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Research at the University of Nebraska demonstrates that buffalograss fairway and rough turfs overseeded with blue fescue in the fall provide extended green appearance and enhance turfgrass quality.

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PURPOSE

The purpose of *USGA Turfgrass and Environmental Research Online* is to effectively communicate the results of research projects funded under USGA's Turfgrass and Environmental Research Program to all who can benefit from such knowledge. Since 1983, the USGA has funded more than 290 projects at a cost of \$25 million. The private, non-profit research program provides funding opportunities to university faculty interested in working on environmental and turf management problems affecting golf courses. The outstanding playing conditions of today's golf courses are a direct result of ***using science to benefit golf***.

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Overseeding Fine Fescue in Buffalograss Turfs

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SUMMARY

Acceptance of buffalograss as a turfgrass species in northern climates is somewhat limited by its extended winter dormancy. Management procedures that prolong green color retention in buffalograss turfs without a negative impact on turfgrass adaptation and quality would be desirable. Research at the University of Nebraska demonstrated enhanced color retention and turfgrass quality, when fine-leaved fescues were overseeded in existing buffalograss turfs. The study's findings include:

- The resulting turfgrass mixture extended turfgrass color retention by more than two months compared to monostands of buffalograss.
- Blue fescue overseeded in the fall gave superior turfgrass quality when compared to Chewings and hard fescue overseedings.
- The blue-green color of blue fescue blended well with the color of buffalograss and resulted in improved turfgrass quality and appearance. Similar responses were observed for buffalograss and blue fescue mixtures maintained at fairway and rough heights of cut.
- The results of this research indicate that buffalograss fairway and rough turfs overseeded with blue fescue in the fall provide extended green appearance and enhance turfgrass quality.

Buffalograss [*Buchloë dactyloides* (Nutt) Engelm.] is a warm-season turfgrass with excellent drought resistance and a strong potential for use where water conservation is an issue (4). Buffalograss grows from central Mexico to the prairie provinces of Canada. Many cultivars of buffalograss have excellent low temperature tolerance. This trait sets it apart from most warm-season turfgrasses since most of them lack the ability to persist in northern climates (1, 5).

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Low temperature tolerant buffalograss cultivars thrive in the northern portions of the Great Plains, but they go dormant in the fall, usually with the first killing frost, and have a winter dormancy period that extends into the late spring until soil temperatures reach 60°-65° F (15°- 19° C). In some cases, this annual dormancy limits the acceptance and use of buffalograss as a turf (4).

Bermudagrass turfs also experience winter dormancy and many bermudagrass greens, fairways, and tees are overseeded with cool-season grasses on a temporary basis to enhance their performance and playing quality during this dormancy period (1, 5). Attempts to use mixtures of warm- and cool-season turfgrasses as permanent turfs have met with limited success. In theory, mixtures of warm- and cool-season grasses seem practical because the optimum growth conditions for each species should complement one another with cool-season grasses growing well in spring and fall and warm-season grasses growing best in the summer (2). However, it is difficult to obtain



Buffalograss is a warm-season turfgrass that has extended winter dormancy when grown in northern climates. Mixtures of buffalograss and fine-leaved fescues (foreground) may enhance turfgrass color retention compared to buffalograss alone (background).

