

Buffalograss Management Research: The Results May Surprise You

The surprising response of this native species to management inputs.

BY KEVIN W. FRANK

Buffalograss [*Buchloe dactyloides* (Nutt.) Engelm.] is a warm-season grass native to the Great Plains region of the United States. The only turfgrass species native to North America, it has long been claimed to be a low-maintenance grass with reduced irrigation, nitrogen, and mowing requirements.

THE NEED FOR RESEARCH

In response to a 1984 USGA call for proposals to develop reduced-maintenance turfgrasses, a team of scientists from the University of Nebraska led by Drs. Edward Kinbacher, Terrance Riordan, and Robert Shearman began evaluating buffalograss for use as a turfgrass. Interest in water conservation and reducing chemical inputs for turfgrass culture made buffalograss a desirable choice. USGA-sponsored breeding efforts to improve buffalograss for use as a turfgrass have been very successful and have resulted in the release of eight buffalograss cultivars.

As the new buffalograss cultivars entered the market, it became evident that there was a need for research to investigate fundamental management practices. After all, this was not the same buffalograss that had been growing on the Great Plains for many thousands of years, but rather this was buffalograss that had been selected for favorable turfgrass traits such as color, density, uniformity, and vigor of spread.

Most management recommendations supported the low-maintenance philosophy by advocating little or no fer-

tilizer application, as well as infrequent or no mowing. In low-maintenance areas where expectations are simply based on having ground cover, buffalograss managed in this manner is acceptable. However, for those who have planted buffalograss in golf course roughs or home lawns, following these management recommendations has often led to disappointment with the quality of turf achieved.

UNIVERSITY OF NEBRASKA RESPONDS

Common perceptions of buffalograss are that it is generally non-responsive to nitrogen applications, and high nitrogen rates do not benefit buffalograss but only increase weed interference. There also are questions about mowing height adaptation for different buffalograss cultivars. With these questions in mind, and funding from the USGA's Turfgrass and Environmental Research Program, research was initiated in 1995 to investigate nitrogen rate and mowing height

effects on four different buffalograss cultivars.

Buffalograss was established in 1995, and management treatments were initiated in 1996 and continued through 1998. The mowing heights were one, two, and three inches. The one-inch height was mowed twice per week, while the two-inch and three-inch heights were mowed once per week. Nitrogen rates were applied in two equal applications, with the first application in early June and the second application in mid-July, six weeks after the first application.

A polymer coat fertilizer (36-1-6, N-P₂O₅-K₂O) was used to apply total nitrogen amounts of 0.5, 1.0, 2.0, and 4.0 pounds per 1,000 square feet. An untreated control (no fertilizer) was included as a comparison. Immediately following nitrogen application, the plots were irrigated with one-half inch of water. After adjusting for precipitation, one inch of water was applied every two weeks throughout the duration of the research. Preemergence herbicides were applied each year from 1996 to 1998 to control annual weeds.

Turfgrass quality, color, and density were rated visually on a scale of 1-9 as used by the National Turfgrass Evaluation Program (NTEP). A quality rating of 1 is extremely poor, 9 is excellent, and 6 is acceptable. Ratings were taken every two weeks, starting two weeks after the first nitrogen application, and continued until six weeks after the second nitrogen application. Clippings were harvested four weeks after each

Buffalograss Cultivars and Research Locations Used to Investigate Cultural Management Programs

Buffalograss Cultivars

| | |
|-----------|------------|
| 378 | Vegetative |
| NE 91-118 | Vegetative |
| Cody | Seeded |
| Texoka | Seeded |

Research Station Locations

| | |
|-------------------------|---------------|
| University of Nebraska | Mead, NE |
| Kansas State University | Manhattan, KS |
| Utah State University | Logan, UT |

fertilizer treatment, oven-dried, and weighed.

BUFFALOGRASS RESPONDS TO NITROGEN APPLICATIONS

The results of the nitrogen rate applications to the buffalograss revealed several interesting trends. In 1996, the first year of nitrogen treatments after establishment, there were virtually no differences in buffalograss quality, color, or density among the nitrogen rates, especially at the Kansas site. Without prior knowledge of the research, most people would not even have recognized that different nitrogen rates had been applied to the buffalograss. Perhaps results such as these led to the belief that buffalograss is unresponsive to nitrogen applications.

However, successive years of nitrogen treatments revealed otherwise. By 1998, the third year of nitrogen treatments, buffalograss was displaying a very favorable response to the nitrogen applications at all locations. As the nitrogen rate increased from 0 to 4 pounds N per 1,000 square feet per year, buffalograss quality, color, and density all increased. Although the differences in quality among nitrogen rates was very small in 1996, by 1998 the effects of the nitrogen rate had become clear. It also was evident that quality declined from 1996 to 1998 for nitrogen rates less than 2 pounds N per 1,000 square feet, remained relatively constant for the 2-pound N rate, and increased for the 4-pound N rate.

Contrary to popular notion, there was no observed increase in weed interference as the nitrogen rate increased. Buffalograss responded to the nitrogen applications just as all other turfgrasses do, with improved color, quality, and density. The lack of response to the nitrogen applications in the first year of treatments was likely due to adequate levels of soil fertility. As the residual soil nitrogen was utilized by the buffalograss over the next two years, the beneficial effects of the nitrogen applications became more evident. This may explain



(Top) Buffalograss management research plots at the Kansas site at four weeks after the second fertilizer application in 1996 showing little differences in quality.

