

Buffalograss Moves From Rough Grass to Fairway Potential

By Robert C. Shearman

I am often asked, "Does buffalograss have a role as a golf course turf?" My response, of course, is, "Yes!" It is an excellent selection for roughs and a recent release, Prestige (Photo 1), has strong potential for use as a fairway turf.

A little over 20 years ago, the University of Nebraska-Lincoln (UNL) started a breeding program to improve buffalograss as a turfgrass species. The United States Golf Association partnered with us in this effort.

Why buffalograss?

We felt buffalograss had some natural characteristics that made it an excellent candidate for use as a golf course turf. Buffalograss is native to the Great Plains of North America. It is a dense, low-growing, warm-season grass species with excellent high-temperature tolerance, drought resistance and water conservation characteristics. It has a very low nitrogen requirement. These attributes piqued our interest in improv-

ing buffalograss as a golf course turfgrass species.

Our program has been quite successful to this point. We've released nine cultivars (Table 1, p. 62) in the past 20 years that have returned more than \$1 million in royalties to UNL and the USGA.

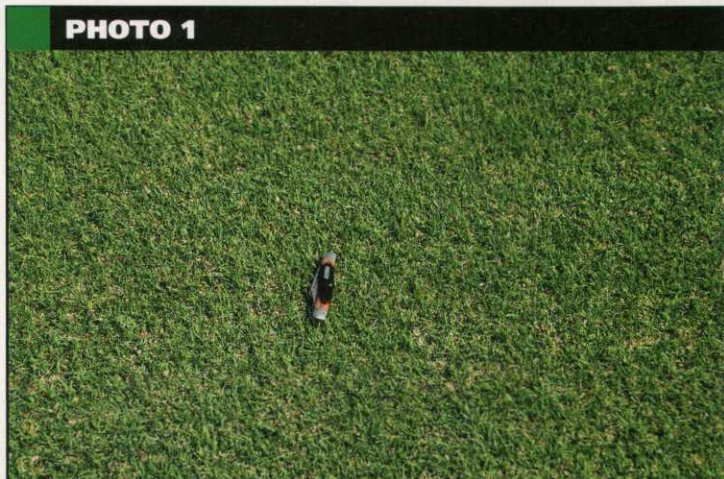
The success of this program has been primarily the result of a team effort involving faculty, staff and students in agronomy, entomology, biochemistry, biological engineering, horticulture and plant pathology. Terry Riordan provided leadership for the UNL buffalograss breeding program for nearly 18 years. It was under his leadership that the majority of the current cultivar releases were made. In 2002, a Buffalograss Breeding Program Working Group (Table 2, p. 64) was formed, and I had the good fortune to take on the role of leading this group and the buffalograss breeding program.

In most of our selection studies, we maintain buffalograss germplasm with 1 inch of water per month, whether from rainfall, irrigation or both. Buffalograss has a deep and extensive root system, relatively slow vertical growth rate, leaf hairs, and leaf rolling characteristics contribute to its ability to avoid drought and recover successfully from extended drought stress. All of our selections are evaluated for their tolerance to close mowing (Photo 2, p. 62). Our recent improvements have concentrated on turfgrass performance, increased seed yield and enhanced establishment characteristics.

Buffalograss is quite variable and is a relatively easy species to improve using traditional plant breeding techniques. Our research results indicate that cultivars can be developed with improved turfgrass quality, color and density, as well as extended greenness and increased seed yield potential. As water conservation continues to become a

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PHOTO 1



Prestige is a new release from the University of Nebraska-Lincoln buffalograss breeding program. Here it is growing at five-eighths of an inch while irrigated with 1 inch of water per month.



QUICK TIP

All superintendents know that to fully understand plant health and durability, they need to be aware of the impact that soil can have on their turf. Floratine Products Group provides one of the most comprehensive and accurate soil evaluation systems in the industry. Floratine works with Harris Laboratories to perform chemical extraction, water extraction and soluble paste tests to measure chemical components and nutrient availability. The data is then run through the proprietary Analync system, an exclusive partner to Floratine, which analyzes soil, water and environmental factors to give superintendents the most accurate information about their soil. All of this gives superintendents an in-depth look at possible soil issues, allowing them to better treat and strengthen their turf. To learn more about Floratine's soil evaluation, or for a list of Floratine distributors, please visit www.floratine.com.

TABLE 1

We have released nine vegetative and seeded type cultivars since the start of our breeding program in 1984.

Cultivar	Year Released	Propagation Method
609	1993	Vegetative
315	1993	Vegetative
378	1995	Vegetative
Tatanka	1995	Seed
Cody	1997	Seed
Legacy	1997	Vegetative
Bowie	2001	Seed
Prestige	1997	Vegetative
SWI-2000	2006	Seed

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 concern for the turfgrass industry, these characteristics and the drought resistance of buffalograss will become even more important and its acceptance as a golf course turfgrass species will continue to increase.

Improvements made

The following cultivars are some examples of the excellent improvements in buffalograss turfgrass performance that we have been able to make.

Legacy is a dark blue-green cultivar with a low growth habit and excellent turfgrass quality. It is noteworthy for its reduced canopy height and rapid lateral spread, making it an excellent turf-type buffalograss. Legacy is adapted to the central and northern Great Plains, but it has performed well as far north as Toronto and as far east as Maryland. It has excellent winter hardiness.

