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, 2010, more than 1,678 promising turfgrasses and associated endophytes were collected in Italy, the Atlas Mountains in Morocco, and Latvia. These have had seed produced in The Netherlands and will be evaluated in New Jersey. More than 9,450 new turf evaluation plots, 118,000 spaced-plant nurseries and 19,500 mowed single-clone selections were established in 2010.

More than 350,000 seedlings from intra- and inter-specific crosses of Kentucky bluegrass were screened for promising hybrids under winter greenhouse conditions, and the superior plants were put into spaced-plant nurseries in the spring. More than 25,000 tall fescues, 8,000 Chewings fescues, 9,600 hard fescues, 70,000 perennial ryegrasses, and 10,000 bentgrasses were also screened during the winter in greenhouses, and superior plants were put in spaced-plant nurseries. More than 350 new inter- and intra-specific Kentucky bluegrasses were harvested in 2010.

The following crossing blocks were moved in the spring of 2010: 6 hard fescues (206 plants), 1 Chewings fescue (25 plants), 16 perennial ryegrasses (1,524 plants), 7 strong creeping red fescues (269 plants), 10 tall fescues (237 plants), 4 velvet bentgrasses (93 plants) 4 creeping bentgrasses (80 plants), and 6 colonial bentgrasses (131 plants).

To enhance our breeding for resistance to gray leaf spot, an early July 2010 planting of 860 perennial ryegrasses were seeded. Excellent *Pythium* blight control was attained, and a good gray leaf spot epidemic occurred. These data will be used to select future varieties of perennial ryegrass. More than 18,000 perennial ryegrasses were planted in the spring of 2010 as space plants. They were allowed to develop seedheads in the late spring, and selections were made for stem and crown rust resistance. A total of 1,180 clones were identified.

The breeding program continues to make progress breeding for disease resistance and improved turf performance. New promising varieties named and released in 2010 were 'Empire' and 'Godiva' Kentucky bluegrasses; 'Side Winder', 'Fesnova', 'Rebel Advance' and 'Rebel XLR' tall fescues; 'Shademaster II' and 'Miser' strong creeping red fescues; and 'Rio Vista', 'Octane', 'Bonneville', and 'Rinova' perennial ryegrasses.

Over 9,450 new turf evaluation plots, 118,000 spaced-plant nurseries and 19,500 mowed single-clone selections were established in 2010.

Summary Points

- Continued progress was made in obtaining new sources of turfgrass germplasm. 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 have resulted in the continued development and release of top performing varieties in the NTEP.
- Fifteen new tall fescues, three fine fescues, five Kentucky bluegrasses, two bentgrasses, and three perennial ryegrasses were released in 2009.
- 'Capri' colonial bentgrass is an improved variety with better brown patch resistance, and 'Pinup' creeping bentgrass has improved dollar spot resistance.
- Published or have in press more than 10 referred journal articles in 2009.