

An Old Grass is Getting a New Look

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BUFFALO once roamed vast areas of the Midwest plains, which they shared with *Buchloe dactyloides*, a native grass that gained the name buffalograss. Though buffalograss tolerates close mowing and can be found on non-irrigated fairways in the Midwest, it has generally formed an open, low-density turf that has been acceptable only in very low maintenance situations.

The goal of the buffalograss research program at the University of Nebraska is the development of improved vege-

tative and seeded turf-type buffalograsses which allow golf courses to use less water, fertilizer, and pesticides, and will require less mowing. This is part of a larger overall program funded by the USGA since 1982 that has among its objectives a 50% reduction in water use and certain golf course maintenance costs.

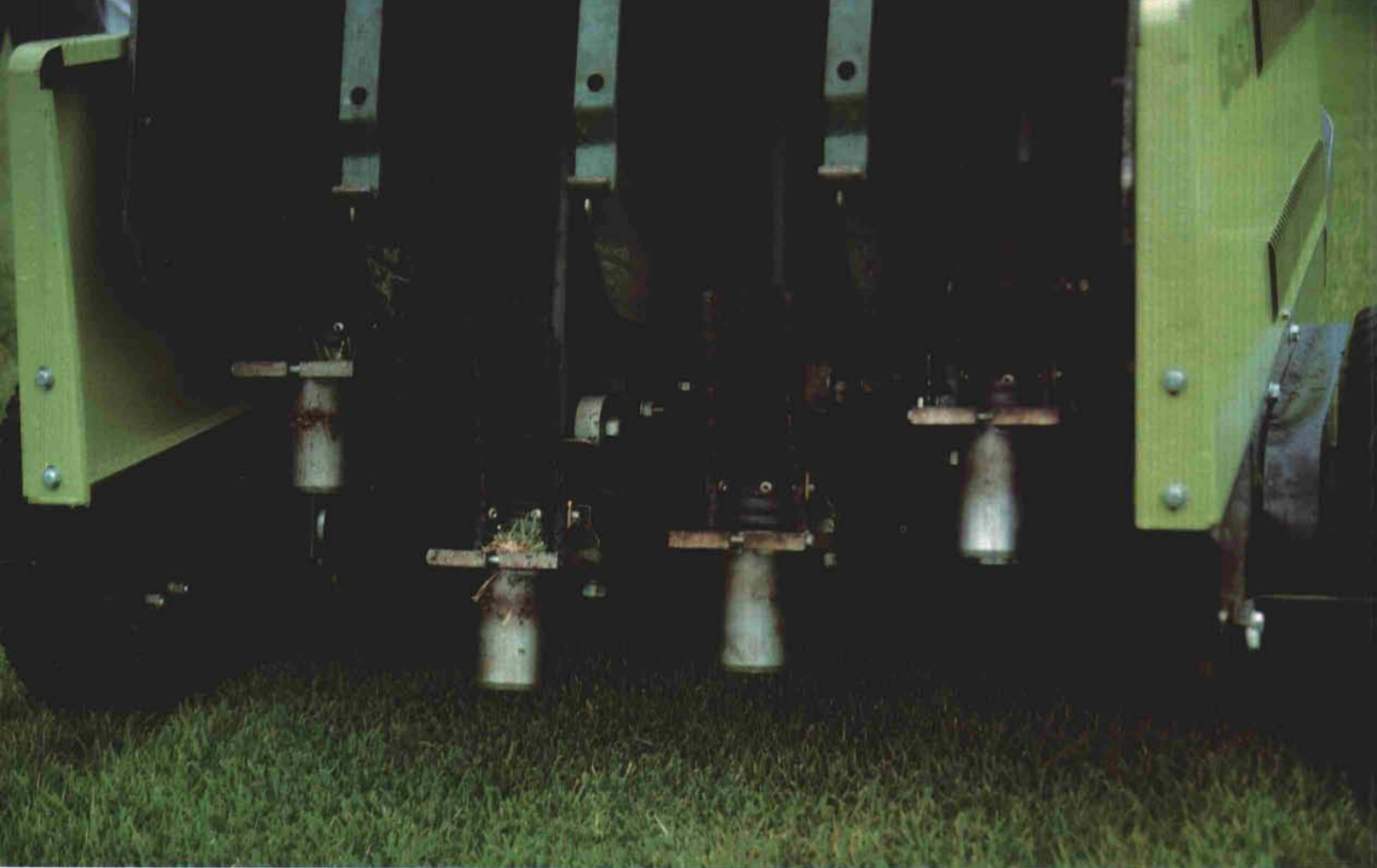
In 1984, Nebraska received approval to start the project. Dr. Ed Kinbacher, of the Department of Horticulture, traveled the Central Great Plains collecting buffalograsses. He also visited

