Breeding and Development of Zoysiagrass

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Goals:

- *Develop improved zoysiagrass cultivars with multiple character performance involving low water-use, persistence under drought and temperature stress, and tolerance to poor water quality.*

- *Develop seeded zoysiagrasses that are genetically stable, with improved turf quality, persistence, and competitive ability.*

- *Continue genetic studies involving the heritability and stability of biological traits.*

Cooperators:

Dr. Ikuko Yamamoto
Mr. Samuel K. Riffell

Marking the 11th year of this USGA-sponsored research project, more than $500,000 has been directed toward the breeding and improvement of zoysiagrass. Germplasm acquisition and maintenance continue, and TAES-Dallas is serving as a remote quarantine site for zoysiagrasses introduced from other countries, primarily China and Japan.

The NTEP zoysiagrass trials established in 1991 include nine TAES entries. DALZ8507, a fine-textured, cold hardy *Zoysia matrella*, topped the trials since 1993. Other varieties that are doing well include DALZ8512, DALZ8514, DALZ9006.

The zoysiagrass breeding program has expanded its personnel with the addition of Dr. Ikuko Yamamoto (Pennsylvania State University, 1994) as an Assistant Research Scientist. Dr. Yamamoto is working closely with Drs. Colbaugh and Reinert on the heritability of host-plant resistance mechanisms. This research employs both conventional and biotechnical approaches to genetic recombination, with additional collaboration with Dr. Andrew Patterson (Soil and Crop Science Dept., Texas A&M University, College Station, TX).

Additional germplasm has been introduced to the program from Japan and China. Several progeny populations of previous hybrids and recent introductions are under evaluation. Over the past several years, greater emphasis has been directed to salinity tolerance (initiated by Dr. Ken Marcum, now at University of Arizona.), shade tolerance (Ms. Sharon Morton, now a Pott's Fellow in Ph.D. Program, Texas A&M

University), water-use requirements (Dr. Richard White, now Associate Professor, Texas A&M University), and establishment technology (Dr. Bridget Ruemmele, now Assistant Professor, University of Rhode Island).

Five zoysiagrasses, DALZ8502 (Z *matrella:* fine texture), DALZ8507 (Z *matrella:* medium-fine texture), DALZ8512 (Z *japonica:* medium-coarse texture), DALZ8514 (Z *japonica:* medium-coarse texture), and DALZ9006 (Z *matrella:* medium-fine texture) will be submitted for release in the spring 1996. Three of them are presently under foundation increase. High productivity is one of the superior characteristics of these new lines. In contrast to MEYER, which requires 12 to 24 months between crop cycles, DALZ8512 and DALZ8514 can be harvested two to three times every 24 months. DALZ8502 also produces two to three crops every 24 months at Dallas; however, this selection may not provide sufficient winter hardiness in the transition zone climates of the U.S. DALZ8507 and DALZ9006 produce a crop on a 9 to 12-month cycle.

Mean Turfgrass Quality Ratings of Zoysiagrass Cultivars for Each Month Grown at Twenty-Three Locations in the United States. 1994 NTEP Data.[2]

	Turfgrass Quality Ratings 1 - 9; 9 = Ideal Turf: Months[1]												
NAME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
TC 2033	5.7	4.7	5.2	4.8	5.4	6.2	5.9	6.7	6.6	6.5	6.1	4.9	6.1
CD 2013	5.4	4.3	4.7	4.9	5.2	5.8	6.2	6.7	6.2	6.6	6.1	4.3	6.1
DALZ 8507	5.2	5.0	5.3	5.3	5.0	5.8	6.3	6.7	6.4	6.3	5.8	4.4	6.0
EMERALD	5.3	4.6	5.1	5.2	5.4	6.2	6.2	6.4	6.1	6.2	5.6	4.5	6.0
TC 5018	5.4	4.0	4.8	4.7	5.6	6.1	5.9	6.5	6.1	5.9	5.7	4.1	5.9
QT 2004	5.3	4.4	4.6	4.6	5.1	5.5	6.0	6.4	6.2	6.3	6.1	4.2	5.9
SUNBURST	5.0	4.3	4.7	4.8	5.4	5.8	5.9	6.3	6.0	6.3	6.1	4.4	5.8
DALZ 8508	5.2	4.8	5.6	5.3	4.8	5.8	6.0	6.6	6.1	6.1	5.3	4.0	5.7
CD 259-13	5.2	4.2	4.3	4.0	5.6	6.1	6.1	6.1	5.8	5.7	4.9	3.5	5.7
MEYER	5.0	4.3	4.1	4.6	5.2	5.7	5.9	6.2	6.0	6.0	5.5	3.7	5.7
BELAIR	4.8	4.3	3.9	4.1	5.2	5.7	5.6	6.2	5.6	5.6	5.5	3.9	5.6
DALZ 9006	5.9	5.0	5.3	5.4	4.8	5.9	5.9	6.3	6.1	5.9	5.3	4.1	5.6
DALZ 8514	5.7	4.9	4.9	4.8	4.7	5.6	5.6	6.1	6.0	6.0	6.0	4.3	5.5
DALZ 8512	5.7	4.4	4.9	5.0	4.8	5.8	5.7	6.2	5.9	6.2	6.4	4.8	5.5
TGS-W10	5.2	4.0	4.0	4.6	5.2	5.7	5.5	6.0	5.4	5.7	5.3	3.8	5.4
EL TORO	5.3	4.7	4.9	4.8	4.5	5.5	5.5	6.0	5.8	6.1	6.3	4.3	5.3
TGS-B10	5.3	4.2	4.2	4.1	5.1	5.5	5.5	5.9	5.5	5.5	5.1	3.7	5.3
QT 2047	4.8	4.0	3.8	4.2	5.1	5.4	5.4	5.7	5.5	5.4	4.7	3.5	5.3
DALZ 8516	5.3	4.7	4.9	5.3	4.6	5.1	5.1	5.4	5.4	5.9	5.7	4.2	5.0
KOREAN COMMON	4.9	4.1	4.1	4.1	4.9	5.1	5.1	5.4	5.1	5.2	5.0	3.5	5.0
JZ-1	4.9	4.2	4.1	4.1	4.8	5.0	5.1	5.4	5.1	5.5	5.2	3.2	5.0
DALZ 8502	6.0	5.2	4.8	5.0	4.2	4.7	4.8	4.8	5.2	5.4	5.7	4.7	4.6
DALZ 8501	4.8	4.7	3.9	4.4	3.9	3.8	4.2	4.2	4.4	4.9	5.1	3.6	4.0
DALZ 8701	5.6	5.2	3.9	4.3	3.4	4.1	4.0	4.2	4.2	4.9	5.6	3.6	3.8
LSD VALUE	1.3	0.8	1.0	0.9	0.7	0.6	0.6	0.6	0.6	0.7	0.9	1.2	0.5

[1] To determine statistical differences among entries, subtract one entry's mean from another entry's mean. Statistical differences occur when this value is larger than the corresponding LSD Value (LSD 0.05).

[2] Source: National Turfgrass Evaluation Program. National Zoysiagrass Test - 1993.