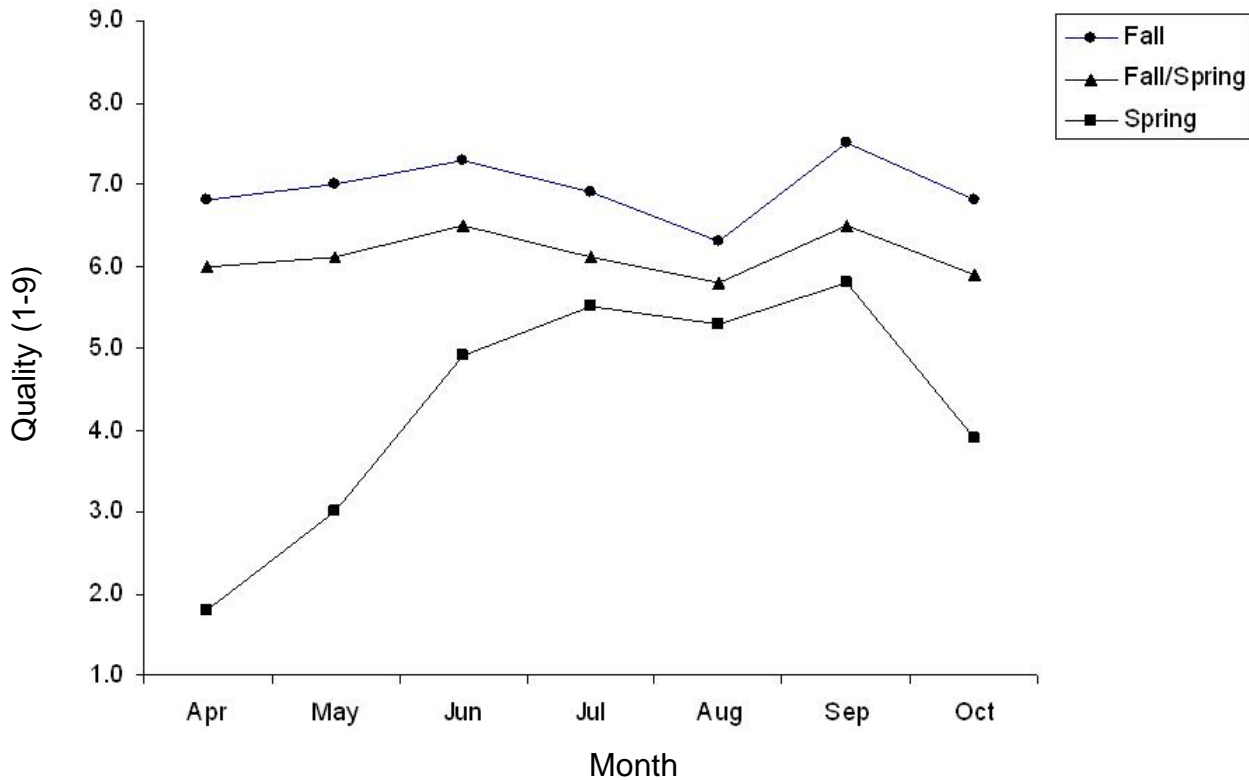


Figure 1. Turfgrass quality ratings for overseeded buffalograss when blue fescue was seeded in fall, fall/spring, or spring (i.e. 1-9 visual rating scale with 1= poorest and 9= best).

and maintain the desired mixture composition. The consequence of these mixture attempts often is a patchwork quilt appearance that results in undesirable turfgrass uniformity and quality.

