

## Executive Summary

### BREEDING, EVALUATION AND CULTURE OF BUFFALOGRASS FOR GOLF COURSE TURF

#### STATUS OF '609' BUFFALOGRASS

'609' Production - At the beginning of 1992 there were approximately 90 acres of '609' buffalograss production located at the Crenshaw/Doguet sod farm at Bastrop, Texas. During this last year, Crenshaw/Doguet instituted a new partnership policy and this program has been so successful that there are now over 400 acres of '609' being produced in locations in California (three locations), Arizona, Oklahoma, and Missouri.

'609' Marketing - '609' is completely sold out. This cultivar has been well received and prices have been held at a premium over competing species. A video tape promoting '609' should be available shortly from Crenshaw/Doguet.

'609' Performance - '609' is performing well in most situations. In Texas, where the greatest majority of use has occurred, '609' can be compared favorably to Prairie buffalograss and Tifway bermudagrass.

#### STATUS OF PROPRIETARY VEGETATIVE VARIETIES

Plant patents have been prepared for NE 84-315 and NE 85-378. Variety releases are being prepared for both of these experimental female buffalograsses. It is anticipated that NE 84-315 will be released nationally, and NE 85-378 will be released for sale only in Nebraska and the surrounding area. Other experimentals that are being considered for release include NE 84-436, NE 84-45-3 (male), and possibly NE 84-409.

#### STATUS OF SEEDED TURF-TYPE BUFFALOGRASSES

The Native Turfgrass Group indicate that seeded turf-type buffalograsses will be available in 1994. Approximately 30 acres of vegetative plantings have been made to produce commercial seed of two of the NTG synthetics. A representative from O.M. Scotts & Sons has visited the University of Nebraska and NTG to discuss sub-licensing of a cultivar from the NTG series. With the help of Dr. Jeff Klingenberg, Sharps Bros. Seed made excellent progress in 1992. Parents were selected, increased in a new greenhouse, and planted in half-sib family synthetics. These synthetics, ten in number, will be used to produce breeders seed for possible new cultivars.

#### LICENSING AGREEMENTS

The University of Nebraska has entered into a long-term agreement with Crenshaw/Doguet Turfgrass Inc. which makes them the exclusive national marketing agent for vegetative buffalograsses. The University of Nebraska has maintained complete rights for marketing in Nebraska and also for the release of seeded buffalograsses. Crenshaw/Doguet has paid \$25,000 in royalties during the past 12 months of '609' marketing.

#### BUFFALOGRASS BREEDING

Breeding efforts continue in developing new seeded and vegetative turf-type buffalograsses. Progress has been excellent, indicating that there is a great deal of potential for additional improvements. Characteristics that are being considered for

improvement include shade tolerance, insect and disease resistance, low mowing tolerance, continued improvement in turfgrass quality and adaptation.

### **BUFFALOGRASS MANAGEMENT STUDIES**

A field study was initiated in 1992 to determine optimal planting date for five improved turf-type buffalograsses. Another study, initiated in the fall of 1992, will investigate establishment protocols and planting dates for the conversion of a mature stand of fairway-maintained Kentucky bluegrass to a turf-type buffalograss. A number of studies have been conducted on buffalograss tolerance to herbicides. Some phytotoxicity was observed indicating a need for cautious use of herbicides on buffalograss, and a need for additional work in this area.

### **BUFFALOGRASS INSECT AND DISEASE RESEARCH**

Chinch Bug Control and Biology-Progress is being made in the area of buffalograss insect research. Weekly samples taken during the last three growing seasons have given us a better understanding of the 'buffalograss' chinch bug life cycle and provided information about timing control applications. Visiting scientist, Dr. Phil Busey, is assisting with development of a laboratory rearing method for 'buffalograss' chinch bugs.

Chinch Bug Resistance-The ability of chinch bugs to reproduce on different buffalograss selections was measured by placing chinch bugs into enclosures that had been pressed into the turf. There was considerable variability in chinch bug numbers making evaluation of resistance difficult.

