Breeding, Evaluation and Culture of Buffalograss for Golf Course Turf

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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 with significantly reduced cultural inputs.*
- *Determine the 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.*

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Through October, sales of buffalograss by Crenshaw & Doguet turfgrasses, Inc. has been above last year's level (approximately $1.5 million for '609'). A/G Sod of Phoenix, AZ, currently has 90 acres of '609' and PRAIRIE under production. This region has great market potential because of water issues in Arizona and the interest in using buffalograsses on golf courses.

Three selections: NE 86-61, NE 86-120 end NE 91-118, are currently being processed for release, protection, and commercialization. These genotypes have excellent quality, density, low mowing tolerance, and excellent sod production characteristics. Disclosures are being developed for these three genotypes, and they were entered into the 1996 National Turfgrass Evaluation Program Buffalograss Trial. Two of these selections have been vegetatively increased at Todd Valley Sod Farm at Mead, NE. The third will be planted next spring.

The older top selections in the program ('315', '378', 86-61, 86-120, 91-118) continue to perform well, but due to the mild conditions, fewer differences were seen this year. Additional vegetative selections, identified from nurseries and progeny rows, will be subjected to further evaluation.

Experimental seeded varieties show good performance compared to the vegetative varieties and better than standards. Single cross varieties were first evaluated in the field in 1996. Single crosses may provide improved uniformity

compared to the more typical synthetic crosses.

Inheritance studies continue to yield useful information. Selection for seed weight increased means by 13.7 and 25.6 mg per 100 caryopses in two populations. These gains from selection suggest increases in seedling vigor with additional cycles.

Buffalograss management research centered around planting date, mowing height, and nitrogen fertilization programs. The optimal seeding dates for buffalograss at Nebraska are April through June and at Utah, April through July. Late season plantings suffered winter kill or had inadequate buffalograss cover the next year.

Weed competition is the most important factor restricting buffalograss establishment. A major study was started in 1996 to determine best management practices for buffalograss. Mowing heights of 1, 2, and 3 in., and nitrogen levels of 0, 0.5, 1.0, 2.0, and 4.0 lb. N/1000ft2 were applied.

The lab component of this project includes tissue culture, DNA content measurement, and molecular marker research. Cell suspension cultures of buffalograss have been established from '609' and 84-45-3. Callus also can be initiated from unexpanded leaf material of 84-45-3 and '315'; however, no organogenesis has been observed so far. This research is essential for future transformation of buffalograss with genes, such as those conferring resistance to herbicides.

Flow cytometry has enabled differentiation of three ploidy levels among buffalograss accessions. It has identified a trend of tetraploids in southern Great Plains and hexaploids in the northern Plains.

Table 4. 1995 mean turfgrass quality turfgrass ratings of buffalograss cultivars for each month grown at twelve locations in the U.S.

Name	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
NTG-3	5.0	5.3	5.7	6.0	5.7	6.2	5.9	5.5	5.5	4.8	3.6	2.5	5.5
378 (NE 85-378)	4.3	4.8	5.4	6.2	5.7	6.5	5.6	5.6	4.9	4.3	3.4	2.5	5.4
315 (NE 84-315)	4.5	4.7	5.4	6.2	6.1	6.2	5.7	5.5	4.9	4.0	3.0	2.3	5.4
609 (NE 84-609)	5.3	5.2	6.0	6.6	4.9	5.8	5.9	5.9	5.8	5.6	5.8	3.8	5.4
NTG-5	4.2	4.8	5.4	5.6	5.4	6.2	5.7	5.6	5.5	4.7	3.6	2.3	5.4
NE 84-436	5.0	5.0	5.6	5.8	5.5	6.2	5.6	5.6	5.3	4.3	3.6	2.2	5.4
TATANKA (NTG-1)	5.0	5.0	5.4	6.0	5.5	6.2	5.5	5.4	5.4	4.8	4.0	2.5	5.3
NTG-4	4.8	4.8	5.7	5.8	5.4	6.3	5.6	5.3	5.3	4.7	3.8	2.5	5.3
NTG-2	4.5	4.8	5.3	5.9	5.2	6.0	5.5	5.3	5.4	4.7	4.1	2.8	5.3
SHARPS IMPROVED	4.8	5.3	5.3	6.2	5.4	5.8	5.4	5.3	5.2	4.9	3.9	2.3	5.2
PRAIRIE	5.2	5.2	6.0	6.2	4.9	5.6	5.3	5.5	5.5	5.4	5.0	3.7	5.1
AZ 143	4.8	5.5	5.9	5.7	5.2	5.8	5.2	5.2	5.2	4.4	3.4	2.5	5.0
BISON	4.3	5.0	5.4	6.2	4.9	5.5	5.4	5.2	4.9	4.8	3.7	2.5	5.0
BUFFALAWN	5.8	5.3	5.6	5.8	4.7	6.1	5.3	5.1	5.2	4.7	5.1	3.3	5.0
TOP GUN (BAM 101)	4.5	5.0	5.3	5.8	4.9	5.7	5.1	5.0	5.0	4.8	4.1	2.7	4.9
TEXOKA	4.2	4.8	5.3	5.3	4.7	5.6	5.2	5.0	5.1	4.5	3.6	2.3	4.9
HIGHLIGHT 25	6.0	5.7	5.8	5.8	4.5	5.7	5.0	4.9	5.1	5.2	5.4	3.7	4.8
PLAINS (BAM 202)	4.5	5.0	5.3	5.6	4.8	5.6	5.2	4.7	4.5	4.7	3.9	2.7	4.7
NE 84-45-3	4.2	5.2	5.1	5.3	4.4	5.4	5.1	4.6	4.4	3.7	2.8	2.5	4.5
HIGHLIGHT 15	5.5	5.5	5.4	5.8	4.2	5.4	4.9	4.3	4.9	4.8	5.2	4.2	4.5
HIGHLIGHT 4	5.5	5.2	5.4	5.3	4.1	5.2	4.9	4.6	5.0	4.5	5.1	3.3	4.5
RUTGERS	5.8	5.2	5.3	5.3	3.8	5.0	4.6	4.7	5.1	5.0	4.8	3.0	4.4
$LSD_{0.05}$	1.4	1.3	0.7	0.7	0.8	0.8	0.8	0.8	0.9	1.0	1.1	1.6	0.7

[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.