Breeding and Development of Bentgrass

Dr. Milt Engelke

Texas A&M University

Goals:

- *Develop stress tolerant bentgrass cultivars with specific emphasis on heat tolerance, root growth characters, turf quality, and resistance to natural disease and insect pests.*
- *Continue genetic studies involving heritability and stability of biological traits associated with stress tolerance.*

Cooperators:

Ikuko Yamamoto
Jamie M. Mills
Marine Doin

The bentgrass breeding program is a cooperative research project funded jointly by the Texas Agricultural Experiment Station (TAES), the USGA and Bentgrass Research, Inc. (BRI). This project was initiated in April, 1985.

The bentgrass project released MARINER Creeping Bentgrass to the industry in 1996. The variety was licensed to Pickseed West, Inc. which also handles CATO Creeping Bentgrass, released in 1993. MARINER is a salt tolerant reselection from Seaside, and has improved turf quality. It is recognized as a specialized grass that will have considerable utility in areas where salinity is a problem.

Three additional grasses are being prepared for release in early 1997. E. F. Burlingham holds options on CENTURY (Syn92-1) and IMPERIAL (Syn92-5). TMI and Scotts hold an option on BACKSPIN (Syn92-2). The initial seed harvest from the Syn96 series was made in 1996 (planted in the fall of 1995) with great production expectations.

Three individual lines have been created which further combine added disease resistance, including total resistance to Dollar Spot along with improved genetic color, texture and density of stand. Preliminary indications suggest these will provide a substantial incremental improvement for biological adaptability to natural environmental conditions.

The bentgrass breeding program has initiated a program for genetic improvement utilizing the concepts of biotechnology. Nodal explants have been generated of each of the parental lines of CENTURY, all

having excellent stability of phenotypes. In cooperation with Dr. Phil Colbaugh (Turfgrass Pathology), the intent of the project will be to incorporate the gene(s) conditioning for Dollar Spot resistance directly into the parental clone(s) of CENTURY, followed by minimal reselection to develop a Dollar Spot resistant variety with the excellent agronomic and biological characteristics of CENTURY.

Research is also being conducted in cooperation with Dr. Richard White, Texas A&M College Station on methodology and success of interseeding of the new bentgrasses into existing bentgrass greens.

Preliminary results are very encouraging based on electrophoresis analysis of Penncross greens that have been interseeded with CENTURY utilizing various cultural procedures. Future efforts will also examine other methods of mechanical and chemical treatments and timing and rates of interseeding.

Table 3. 1995 mean turfgrass qauality ratings of bentgrass cultivars for each month grown on a green at twenty-five locations in the U.S. and Canada.

Name	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct	Nov.	Dec.	Mean
LOFT'S L-93	4.4	4.3	5.8	6.1	6.3	6.7	6.4	6.5	6.4	6.7	6.4	5.1	6.4
PENN A-1	4.1	4.6	5.3	6.0	6.2	6.3	6.3	6.2	6.2	6.6	6.3	5.1	6.1
PENN G-2	4.1	4.3	5.3	5.9	6.1	6.3	6.2	5.8	6.1	6.6	6.0	5.0	6.0
PENN A-4	4.5	5.0	5.5	6.0	6.3	6.3	6.1	6.1	6.0	6.4	6.2	5.3	6.0
CATO	4.1	4.3	5.5	5.6	6.1	6.2	6.1	6.1	6.2	6.3	5.8	5.2	6.0
PROVIDENCE	4.0	4.5	5.3	6.0	6.0	6.0	5.9	5.9	6.1	6.2	5.9	4.8	5.9
PENN G-6	3.6	4.2	5.5	5.6	6.0	6.0	6.2	6.0	6.0	6.2	5.8	4.2	5.9
SOUTHSHORE	4.4	4.5	5.6	5.7	5.9	6.1	5.8	5.7	5.8	5.9	5.9	4.7	5.8
IMPERIAL	4.0	4.2	5.7	5.7	5.9	5.9	5.6	5.6	5.5	5.9	5.4	4.7	5.6
CENTURY	4.2	4.5	5.5	5.7	5.7	5.7	5.7	5.6	5.5	5.8	5.5	4.7	5.6
PENNLINKS	4.1	4.0	5.5	5.5	5.6	5.8	5.6	5.6	5.6	5.7	5.3	4.5	5.6
CRENSHAW	3.4	4.2	5.5	5.4	5.6	5.8	5.7	5.6	5.5	5.9	5.6	4.2	5.5
BAR WS 42102	3.2	3.7	4.7	5.3	5.7	6.0	5.6	5.5	5.6	5.6	4.7	3.3	5.5
SR 1020	4.2	4.4	5.2	5.4	5.4	5.6	5.5	5.4	5.6	5.8	5.8	5.0	5.5
DG-P	3.9	3.9	5.1	5.1	5.3	5.4	5.4	5.6	5.7	6.0	5.4	4.6	5.5
BACKSPIN	3.6	4.0	5.4	5.5	5.8	5.7	5.5	5.5	5.3	5.6	5.0	4.4	5.5
ISI-AP-891500	3.5	4.0	5.3	5.0	5.4	5.8	5.3	5.4	5.8	5.8	5.3	4.5	5.5
MSUEB	3.8	4.0	4.9	5.4	5.3	5.5	5.5	5.5	5.7	5.6	5.1	4.5	5.4
LOPEZ	3.7	3.9	4.9	5.0	5.2	5.5	5.4	5.4	5.6	5.9	5.3	4.5	5.4
REGENT	4.1	3.9	5.4	5.0	5.1	5.4	5.3	5.5	5.5	5.7	5.2	4.4	5.3
PRO/CUP	3.5	3.7	5.4	4.8	5.1	5.3	5.4	5.3	5.2	5.4	5.1	4.2	5.2
TRUELINE	3.5	3.6	5.3	4.9	5.0	5.2	5.2	5.3	5.4	5.4	5.2	4.3	5.2
MARINER	4.3	4.1	5.2	4.9	5.1	5.2	5.0	5.2	5.3	5.5	4.9	4.4	5.1
PENNCROSS	3.7	3.9	5.0	5.1	5.1	5.2	5.0	5.1	5.2	5.3	4.7	4.0	5.1
18TH GREEN	3.1	3.6	4.6	4.8	5.1	5.4	5.4	5.4	5.0	5.1	4.3	3.6	5.0
BAR AS-492	4.6	4.1	4.2	4.0	4.1	4.0	4.0	4.0	4.8	4.7	5.0	4.5	4.3
TENDENZ	3.7	3.6	4.2	4.0	4.1	4.3	3.8	3.8	4.6	4.4	4.1	3.9	4.1
SEASIDE	3.7	3.4	4.0	3.7	3.7	3.8	3.7	3.9	4.5	4.3	4.4	4.0	4.0
$LSD_{0.05}$	1.4	1.2	1.0	0.7	0.5	0.5	0.4	0.5	0.6	0.6	0.9	1.2	0.4

[1]Turfgrass quality ratings on a 1 to 9 scale where 9 = ideal turf. To determine statistical differences among entries, subtract on entry's mean from another entry's mean. Statistical differences occur when this value is larger than the corresponding $LSD_{0.05}$ value.