Mealybug Resistance-A unique opportunity to study resistance to mealybugs occurred this spring when a greenhouse study evaluating bur production became heavily infested with mealybugs. Significant differences in resistance were found among the 38 selections evaluated, with '609', Prairie, and a few experimental selections showing good resistance.

Leaf Spot Disease-During the last two summers a leaf spotting disease resembling dollar spot of bluegrass was observed in many buffalograss lawns in eastern Nebraska. In order to better understand the disease, a series of studies is being planned including: confirming the pathogen responsible, identifying environmental conditions which favor the disease, and screening buffalograss germplasm for resistance.

### **STUDENT PROGRESS**

At the present time there is a need for several new students at the University of Nebraska, and efforts are being made to recruit them through the American Society of Agronomy. Jeff Klingenberg has completed his Ph.D. work, Katherine Kerner is finishing work on her M.S. thesis, and Jennifer Johnson-Cicalese is now pursuing her Ph.D. part-time. Publications are being prepared from this research.

## **BREEDING, EVALUATION AND CULTURE OF BUFFALOGRASS FOR GOLF COURSE TURF**

### **STATUS OF '609' BUFFALOGRASS**

'609' Production - At the beginning of 1992 there were approximately 90 acres of '609' buffalograss production located at the Crenshaw/Doguet sod farm at Bastrop, Texas. During this last year, Crenshaw/Doguet instituted a new partnership policy where qualified growers could enter into an agreement to produce '609' with no up-front cost and with complete technical support from Crenshaw/Doguet. This program has been so successful that currently, there are over 400 acres of '609' being produced in California (three locations), Arizona, Oklahoma, and Missouri. During 1992, production was viewed at Bastrop, TX, Oklahoma, and one California location. Although there were problems with too much precipitation at the Oklahoma location, it was obvious that '609' buffalograss was performing well throughout a fairly large geographic area in the Southwest.

'609' Marketing - '609' is completely sold out. This cultivar has been well received, and prices have been held at a premium over competing species. Crenshaw/Doguet has hired a marketing company, and thus far every marketing effort has been done professionally. A video tape promoting '609' should be available shortly from Crenshaw/Doguet.

'609' Performance - '609' is performing well in most situations. It is not always perfect, but most of the time the grass is better than would be expected from a new turfgrass species. Problem areas include Nebraska, where there was some winter damage, and Colorado and California where the rate of coverage is slightly slower than expected. But successes, such as in Arizona and Texas, suggest a lot of potential for '609'. In Texas, where the greatest majority of use has occurred, '609' can be compared favorably to Prairie buffalograss and Tifway bermudagrass. In most situations '609' has comparable quality to bermudagrass. It is still far too early to make a final decision on the geographic adaptation or the potential use of '609' in various situations, but initial indications are very positive.

### **NATIONAL BUFFALOGRASS TESTS**

To date, very little information has been returned from the National Test locations. However, this data usually becomes available during the winter period. During 1992 tests were observed at Nebraska, Oklahoma, Texas, and California, and overall they look very good. Results from the 40 national tests should be very helpful in making decisions on buffalograss suitability and adaptation. A table summarizing the experimental material included in the test is given in Table 1.

## **STATUS OF PROPRIETARY VEGETATIVE VARIETIES**

Plant patents have been prepared for NE 84-315 and NE 85-378. Variety releases are being prepared for both of these experimental female buffalograsses. It is anticipated that NE 84-315 will be released nationally, and NE 85-378 will be released for sale only in Nebraska and the surrounding area. The reason for this is that they have fairly comparable performance characteristics, and national release of two similar cultivars may not be the best marketing decision. Other experimentals that are being considered for future release include NE 84-436, NE 84-45-3 (male), and possibly NE 84-409. During 1993 a major effort will be made to increase new material for anticipated release.

