

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 9, 2006, over 3,000 promising turfgrasses and associated endophytes were collected in southern Italy, Lithuania, Denmark, Massachusetts, and New Hampshire. Many of these associated endophytes should be new and unique and should have properties to enhance turfgrass performance. Over 9,106 new turf evaluation plots, 80,000 plants in spaced-plant nurseries and 30,000 mowed single-clone selections were established in 2006.

Over 90,000 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 80,000 tall fescues, 25,000 perennial ryegrasses, and 45,000 fine fescues were also screened during the winter in greenhouses. The progenies of 650 new hybrid Kentucky bluegrasses were screened in spaced-plant nurseries to determine apomixis levels and other important turf and seed production characteristics.

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 2006. 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 fuciformis*) and crown rust (*Puccinia coronata*). Some of the new gray leaf spot cultivars released this year are 'Regal 5', 'SR4600', 'Apple GL', 'Attribute', 'Revenge GLX', 'Harrier', 'Stellar GL', 'Homerun', 'Protégé GLR',



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

'IG2', 'Fiesta 4', 'Manhattan 5 GLR', 'Charismatic II', 'GLSR', 'Secretariat II GLSR', 'All Star 3', 'Dart', 'Derby Xtreme', 'Exacta II GLSR', 'Palace', 'Palmer V', 'Primary', and 'Repell GLS'.

New promising intra-specific hybrids of Kentucky bluegrass hybrids from our program are 'Bewitched', 'Zinfandel', 'Pinot', 'Shiray', 'Belissimo', 'Argos', 'Skye', 'Rythum' and 'Arid'. Continued progress is being made on inter-specific and intra-specific hybrids of Kentucky bluegrass and Texas bluegrass. The new hybrids containing some Texas bluegrass material are 'Longhorn', 'Bandera', and 'Fahrenheit 90'.

Continued progress has occurred in the development of compact brown patch - resistant tall fescue cultivars. The new cultivars 'Firenza', 'Rhambler', 'Millennium', 'SRP', and 'Six Point' have performed well to date. Progress has also been made on increasing the occurrence of rhizomes in tall fescue. Some of the new enhanced spreading types were included in the 2006 National Turfgrass Evaluation Trial.

In the bentgrass project, 30 new clones from 21 new sources were identified with dollar spot resistance. Eighty new colonial bentgrasses from 12 new sources were identified with brown patch resistance. Fifty velvet bentgrasses from 15 new sources were identified with dollar

spot and brown patch resistance. The new creeping bentgrass cultivars co-developed by Rutgers were 'Authority', 'Tye', 'MacKenzie', 'Kingpin', 'Benchmark', 'Shark', 'Memorial' and 'SR1150'; and the new velvet bentgrass cultivars were 'Legendary' and 'Villa'.

An improved Rutgers wear simulator was developed that is mounted on a walk-behind Toro rotary mower. This machine is used to identify selections with better wear tolerance.

Summary Points

- Continued progress was made in obtaining new sources of turfgrass germplasm from old turf areas in Europe and New England. 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. Thirteen new perennial ryegrasses were released during 2006 with improved gray leaf spot resistance.
- Substantial progress was made in developing intra- and inter-specific hybrids of Kentucky bluegrass. Nine new promising Kentucky bluegrass cultivars were released in 2006 and three inter-specific hybrids from Kentucky bluegrass and Texas bluegrass were released.
- Forty-eight new sources of dollar spot and brown patch were identified in creeping, colonial, and velvet bentgrasses. Seven new creeping bentgrass cultivars and two velvet bentgrass cultivars were released in 2006.
- A new improved Rutgers novel wear simulator was developed in 2006 by mounting the wear unit on a Toro walk-behind a rotary mower power unit.