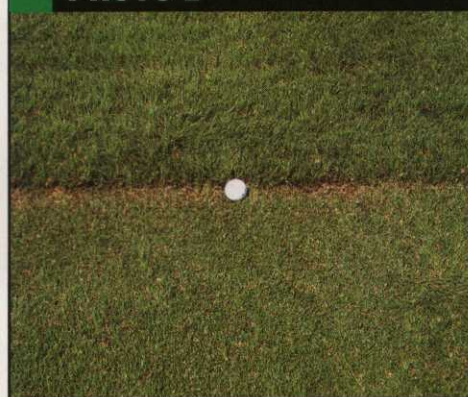
Prestige is a vegetative cultivar with a wide range of adaptation. Prestige is lighter green than Legacy, and tolerates mowing heights as low as one-half inch (Photo 1, p. 60). It has an extended green cover period that is enhanced by its greening up early in the spring and staying green longer in the fall than most other cultivars. It also has excellent winter hardiness, and is adapted to the southern through northern Great Plains. Prestige also has excellent chinch bug (*Blissus occiduus*) resistance.

Bowie, a seeded, turf-type buffalograss, has a wide range of adaptation and very good turf-

grass quality characteristics. Bowie is comparable to Tatanka and 609 for turfgrass quality, but is darker green and has a wider range of adaptation than either of those cultivars. It has very good seed yield potential, similar or better than Texoka. Bowie has excellent winter hardiness and excellent mealybug [*Tridiscus sporoli* (Cockerell) or *Trionymus* spp.] resistance. In 2006, we released SWI-2000. It performs and appears similar to Bowie, but has superior seed yield potential.

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PHOTO 2



Selections are based on desirable turfgrass color and quality, and tolerance to low mowing heights. This selection is being evaluated at five-eighths of an inch (foreground) and 2.5 inches (background), and receives 1 inch of water per month. This photo was taken in July 2007.

TABLE 2

Our buffalograss breeding program is based on a team effort. In 2002, we formed a working group to address the complex issues of improving buffalograsses. The following individuals are current members of this working group.

Working Group Member	Area of Expertise
Bob Shearman, Ph.D.	Leader/Facilitator
Bekele Abeyo, Ph.D.	Project Coordinator
Fred Baxendale, Ph.D.	Entomology
Roch Gaussoin, Ph.D.	Weed Science & Management
Loren Giesler, Ph.D.	Plant Pathology
Tiffany Heng-Moss, Ph.D.	Entomology
Don Lee, Ph.D.	Genetics
Gautam Sarath, Ph.D.	Molecular Biology
Desalegn Serba	Breeding
Kenton Peterson	Physiology & Management
Songul Severmutlu	Physiology & Management
Paul Twigg, Ph.D.	Molecular Biology
Ken Vogel, Ph.D.	Breeding and Genetics
Lannie Wit	Project Management



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Certainly, we are fortunate to have several excellent cultivars available for golf course use. Some of these cultivars are being used in golf course roughs with good success and performance, but their use has been limited.

Three aspects have been the primary limiting factors for use of buffalograss to date on golf course turfs. First, turf-type buffalograsses are new to the industry, and it takes time for any to accept the use of a new turfgrass species in the industry. Second, it is relatively expensive to establish buffalograss. Vegetative plantings are costly and labor intensive. Seed sources are relatively expensive compared to other turfgrass species. Third, buffalograss is a warm-season species with excellent winter hardiness, but has an extended winter dormancy period. Prestige with its extended green period is certainly an exception to this concern.

I believe acceptance of buffalograss is on the increase due primarily to concerns of our industry over water conservation and the need to reduce inputs, like fertilizer and pesticide use. As more individuals use buffalograss on golf courses, its acceptance by the turfgrass industry will definitely increase.

Improving seed yield and establishment potential are also important. We have placed an emphasis on improving seed yield potential of our current germplasm (Photo 3, p. 66). Improving seed yield will reduce costs for the end user and improves returns for the seed producers.

We have made excellent strides in this regard and have recently placed eight experimental lines with outstanding seed yield characteristics into extensive regional turfgrass evaluation trials. Pending their overall performance in these trials, we anticipate their potential release in the next year or two.

We also have some excellent vegetative experimental lines (Photo 2, p. 62) that have very good fairway and rough turfgrass characteristics. Five vegetative experimental lines were also placed in regional turfgrass evaluation trials. These lines have outstanding turfgrass quality and drought resistance traits, and several have excellent chinch bug resistance characteristics as well. These lines tolerate low mowing and require limited fertilizer inputs. We anticipate release of some of these lines in the very near future.

Twenty years of improving buffalograss is a relatively short time compared to the time and efforts put into improving Kentucky bluegrass, perennial ryegrass, tall fescue and bermudagrass. We are pleased with the progress made to date, but we also know that as buffalograss is accepted for use in our industry there will be even more improvements made in the future. Certainly, buffalograss has a great deal of variable and desirable traits that can be exploited for the benefit of turfgrass use. It is just a matter of taking advantage of these attributes and putting them to use.

Conclusions

The acceptance of buffalograss as a relatively new turfgrass species has come along way in a little over two decades of selection, breeding and improvement. As water shortages become more of an issue in the future, the need to conserve water for turfgrass use will become even more essential.

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PHOTO 3



Project Coordinator Bekele Abeyo observes advanced lines that have been selected for improved seed yield potential and turfgrass performance.

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Certainly, a tough, drought-resistant, native turfgrass species like buffalograss will play an important role in meeting this need. The cooperative research effort between UNL and the USGA has demonstrated that buffalograss has excellent potential for development as a turfgrass species. The nine cultivars released to date have proven track records for excellent turfgrass performance with minimal requirements for inputs. The experimental lines presently under testing show promise for even better turfgrass performance in the future.

Robert (Bob) C. Shearman holds a distinguished professorship in the Agronomy and Horticulture Department at the University of Nebraska-Lincoln. His responsibilities include research, teaching and extension. He is Sunkist Fiesta Bowl professor of agronomy, and is currently in charge of the buffalograss breeding program.

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