## **STATUS OF SEEDED TURF-TYPE BUFFALOGRASES**

The Native Turfgrass Group indicate that seeded turf-type buffalograsses will be available in 1994. Observations in the National Buffalograss Tests indicate that their experimentals are performing well. Approximately 30 acres of vegetative plantings have been made to produce commercial seed of two of the NTG synthetics. One of these synthetics seems to have a more southern adaptation and is being grown in Enid, OK. The other has more northern adaptation and is being grown in Murdock, NE. A representative from O.M. Scotts & Sons has visited the University of Nebraska and NTG to discuss sub-licensing of a cultivar from the NTG series. Presently, efforts are being made to define the market and to develop a strategy for release during 1994.

With the help of Dr. Jeff Klingenberg, Sharps Bros. Seed made excellent progress in 1992. Parents were selected, increased in a new greenhouse, and planted in half-sib family synthetics, composed of 4200 plants. These synthetics, ten in number, will be used to produce breeders seed for possible new cultivars. During 1993, the synthetics will be rogued for off-types and harvested. Seed will then be used for planting of production fields. Sharps may select two synthetics for additional vegetative increase this winter in an effort to increase their production capability.

## **LICENSING AGREEMENTS**

The University of Nebraska has entered into a long-term agreement with Crenshaw/Doguet Turfgrass Inc. which makes them the exclusive national marketing agent for vegetative buffalograsses. There are escape clauses and performance guarantee requirements which protect the University's interests. Under the current setup, there is motivation for them to generate sales for new buffalograsses from Nebraska in a systematic and orderly manner. Their efforts to date have been above and beyond our expectations, and they, undoubtedly, should be rewarded for these efforts. The University of Nebraska has maintained complete rights for marketing in Nebraska and also for the release of seeded buffalograsses. Crenshaw/Doguet has paid \$25,000 in royalties during the first 12 months of marketing '609'.

## **BUFFALOGRASS BREEDING**

Breeding efforts continue in developing new seeded and vegetative turf-type buffalograsses. Progress has been excellent, indicating that there is a great deal of potential for additional improvements. Characteristics that are being considered for improvement include shade, wear, and low mowing tolerance, insect and disease resistance, and continued improvement in turfgrass quality and adaptation. Selections have been made from a progeny evaluation area being maintained at fairway mowing height. These will be further evaluated for their tolerance to low mowing and quality. An 1100 plant nursery was established in June consisting of progeny from five different crossing blocks, progeny of drought tolerant selections, and vegetative collections. Additional breeding work is summarized under the student progress section of this report. Presently buffalograss has a great deal of variability, and it will be relatively easy to capitalize on these variations for improvement. The breeding and development of seeded and vegetative products complement each other, and it is likely that progress in one area will help with the other.

## **BUFFALOGRASS MANAGEMENT STUDIES**

A field study was initiated in 1992 to determine both optimal planting date and latest planting date for five improved turf-type buffalograsses. Cultivars used were: '609', NE 84-315, NE 84-436, NE 85-378, NE 84-453, and Texoka. Planting dates were: June 25, July 9 and 25, September 1 and 24. Cultivars were blocked within replications to create large single cultivar blocks to be used in subsequent management studies. Data will be collected in 1993 to determine winter survival and stand establishment.

Another field study, initiated in the fall of 1992, will investigate establishment protocols and planting dates for the conversion of a mature stand of fairway maintained Kentucky bluegrass to a turf-type buffalograss. The following establishment protocols will be investigated: 1.) Glyphosate applied 7 days before planting; 2.) Glyphosate applied 6 months after planting; 3.) Irrigation with no glyphosate; and 4.) No irrigation with no glyphosate. Treatments 3 and 4 are designed to investigate the use of no-irrigation as a selective control measure. Buffalograss will be plug established from '609', utilizing a 12" x 18" spacing. All four treatments will be tested with fall and spring plantings. Data will be collected on speed of establishment and turfgrass quality and uniformity.

A number of studies have been conducted on buffalograss tolerance to both preemergence and postemergence herbicides. Some phytotoxicity was observed indicating a need for cautious use of herbicides on buffalograss, and a need for additional work in this area. These studies will be compiled for publication this winter.