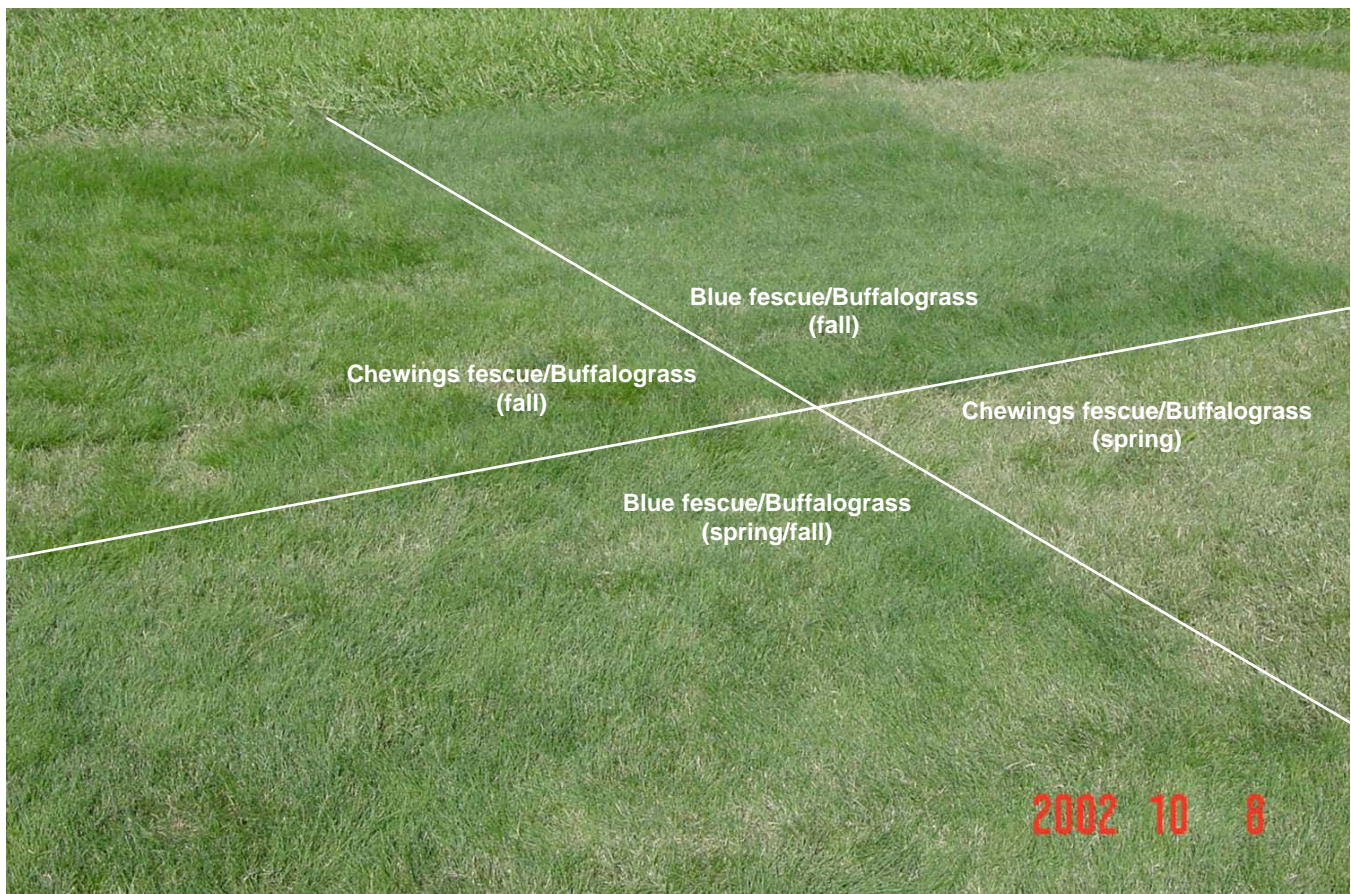
Research was initiated to study the potential of overseeding fine-leaved fescues into established buffalograss turf and to observe the effects of these mixtures on turfgrass color and quality. The first studies investigated species, seeding rate and date, and core cultivation effects on overseeding establishment and buffalograss performance with turfs maintained as golf course roughs. Recent studies have investigated overseeding effects when turfs were maintained under fairway conditions.

Rough Overseeding Studies

Overseeding date and rate studies were conducted during two years on buffalograss turfs maintained as roughs at the University of

Nebraska John Seaton Anderson Turfgrass Research Facility located near Mead, NE. Three fine-leaved fescues [i.e. hard fescue (*Festuca longifolia* Thuill., 'SR 3100'), blue fescue (*F. ovina* L. var. *glauca* Lam., 'SR 3200'), and Chewings fescue (*F. rubra* L. var. *commutata* Gaud., 'SR 5100')] were used in both studies. Fall, spring, and fall and spring seedings were compared in the seeding date study.

