Breeding, Evaluation and Culture of Buffalograss for Golf Course Turf

Dr. Terrance Riordan

University of Nebraska

Goals:

- Develop vegetative and seeded turf-type buffalograsses which conserve energy and water.
- Develop buffalograss establishment protocols and management systems to provide acceptable golf course rough and fairway turf at significantly reduced levels of energy input.
- Determine range of adaptation of turf-type buffalograss.
- Evaluate potential insect and disease pests of buffalograss.
- Evaluate physiological and biochemical principles of environmental stress and nutrient utilization in buffalograss.

Sales of '609' are expected to meet Crenshaw & Doguet projections of $1.5 million for 1994. Sales are still predominately from their original farm at Bastrop, Texas. Three new farms in Bay City, Poteet, and Dallas, will bring total production in Texas to over 400 acres. Performance of '609' has been excellent. The '609' planted in the rough at the Boulders Golf Course in Lake Acworth, Georgia seems to be doing well. This course was rated the top new golf course in Georgia in 1994.

Approximately $60,000 of '378' plugs were sold by Todd Valley Farms, Inc., Mead, Nebraska and $10,000 of '315' plugs were sold by Oak Point Sod, Nickerson, Nebraska during 1994.

In 1995, Native Turf Group will have seed available from two new varieties named CODY and TATANKA. Poor weather and adjustments in planting procedures have resulted in delays in obtaining their first commercial harvest. Sharps Brothers provided seed from six experimentals for our 1994 Evaluation Trial.

During 1994, the project focused on improving tolerance to wear and low mowing, insect resistance, and seedling vigor. To evaluate low mowing tolerance, the mowing height of the 1990 evaluation trial was lowered to 5/8 inches in 1993. Significant differences in turf quality were found among entries, indicating that some genotypes were able to better tolerate low mowing. The top ten entries, four male and six female, were selected from this trial and established in a polycross in May 1994 to allow for recombination and the development of a buffalograss variety for fairway use.

In order to develop a seeded cultivar with improved seedling vigor, divergent phenotypic recur-

rent selection for caryopsis size is being performed with two synthetic populations. Larger caryopsis size has been shown to increase seedling vigor in buffalograss. Realized heritability estimates will be calculated for determining selection for large and small caryopsis size.

Traffic treatments were applied to two evaluation trials with a traffic simulator. Treatments were applied to half of each plot during June through August 1993. Significant differences were found among selections in their traffic tolerance, and '315' and a number of experimentals were among the top performers. For some cultivars, the difference between trafficked and untrafficked halves was minimal. In a trial containing 2000 plants, severe traffic pressure was applied during May through July 1994. At the end of treatments, 81 of the most traffic-tolerant plants were selected for further evaluation.

Results from the 1993 variety trial indicate that two synthetic populations, 90-503 and 90-504, are performing well. It is hoped that one of these will soon be released as a seeded cultivar. Nine vegetative selections were increased in 1994 for possible commercialization. The three with the most potential appear to be 86-61, 91-118, and 86-120. A new replicated evaluation trial, consisting of 48 entries, was also planted in 1994 and a total of 132 new selections were made from our nurseries, native stands or old turfs.

Weed pressure continues to be a major problem during buffalograss establishment. Research was initiated in 1994 to investigate registered and unregistered herbicides for use during seeded buffalograss establishment at two locations in Nebraska and one in Kansas. Plots treated with

herbicides of the imidazolinone family (Pursuit, Cadre) produced significantly higher establishment rates than plots treated with other herbicides tested. Additionally, herbicides currently registered for use on established buffalograss (i.e., Dimension, Ronstar G, Surflan, and Dacthal) severely retarded seed establishment. Pursuit and Image are also being evaluated in a replicated trial on a Crenshaw & Doguet sod farm.

Sod strength of 22 entries in the National Buffalograss Trial were evaluated at two locations using an S-beam load cell connected to a digital read-out. PRAIRIE and '609' exhibited superior sod strength, while seeded and diploid entries exhibited unacceptable sod strengths. Root regrowth was also measured on National Turfgrass Evaluation Program entries and 609 had superior performance. Transplant shock was evaluated for 315 and 378. 378 exhibited superior recovery characteristics over 315, and sod replanted immediately recovered quicker than sod replanted at 48 hours after harvest. Three anti-transpirants tested had no effect on sod recovery.