## BUFFALOGRASS INSECT AND DISEASE RESEARCH

Chinch Bug Control and Biology-Progress is being made in the area of buffalograss insect research. Weekly samples taken during the last three growing seasons have given us a better understanding of the 'buffalograss' chinch bug life cycle and provided information about timing control applications. A range of insecticides, nematodes and other controls have been tested. Good control was obtained with early season applications and no phytotoxicity was observed. Visiting scientist, Dr. Phil Busey, is assisting with development of a laboratory rearing method for 'buffalograss' chinch bugs. This will allow studies on biology and the screening of buffalograss selections for resistance to continue year round. Cooperation with a leading chinch bug taxonomist, Dr. Thomas Henry, will soon yield a description of this new species.

Chinch Bug Resistance-The preliminary study initiated in 1991 to screen six buffalograss selection was harvested this summer and results are being analyzed. Sod squares of 70 selections, moved into a chinch bug infested lawn this April, differed in their ability to recover from transplanting. This made evaluation of chinch bug resistance difficult, but chinch bug damage was evident on some of the selections. Plugs were removed from each plot in September and chinch bug counts are being made. The ability of chinch bugs to reproduce on different buffalograss selections was measured by placing five pairs of chinch bugs into PVC pipe enclosures that had been pressed into the turf. Seventy selections were evaluated with first generation chinch bugs (April-July) and 47 selections with second generation chinch bugs (July-October). Reproduction occurred, but there was considerable variability in chinch bug numbers making evaluation of resistance difficult. These data are still being evaluated and will help us decide on future chinch bug resistance work.

Mealybug Resistance-A unique opportunity to study resistance to mealybugs occurred this spring when a greenhouse study evaluating bur production became heavily infested with mealybugs. The mealybugs had inadvertently been brought in from the field with the buffalograss plugs. Significant differences in resistance were found among the 38 selections evaluated, with '609', Prairie, and a few experimental selections showing good resistance even under severe insect pressure. This study is being repeated to help confirm the resistance we observed. To evaluate resistance in the field, mealybug-infested clippings were sprinkled into PVC pipe enclosures that had been pressed into 27 different buffalograss selections. Mealybugs and their damage were evident within the cages. The cages were harvested in September, and mealybugs extracted from them will be counted this winter. Progeny of the initial selections are being grown in the greenhouse and will soon be inoculated with mealybugs to evaluate the inheritance of resistance. We suspect resistance may be related to leaf pubescence and plan to investigate this further.

Leaf Spot Disease-During the last two summers a leaf spotting disease resembling dollar spot of bluegrass was observed in many buffalograss lawns in eastern Nebraska.

Although the disease caused lesions on the leaf that were quite severe it was not observed to have killed entire plants. Microscopic examination identified spores of *Curvularia* sp. as the presumed pathogen. In order to better understand the disease and develop information upon which to make recommendations to growers, a series of studies is being planned. These include confirming the pathogen responsible, identifying environmental conditions which favor the disease, and screening buffalograss germplasm for resistance. We welcome this cooperation with plant pathologists Dr. Stanley Jensen, Dr. Gary Yuen, and Dr. John Watkins.

## STUDENT PROGRESS

At the present time there is a need at the University of Nebraska for several new students, and efforts are being made to recruit them through the American Society of Agronomy. Jeff Klingenberg has completed his Ph.D. work, Katherine Kerner is finishing work on her M.S. thesis, and Jennifer Johnson-Cicalese is now pursuing her Ph.D. part-time. Jeff and Katherine's work are summarized in the following paragraphs. Publications are being prepared from this research.

**Dissertation title: EVALUATION, GENETIC VARIATION, AND SELECTION FOR IMPROVEMENT OF A SEEDED, TURF-TYPE BUFFALOGRASS POPULATION (*Buchloe dactyloides*)**

JEFFREY P. KLINGENBERG

Improved Buffalograss Root Penetration - Development of turf-type buffalograss cultivars with extensive root systems could enhance the species' drought resistance by enabling it to use greater volumes of soil moisture. Such cultivars could avoid dormancy under drought conditions by sustaining higher water potential in the plant.

A greenhouse root observation system was used to screen 119 buffalograss genotypes for root initiation and penetration to obtain a smaller population for repeated measures on parent and progeny material. An equation for root penetration index (RPI) was developed to identify individuals with superior initiation and overall penetration.