In the seeding rate study, seed rates of 2.0, 4.0, and 6.0 lbs of pure live seed/1000 ft² (10, 20 and 30 g/m²) were compared. The fine-leaved fescues were overseeded into mature stands of buffalograss that were mowed down to one inch with mowing debris removed. The turfs were core cultivated prior to applying seed. After seeding, the cores were broken up and a starter fertilizer was applied at 1.0 lb N/1000 ft² (5 gm N/m²). Turfs were irrigated three times daily with 0.25 inches (6 mm) for three weeks after seeding to maintain a moist soil to enhance fine fescue seedling establishment. Subsequently, irrigation



The blue green color of blue fescue blends well with the color of buffalograss, and provides a uniform turfgrass appearance. Fall overseeding of fine-leaved fescues was preferred to spring or fall/spring seeding. Note the difference in stand composition for the Chewings fescue established in the fall (upper left) versus spring (right).

was applied at 0.5 inch (12 mm) weekly for the rest of the growing season. After establishment, turfs received 2.0 lbs N/1000 ft² and were mowed weekly at 2.5 inches (63 mm) with clippings returned. These studies were repeated in 2001 and 2002.

Fairway Overseeding Studies

A second set of buffalograss overseeding trials was conducted in 2004 and 2005 at the research facility located near Mead, NE. Established buffalograss cultivars maintained as fairway turfs were overseeded with 'Bighorn' blue fescue at 1.0 and 2.0 lbs /1000 ft² (5 and 10 g/m²) in early September. 'Bighorn' blue fescue was selected as the overseeding species based on its drought resistance, low fertility performance, and its grayish, blue-green color. These characteris-

tics were thought to have the best chance to match well with buffalograss and provide more uniform color to the mixture. Establishment procedures were the same as those described for the seeding rate and date trials with the exception of the mowing height and frequency differential. The buffalograsses were mowed three times per week at 0.63 inches (15.6 mm), and received 2.0 lbs N/1000 ft²/season (10 g N/m²/season) and 1.0 inch (25 mm) water per month, either as irrigation, rainfall, or both.

Results of Seeding Rate and Date Studies

In the seeding date studies, fall overseeding gave the best turfgrass quality and color, and highest shoot density ratings compared to spring or fall-spring plantings (Figures 1, 2, and 3). Spring overseeding had the lowest shoot densities