(Bottom) Buffalograss management research plots at the Nebraska site in 1998 showing marked differences in color, density, and overall quality as affected by nitrogen application rates.

previous observations that buffalograss is unresponsive to nitrogen applications. If our research had been conducted for only one year, it is likely we would have drawn the same conclusion.

BUFFALOGRASS USE ON GOLF COURSES AND LAWNS

The following recommendations are relevant to irrigated buffalograss that is mowed weekly. Buffalograss maintained in this manner is not considered to be low maintenance, but representative of common lawn management or golf

course rough management practices. Expectations of buffalograss that is not irrigated or not mowed regularly would be lower and, therefore, would require different management recommendations. Although the buffalograss cultivars had the highest color, quality, and density ratings at the rate of 4 pounds N per 1,000 square feet, our recommendations are to apply 2 pounds N per 1,000 square feet per year as a split application approximately six weeks apart.

There are two reasons for making the 2-pound N rate recommendation. First,

the clipping weights at the rate of 4 pounds N per 1,000 square feet per year were significantly higher than at the other nitrogen rates. Although buffalograss had the highest quality, color, and density at the 4-pound N rate, it also had the greatest clipping production, thereby effectively eliminating any potential buffalograss has for reduced mowing frequency. Second, if we were to recommend the 4-pound N rate, we also would eliminate the reduced fertility requirement of buffalograss. Recommending a 4-pound N rate would place buffalograss under essentially the same fertilization program as other turfgrasses, such as Kentucky bluegrass.

MOWING HEIGHT RECOMMENDATIONS VARY BY CULTIVAR

Buffalograss response to the three mowing heights varied among cultivars. At the one-inch mowing height, the vegetatively propagated cultivars 378 and NE 91-118 had good color, quality, and density. The seed-propagated cultivars, Cody and Texoka, performed poorly at the one-inch mowing height, and they rarely had acceptable density, even at the 4-pound N rate. Cody and Texoka responded well to the two-inch and three-inch mowing heights. In contrast, 378 and NE 91-118 generally

had higher quality when mowed at two inches rather than three. At the three-inch mowing height, NE 91-118 often lacked uniformity. Although this appearance would be suitable for low-maintenance areas, on higher-profile areas this would be unacceptable.

Mowing height recommendations vary based on seeded or vegetative cultivars and the end-users' expectations and desired use. In a low-maintenance area, all of the buffalograss cultivars could be mowed only once or twice a year, but if a more aesthetic turf were desired, the following recommendations would pertain. For vegetative cultivars, mowing heights of one-half to three inches are acceptable. The half-inch mowing height would only be recommended for use as golf course fairways. As mentioned previously, some vegetative cultivars such as NE 91-118 have better uniformity at the two-inch mowing height. Due to poor density at low mowing heights, the mowing height recommendation for seeded cultivars is two to three inches.

MATCHING EXPECTATIONS WITH MANAGEMENT

Our research has shown that although buffalograss may still be considered a low-maintenance turfgrass, it does respond favorably to nitrogen applications and can produce a high-quality

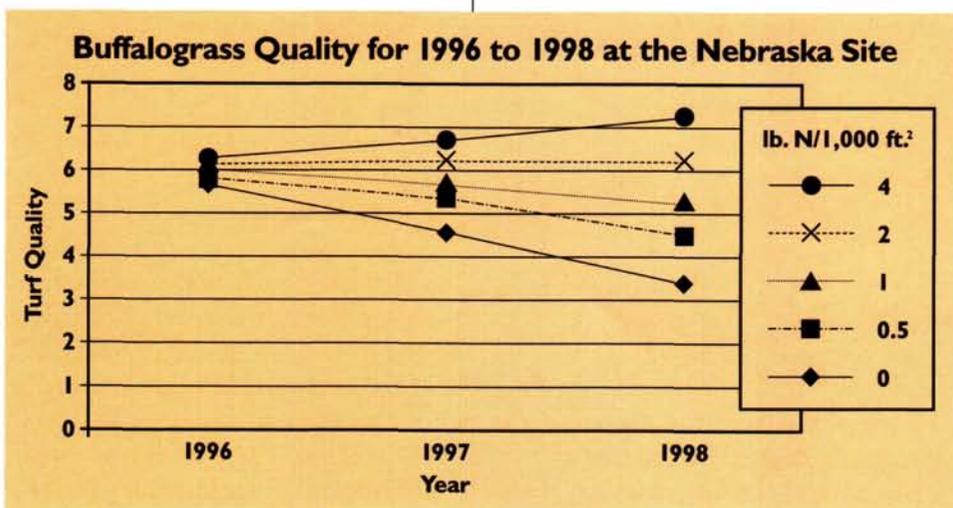
turfgrass with regular mowing and nitrogen applications. The key to successful buffalograss management is to determine your expectations and then tailor the management program to meet them. Although we recommend nitrogen applications to buffalograss to achieve a good quality turfgrass, the amount recommended, 2 pounds N per 1,000 square feet per year, is certainly less than the amount of fertilizer many turfgrasses require.

If you have buffalograss and haven't been satisfied with its performance, consider modifying your management scheme to reflect these recommendations. In the proper setting, with the proper expectations and management scheme, it may surprise you. After all, this is not the buffalograss that this nation's pioneers traveled across 200 years ago.

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Buffalograss quality at the University of Nebraska site from 1996 to 1998 was rated from 1 to 9 (with 9 the highest quality and 1 the lowest quality). Quality differences did not show up until the year after fertilizer treatments began.