in the spring of 2008. Approximately 37 colonial bentgrass plants from 10 new sources were identified with improved brown patch resistance. Approximately 63 velvet bentgrass clones from 15 new sources were identified with improved brown patch and dollar spot resistance. Collection trips from New Jersey, Pennsylvania, and New York in 2007 yielded 150 new bentgrass collections. These plants were planted in a spaced-plant nursery in the fall of 2007.

## Summary Points

- Continued progress was made in obtaining new sources of turfgrass germplasm from old turf areas in Europe. These sources are being used to enhance the Rutgers breeding program.
- Modified population backcrossing and continued cycles of phenotypic and genotypic selection combined with increasing sources of genetic diversity in turfgrass germplasm and beneficial endophytes enables significant improvements in the performance of new cultivars. Twenty new perennial ryegrasses were released during 2007 with improved gray leaf spot resistance.
- Fifteen new improved tall fescues were released in 2007.
- Substantial progress was made in developing intra- and inter-specific hybrids of Kentucky bluegrass. Ten new promising Kentucky bluegrass cultivars were released in 2007 and three inter-specific hybrids from Kentucky bluegrass and Texas bluegrass were released.
- Seven new fine fescue for low maintenance turf were released.
- Thirty-two creeping bentgrass clones were identified with dollar spot resistance. Thirty-seven colonial bentgrass clones were found with improved brown patch resistance. Sixty-three clones of velvet bentgrass were found with resistance to dollar spot and brown patch.