Dr. Milt Engelke at Texas A&M to obtain buffalograss from their program, which was about to be discontinued. These clones were planted in the greenhouse along with 200 Texoka and Sharp's Improved buffalograss seedlings.

In the spring of 1985, all plant material was established in the field for initial observation, with the belief that it would take at least two years to obtain materials for selection. After just 10 weeks, however, most plots had become completely covered, and it was clear

Buffalograss has the potential for rapid spread by numerous stolons that branch profusely.





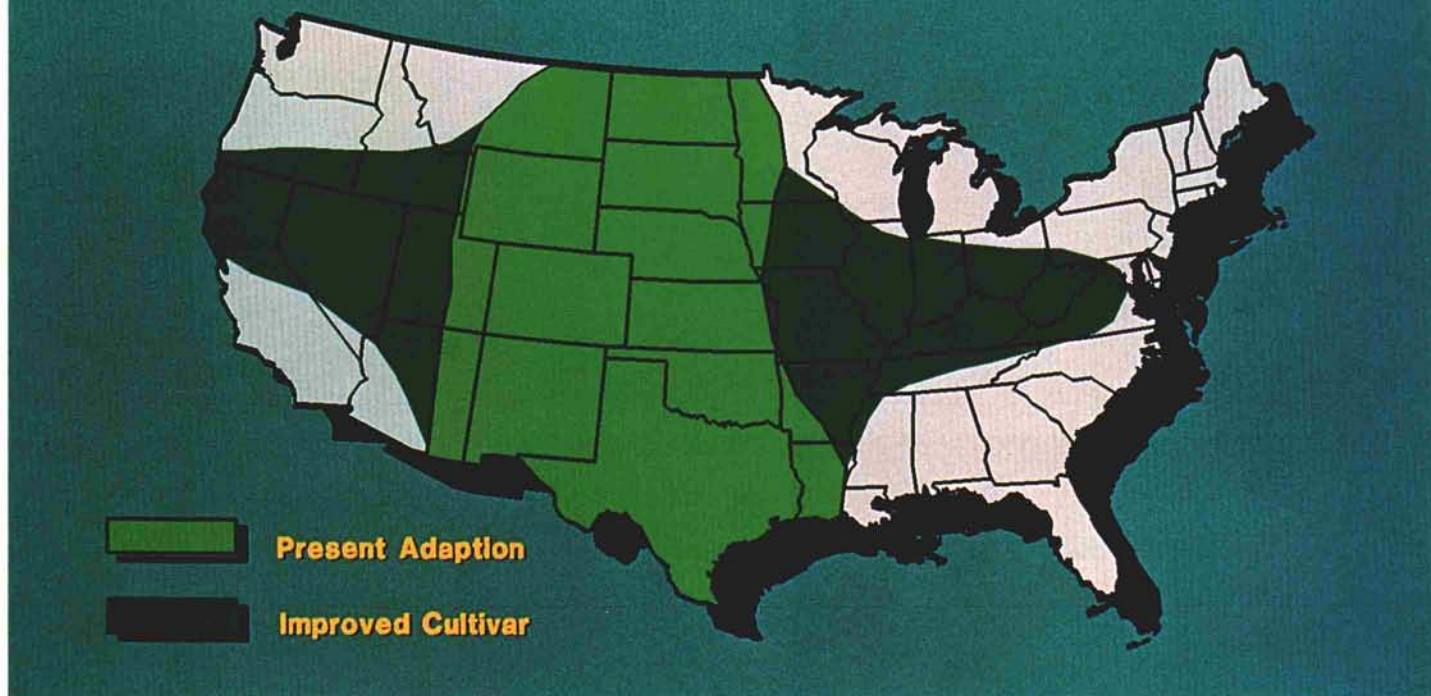
(Above) A core aerator has been modified to assist in harvesting buffalograss plugs for propagation.