Results indicated that over time variation in root extension was significantly different among the initial and selected genotypes. Realized gain from selection based on half-sib progeny indicated a 30% increase in both total root penetration and RPI, suggesting merit in using this system as a screening device for rooting performance. However, less genetic variation in the selected population of both parent and progeny material and low narrow sense heritabilities suggested that further selection in the smaller population would result in little gain. Therefore, if recurrent cycles of selection are desired, the initial population should be much larger, so that high additive genetic variance for root penetration may be maintained.

Field Evapotranspiration: Mini-lysimetry - Evapotranspiration differences were studied as part of the effort to characterize the drought resistance capabilities of

buffalograss under turfgrass conditions. Mini-lysimeters were used to evaluate actual field evapotranspiration ( $ET_A$ ) and its ratio (crop coefficient  $K_c$ ) to potential evapotranspiration ( $ET_p$ ) for 41 buffalograss genotypes in repeated runs over two growing seasons at Mead, NE. The objectives of this study were to determine the population level of  $ET_A$ , determine genotypic variation and seasonal stability existing within the finite population at this location, and estimate potential gain from selection for  $ET_A$ .

Results indicated highly significant genetic variation for both  $ET_A$  and  $K_c$  in this selected population. As plants matured in the lysimeters  $K_c$  value also increased. Genotypic performance was extremely stable regarding the seasonal environmental index ( $r^2 \geq 0.95$ ). Relatively high heritability estimates and a selection intensity of 30% indicated an estimated gain from selection of  $\pm 2.85$  mm  $ET_A$  48 h<sup>-1</sup> from the initial population with an overall mean of 11.6 mm  $ET_A$  48 h<sup>-1</sup>. Data suggest merit in selecting for  $ET_A$ , with direction of selection dependent on the entries' genotypic response to other environmental stress tests.

#### Buffalograss Genotypic Variation and Seasonal Stability for Turfgrass Quality Traits

Thirty-six buffalograss genotypes were evaluated for turf performance under non-irrigated conditions at Mead, NE during the growing seasons of 1990 and 1991. The three-year-old plots were subjected to visual turfgrass color, quality, density, stress, harvest clipping weights, and fall dormancy data analysis. Objectives were to determine population genetic variability, estimate additive genetic variance for heritability, determine relativeness of multiple traits, and determine individual genotypic stability across seasonal environments. Data were taken as repeated measures within each season and analyzed in single and combined observation times and among years.

Results indicated more population variance during early- to mid-season for color, quality, and density. Quality rating was highly correlated with color and density. Population instability for genotypic quality existed across the established environmental index. Clipping weight analysis in single and combined years indicated genotypic variability; however, high CVs implied imprecision due to intrinsic variability not accounted for by the measurement of this trait. Mid-season stress and fall dormancy were not correlated, indicating that they should be treated as separate traits. Overall, the test indicates merit in using visual ratings to select for turfgrass quality, fall dormancy, and stress. In addition, variation in genotypic stability suggests that it is possible to select buffalograss genotypes for targeted environments.

#### Evaluation of Seed Yield Components - Development of a seeded, turf-type

buffalograss synthetic cultivar requires selecting a set of parents that produce adequate seed yields and produce an aesthetically pleasing, stress resistant turf. An open pollinated crossing block consisting of 30 female and five male genotypes was established at Mead, NE in 1990. The test objectives were to evaluate both genetic variation for components of seed yield and field compatibility of males and females for the location. In addition, seeds from individual genotypes were considered half-sib families representing pedigree material for future studies on family structure and recombination.



Results of the two-year study indicated significant ( $P \leq 0.01$ ) variation among the female genotypes for bur yield, percent seedling emergence, false smut infection rate, and percent seed set. Significantly higher yields in the second season were attributed to field plot maturity. The highly significant year x genotype interaction from the combined analysis affected estimated genetic variance components, causing estimated heritabilities to be very low ( $h^2 < .20$ ). The small amount of seed from 1990 potentially caused inadequate sampling of the population. However, genotypic frequency distributions of 1991 and combined seasons indicated that both a high bur yielding group and a low bur yielding group exist in this population, indication merit in selection for seed yield performance. The 1992 parent and progeny yield data will confirm superior performing genotypes and should provide better estimates of additive genetic variance and heritability.