A highly significant positive correlation was found between the amount of pubescence and susceptibility to mealybugs ($r = 0.78$). Scanning electron microscopy was used to investigate this possible mechanism of resistance. Results suggest that pubescence may provide a framework for the attachment of waxy ovisacs and a foothold for the mobile first instar. The inheritance of mealybug resistance and the development of a seeded, resistant cultivar is underway. Seed has been harvested from a crossing block containing mealybug resistant plants, and seedlings from this crossing block are currently being evaluated forresistance.

A study was conducted to develop an effective, non-destructive way to monitor mealybug populations on buffalograss plants. Adhesive-covered

"sticky stakes" were placed in pots of mealybug-infested buffalograss to determine if the stakes would trap mealybugs. Large numbers of mealybugs were captured on the sticky stakes, indicating that they can be used to detect mealybugs. Work is underway to evaluate the biology and life cycle of these mealybug pests and to determine the role several parasitic wasp species play in reducing mealybug population levels.

Two studies were conducted to evaluate control of buffalograss chinch bugs using *Beauvaria bassiana*, entomopathogenic nematodes, and combinations of insecticidal soap.

Mean Turfgrass Quality Ratings of Buffalograss Cultivars for Each Month Grown at Nineteen Locations in the United States. 1994 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**
NE 85-378	5.2	4.5	4.3	5.9	5.8	6.6	6.2	5.8	5.7	4.8	4.3	4.3	5.8
609 (NE 84-609)	5.0	4.7	4.6	4.6	4.9	6.0	6.1	5.6	6.1	5.4	5.8	5.1	5.6
NTG-4	4.8	4.5	4.7	6.1	5.2	6.1	5.9	5.7	5.6	4.9	4.8	4.1	5.6
NTG-5	5.3	5.0	4.2	6.3	5.2	6.1	5.9	5.6	5.3	4.9	4.9	3.6	5.5
315 (NE 84-315)	5.2	4.7	4.7	4.8	5.9	6.4	5.7	5.5	5.5	4.7	4.2	3.4	5.5
NTG-2	5.5	4.2	4.6	6.0	5.1	5.9	5.7	5.6	5.5	4.9	4.8	3.6	5.5
NE 84-436	5.0	5.2	4.7	4.8	4.8	6.1	5.8	5.7	5.6	4.7	5.1	3.4	5.4
NTG-3	5.0	5.0	4.2	4.3	5.1	6.0	5.9	5.6	5.5	4.9	5.2	3.6	5.4
AZ 143	5.5	4.7	4.4	4.9	4.9	6.1	5.6	5.6	5.4	4.7	4.4	3.9	5.4
TATANKA (NTG-1)	4.8	4.8	4.2	4.8	4.9	6.0	5.8	5.1	5.3	4.7	4.9	3.9	5.3
TEXOKA	5.2	4.3	4.3	4.8	4.6	5.7	5.6	5.2	5.2	4.8	4.8	3.8	5.2
BISON	5.2	4.3	4.8	5.4	4.8	5.1	5.4	5.0	5.5	4.8	5.3	3.6	5.1
SHARPS IMPROVED	4.8	4.7	4.8	4.2	4.6	5.7	5.4	5.0	5.3	4.8	5.0	3.7	5.1
TOP GUN (BAM 101)	5.0	4.7	4.3	5.4	4.6	5.6	5.5	5.0	5.1	4.6	4.9	3.3	5.0
PLAINS (BAM 202)	4.8	4.3	4.7	4.8	4.4	5.5	5.4	4.8	5.1	4.8	5.2	3.8	5.0
PRAIRIE	5.2	5.0	4.3	4.3	4.1	5.6	5.3	4.9	5.5	5.1	5.2	4.4	5.0
BUFFALAWN	5.0	5.0	4.1	4.1	3.7	5.5	5.4	5.4	5.7	5.0	5.3	4.2	4.9
NE 84-45-3	5.0	4.2	4.1	4.1	4.3	5.3	5.2	4.6	4.4	4.0	4.2	3.1	4.6
HIGHLIGHT 25	5.2	4.8	3.9	3.9	3.6	5.3	4.7	4.9	5.1	5.7	5.2	4.1	4.5
HIGHLIGHT 4	5.2	4.7	3.8	4.0	3.5	5.0	4.9	4.8	5.1	5.0	5.4	4.1	4.5
HIGHLIGHT 15	5.0	4.2	4.0	4.1	3.4	4.8	4.6	4.4	4.9	5.1	5.3	4.3	4.4
RUTGERS	5.3	4.2	3.4	3.8	3.3	4.8	4.7	4.5	5.0	5.1	5.0	4.0	4.3
LSD VALUE	1.6	1.1	1.9	1.7	0.9	0.8	0.7	0.8	0.7	0.9	1.3	1.9	0.6

[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 Buffalograss Test - 1993