(Left) Crossing of male and female buffalograss plants in the greenhouse.

Buffalograss Distribution in the United States

Buchloe dactyloides



Buffalograss is native to a large portion of the central U.S., and improved cultivars have increased its range of use.

that certain strains displayed several desirable turf-type characteristics: dark color, good density, low growth habit, and excellent rate of spread. With encouragement from the USGA, these better selections were increased in the greenhouse during the winter and planted in replicated plots in the spring of 1986. The majority of these plots were covered in 8 to 12 weeks and were being mowed by the fall of 1986.

During the next few years the program focused on the evaluation and development of three new vegetative lines, along with additional research that would set the stage for continued development of improved turf-type vegetative and seeded buffalograsses. The most significant results thus far have involved the development of the three vegetative lines, one of which will be commercially available in the spring of 1991. At Nebraska, several different studies were conducted to ascertain the merits of releasing these three genotypes. In summary, one line was better adapted to the South, and that the other two had adaption both in the South and

the North. When placed under minimal maintenance conditions, these three genotypes provide excellent turf quality and require much less management input than other turfgrasses.

After the initial evaluations, tests were arranged with cooperators throughout the United States. Not all tests were successfully established, perhaps because a new species was being evaluated, but buffalograss has done well in the South (Dallas, Texas, and Tucson and Yuma, Arizona) and in other areas of the country (Ithaca, New York; Madras, Oregon; and Ames, Iowa). The most significant application identified by these cooperative tests was the use of this species where water quantity or quality is a problem. Our research has shown that these three lines will use approximately 75% less water than cool-season grasses and will perform well where water is a political and environmental problem.

NE 84-609

The first selection to be released from the USGA buffalograss project is NE

84-609. This clone was selected from material found originally in central Texas. NE 84-609 is obviously adapted to the South, but it has also done well in Nebraska. The positive characteristics of this clone include rapid rate of cover, good density, a dark green color, and excellent fall color (in Nebraska it will stay dark green well into October). NE 84-609 has been licensed by the University of Nebraska to Crenshaw/Doguet Turfgrass Inc., a company located in Austin, Texas. The two principals of this company, Ben Crenshaw (an accomplished golfer, architect, and builder) and David Doguet (former president of the Texas Sod Producers Association) have the experience and expertise to use this grass successfully.

On May 25, 1990, 8,000 pre-rooted buffalograss plugs were planted at the new Crenshaw/Doguet sod farm in Bastrop, Texas. Plugs were planted on three-foot centers into a fumigated sod bed and were irrigated immediately. Because of the rapid spread of this clone, the first harvest was made August 29, 1990, and was used to plant an

additional 20 acres. David Doguet indicates that NE 84-609 is relatively easy to grow, and that it produces an excellent sod. In late October he reported that he had planted approximately 225 acres of buffalograss, including Prairie (a Texas A&M introduction) and NE 84-609, for sale in 1991. Considering that less than one acre of buffalograss has ever been grown and sold, this is a very ambitious, innovative project. However, David Doguet feels that meeting the present golf course market would require over 1,000 acres.

The Crenshaw/Doguet Company currently has sub-licensed the material to a production group in Florida, and they anticipate having growers in Arizona, New Mexico, and California. In 1991 both NE 84-609 and Prairie will be available via shipment from Texas. By 1992 they will be locally available throughout the South.

Other Vegetative Selections

Two other vegetative buffalograss selections will be released by the University of Nebraska in 1991. Both selections are northern types which should do well in the North and in the transition zones of the United States. One surprise, however, is that one of the selections is doing very well in Austin and Dallas, Texas, suggesting a broader adaptation. These selections will probably be commercially available in 1992.