Additive Genetic Covariance: Seedling Emergence - Estimating patterns of genetic growth of a particular character of a population improves expectation of growth for the trait. Growth trajectories can indicate when the highest population variance exists for the trait and at what time that variance is most related to total performance.

As a continuous growth character in buffalograss, seedling emergence is generally slow which has a negative effect on stand establishment. Families or cultivars with early and sustaining emergence would be more acceptable than those with either early emergence and low establishment or late emergence and good establishment. Differences in evolutionary growth patterns may indicate germplasm sources that respond best to seedling emergence.

Therefore, an analysis illustrating an evolutionary pattern of continuous growth for seedling emergence was applied to 30 half-sib buffalograss families. Additive variance and covariance matrices and subsequent graphs were derived to illustrate the genetic relationships of growth over time to seedling emergence in buffalograss. Results indicated that year x family interactions affect covariance relationships with initial emergence and final completed emergence. Therefore, expectations of growth patterns require repeated measurement of random family samples to fully characterize half-sib family response to seedling emergence.

Multiple Trait Selection for Drought Avoidance, Seed Yield, and Turfgrass Characters - A selection index for multiple traits in turfgrass is useful in developing a single value representing an individual's or cultivar's genetic worth. This value can be used to set selection intensity at a desired level that would include the multiple traits.

A turf-type buffalograss population was evaluated for several visual and physical characters. Weighted values were assigned to certain traits after they were evaluated for specific phenotypic and genotypic parameters. The results produced a selection index containing seven traits. From the index, selection intensity was set at 30% and 12 superior half-sib families were selected for recombination as synthetic cultivars. From these 12 superior families, four synthetic blocks were planted in 1992. Each synthetic has been rogued for off-types, and seed will be harvested from the four blocks during 1993.

**Thesis title: INFLUENCE OF NITROGEN CARRIER ON BUFFALOGRASS ESTABLISHMENT**

KATHERINE A. KERNER

Research was conducted regarding the effectiveness of nitrogen carriers on buffalograss (*Buchloe dactyloides* (Nutt.) Engelm.) establishment. Two N-carriers, an organic (5-10-3) and a ureaform/inorganic (17-26-3), were compared in greenhouse and field studies.

Greenhouse studies utilized either 132 cm<sup>2</sup> 8-week prerooted plugs or nonprerooted plugs of '609' buffalograss. Plugs were planted in 3.8 L pots containing an 85% sand 15% Sharpsberg silty clay loam media.

The first greenhouse study consisted of treating each plug at planting with one N-carrier at one rate. Rates used were 0, 2.4, 4.9 and 9.8 g N/m<sup>2</sup>. The statistical design was a 3-way factorial, randomized complete block with 4 replications. The study was performed for 10 weeks. Parameters measured included stolon number and length, tiller number per plug, clipping weight, color, cover and quality. Color, cover and quality were rated on a 1 to 9 scale with 1 = poorest and 9 = best. Parameters were measured once per week.

Results indicated that plugs treated with the ureaform/inorganic N-carrier had significantly higher stolon number per plug and greater stolon lengths. All other parameters measured gave inconclusive results. Eight-week prerooted plugs gave significantly higher parameter values than nonprerooted plugs. Contrary to expectations N rate applied gave varied results, although all rates above 0 g N/m<sup>2</sup> gave significantly higher parameter measurement values. It has been suggested that buffalograss does not utilize as much nitrogen as other turf species.

A second greenhouse study was performed using only 8-week prerooted plugs in the same size container and the same media. Split applications of one N-carrier per plug were applied at planting and at 6 weeks after planting. Rates applied twice were 0, 2.4 and 4.9 g N/m<sup>2</sup> for a total application of 0, 4.8 and 9.8 g N/m<sup>2</sup>. Parameters measured were the same as the first study. The same statistical design was employed but replications were increased to eight.

