Colonial Bentgrass, *(Agrostis tenuis)*, Breeding and Cultivar Development

Dr. Bridget Ruemmele

University of Rhode Island

Goals:

- *Develop resource-efficient, improved colonial bentgrasses for use individually, in blends, or in mixtures with fine fescues.*

- *Improvements desired for colonial bentgrass include: brown patch resistance, increased cold hardiness, dark green color, close mowing tolerance, recuperative ability and wear tolerance, tolerance to reduced cultural inputs, retention of desired turf-type characters.*

Cooperators:

Dr. Joel Chandlee
Ms. Pei-Yu Zeng
Ms. Stephanie Legare

The colonial bentgrass breeding and cultivar development program was initiated by Emeritus Professor C. R. Skogley. Dr. Skogley received partial support for his breeding efforts from the USGA prior to the arrival of Dr. Bridget Ruemmele. After Dr. Ruemmele's arrival, the USGA increased its financial support beginning February 1, 1993 to encourage greater efforts in developing new colonial bentgrass cultivars.

The USGA was instrumental in providing access to germplasm from Dr. William Rumball's breeding program in New Zealand. Seed was seed sent directly from New Zealand and collections were made among nursery plantings maintained at Rutgers University by Dr. C. Reed Funk.

The primary emphasis of the project is to improve *Rhizoctonia* brown patch resistance. Additional goals include the development of cultivars with improved cold hardiness, darker green leaf color, low maintenance requirements, close mowing tolerance, recuperative ability, and wear tolerance. Hybridization with related species to improve the characteristics noted above also will be investigated.

Accessions continue to be added to the germplasm assembled at the University of Rhode Island. Four private companies have been actively involved with cooperative acquisition and assessment of materials introduced from this program. A fifth company is in negotiation for cooperative efforts with the intention of marketing into Europe as well as the United States.

Two collection trips were taken in 1995. The major collection area included sites in

Georgia, Kentucky, Tennessee, and Virginia. A second effort involved previously-unexplored areas of New England. Numerous opportunities, in conjunction with other events, permitted collection during single day travel.

Progeny from 140 additional collections were planted in Rhode Island in 1995 for turf trial evaluation. Earlier genotype collections determined to be superior in turf trials and *Rhizoctonia* brown patch resistance screening in Rhode Island have been planted into space plantings for seed production in both Oregon and Rhode Island. Additional polycross plantings were established in Rhode Island in Fall, 1995, including materials screened for brown patch resistance in greenhouse trials.

Ms. Pei-Yu Zeng, an M.S. degree student, completed advanced greenhouse screening trials for *Rhizoctonia* brown patch resistance in 277 Colonial bentgrasses. Follow-up screening for brown patch resistance was performed by students enrolled in the plant breeding and genetics course. The USGA had previously sponsored a colonial bentgrass breeding project in New Zealand under the direction of Dr. William Rumball. Some of Dr. Rumball's material acquired from plots established at Rutgers University have shown superior brown patch resistance. Other accessions from various collection efforts have also demonstrated resistance to brown patch.

Molecular efforts have included successful preparation of both creeping and colonial bentgrass in tissue culture suitable for gene transfer. We are seeking chitinase genes from multiple sources to introduce into these cultures using a newly-acquired gene gun.