The Nebraska buffalograss development program is continuing, and in 1990 over 100 new selections were made from various evaluation plots and nurseries. Several of these selections show characteristics which promise even better buffalograsses for the future. Initially, the turf-type buffalograss selections were all female, since the female plots exhibited excellent quality with no visible flowering stems. The more recent selections do include a number of male selections which have excellent turf quality and attractive male flowers. These may function quite well in a golf course rough, defining the fairway while allowing golfers to find their golf balls and hit shots with an acceptable penalty.

Seeded Buffalograss Development

The University of Nebraska has entered into agreements with two commercial producers of buffalograss seed to market the seed of new turf-type

buffalograsses. Developing a seeded buffalograss takes more time than developing a vegetative cultivar because of the breeding methods involved and because there are the two sexes in buffalograss. Other turfgrasses have the male and female flowers on the same plant. Much of the research effort by our graduate students at Nebraska involves the development of breeding techniques and screening procedures necessary to develop improved turf-type buffalograsses.

During the last two years excellent progress has been made in developing seeded buffalograsses. Based upon the current outlook, at least three to five seeded buffalograsses will be available for testing during 1991. These experimentals exhibit good turf quality, good color and density, and consist of both male and female plants. The business plan for both production groups calls for the marketing of a seeded buffalograss in 1994.

Plug Production and Establishment

The philosophy of our buffalograss development project is that it is necessary both to develop a new cultivar and to find a way to deliver the cultivar to the market. Market access is especially important for a new vegetatively propagated species.

Among the several advantages to developing a vegetative cultivar, the most important are the reduced time it takes to develop the cultivar and the uniformity obtained from a vegetatively propagated clone. Initial vegetative increases of selected material for plot evaluation were made using a hand plugger obtained commercially for \$10. There was an attempt to improve this plugger, but when costs approached \$100 with no improvement, this project was discontinued. Using this plugger, one person could harvest 300 plugs per hour, which is satisfactory for research work.

As the project continued, it was obvious that plugs were an excellent way to propagate buffalograss. When the plugs were pre-rooted for four to eight weeks and planted on 12- to 15-inch centers, plot coverage was obtained in 10 to 12 weeks.

When graduate students began requesting 5,000 to 6,000 plugs for experiments, a graduate student from biological systems engineering offered assistance in designing a mechanical plug harvester. With assistance from

Lincoln-based Cushman Corporation, the student was able to obtain a Cushman GA-30 and modify it to harvest plugs. The easily modified GA-30 is capable of harvesting 38,000 two-inch plugs per hour. This single piece of equipment has allowed rapid harvest of plant material for research and initial foundation plantings of new grasses. It is hoped that the Cushman Corporation will make this modification available for use by sod growers and golf course superintendents.

Buffalograss Management

Critical to the acceptance of buffalograss in the turfgrass market is the knowledge of how to grow it. Buffalograss is a low-maintenance turfgrass, but it does require proper management. Research at UNL has provided the following recommendations:

1. Fertilize with 1 to 2 lbs. nitrogen per growing season with applications around July 1 and August 15.

2. Irrigate when necessary to maintain color and active growth (i.e., water deeply and infrequently). Typically, this is about once per month in the northern U.S. and more often in the South.

3. Mow weekly to maintain a high-quality turf and every four to six weeks for a golf course rough.

4. The need for pesticides is rare, but use a pre-emergence weed control material when necessary. There are always exceptions, but buffalograss is relatively weed resistant, and most weeds can be controlled by mowing.

If buffalograss is over-managed (too much fertilizer and water), weeds can become a problem. Buffalograss is not very competitive, and weeds are more responsive to intensive management. Maintaining inputs at an optimal level for buffalograss will encourage the buffalograss and discourage the weeds.

Summary

Participating in the development and improvement of buffalograss has been very rewarding. New turf-type buffalograsses will produce an excellent turf for many golf course rough areas, and more importantly, reduce the need for water, fertilizer, mowing, and pesticides on the golf course. This project, funded by the USGA, has fostered the development of new cultivars, the technology necessary to produce sod, plugs, and seed, and the knowledge necessary to manage this species when used for turf.