Results indicated that a split application was as effective as a single application of nitrogen. Other results were similar to the first study. Recommendations based on greenhouse studies for quicker buffalograss establishment include the use of 8 week prerooted plugs and a single application at planting of at least 2.4 g N/m<sup>2</sup>.

Field studies were conducted at the John Seaton Anderson Turfgrass Research Facility near Mead, NE. The first field study was similar to the first greenhouse study. One plug type was planted per plot. There were 36 plugs per 4.5 m<sup>2</sup> plot. The same rates of N application were employed. The statistical design was a 3-way factorial randomized complete block with 4 replications. The second year field study used only 8 week prerooted plugs. There were 25 plugs per 2.3 m<sup>2</sup> plots. Rates of N application were identical to the first greenhouse study. The statistical design was a 2-way factorial randomized complete block with 8 replications. Parameters measured for both field studies

were similar to the first greenhouse study except stolon length was not measured. Parameters were measured once per week for 10 weeks.

There were no significant differences in measured parameter values for both field studies. High initial soil fertility at the research area was thought to be a contributing factor for lack of treatment differences. Differences may have been detected using research plots on lighter, less fertile soils.

## **SUMMARY**

This progress report is the final one related to the Buffalograss Breeding and Development project initiated in 1984. It has been an enjoyable project, and the results have made all our efforts very worthwhile. Since a new project has been funded, we look forward to meeting its objectives. We anticipate that results over the next five years will continue to be equally rewarding to both UNL and the USGA.

**Table 1: National Buffalograss Test: Variety Information**

Variety	Main Adaptation	Breeder	Availability - Yr	Veg/Seed	Ploidy Level N =	Sex	Use
'609'	Southern US	T. Riordan	Crenshaw/Doguet	Veg	4	F	Turf
NE 84-315	Northern US	T. Riordan	Crenshaw/Doguet '94	Veg	4	F	Turf
NE 85-378	Northern US	T. Riordan	UNL - '93/'94	Veg	4	F	Turf
NE 84-45-3	Northern US	T. Riordan	UNL - ?	Veg	4	M	Unmowed Turf
NE 84-436	Northern US	T. Riordan	UNL - ?	Veg	4	F	Turf
Bufflawn	Southern US	Lin Wu	Quality Turf - TX	Veg	2	F	Turf
AZ-143	Northern US	C. Mancino	U of Arizona - ?	Veg	4	F	Turf
Highlight 4	Southern US	Lin Wu	U of California - ?	Veg	2	F	Turf
Highlight 15	Southern US	Lin Wu	U of California - ?	Veg	2	F	Turf
Highlight 25	Southern US	Lin Wu	U of California - ?	Veg	2	F	Turf
Prairie	Southern US	M. Engelke	Texas A & M	Veg	4	F	Turf
Rutgers	Southern US	D. Huff	Rutgers	Seed	2	M/F	Turf
NTDG 1	Northern US	T. Riordan/ B. Ahring	NTG - '94	Seed	4	M/F	Turf
NTDG 2	Northern US	T. Riordan/ B. Ahring	NTG - '94	Seed	4	M/F	Turf
NTDG 3	Northern US	T. Riordan/ B. Ahring	NTG - '94	Seed	4	M/F	Turf
NTDG 4	Northern US	T. Riordan/ B. Ahring	NTG - '94	Seed	4	M/F	Turf
NTDG 5	Northern US	T. Riordan/ B. Ahring	NTG - '94	Seed	4	M/F	Turf
Texoka	Northern US	?	Open Release	Seed	4	M/F	Forage/ Turf
Bison	Central US	C. Taliaferro	NTG	Seed	4	M/F	Forage/ Turf
Sharps Improved	Northern US	?	Sharps Bros. Seed	Seed	4	M/F	Forage/ Turf
Topgun	Central US	?	Bamert Seed	Seed	4	M/F	Turf
Plains	Central US	?	Bamert Seed	Seed	4	M/F	Forage/ Turf