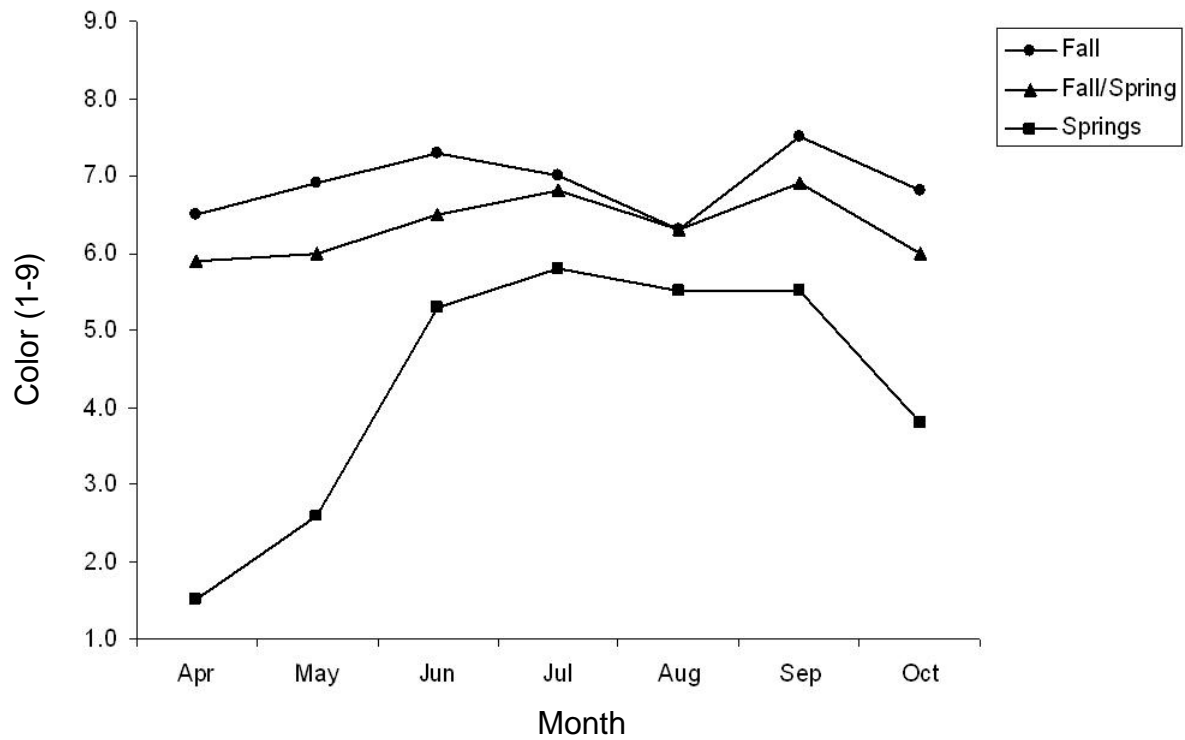


Figure 2. Turfgrass color ratings for overseeded buffalograss when blue fescue was seeded in fall, fall/spring, or spring (i.e. 1-9 visual rating scale with 1= straw brown and 9= dark green).

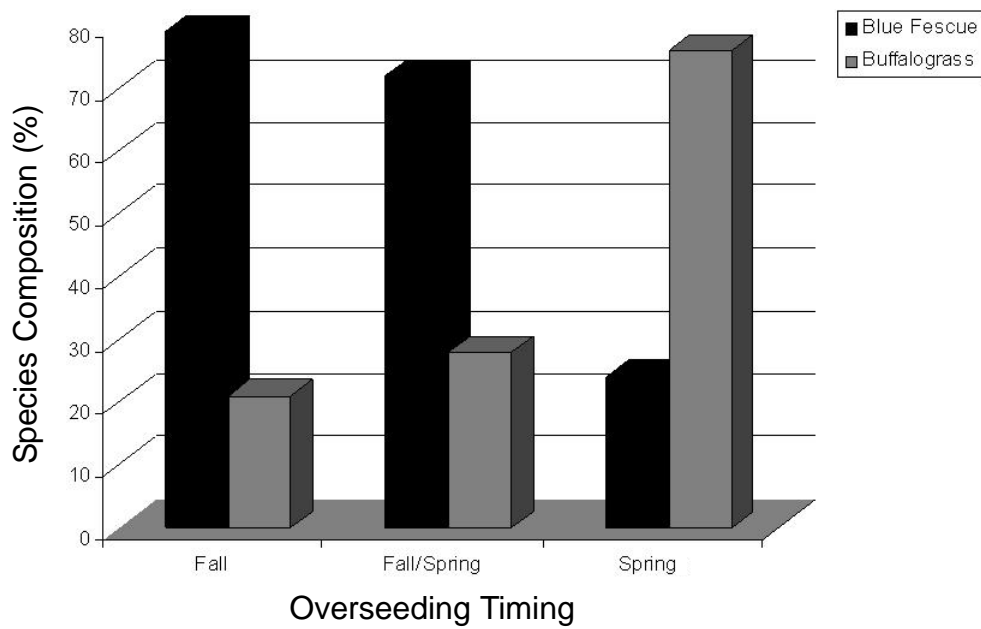


Figure 3. Turfgrass species composition (i.e. percentage of each species) when blue fescue was seeded in fall, fall/spring, or spring.

and fall-spring seeding was mostly intermediate in response. Fine fescue shoot density was highest in May and declined gradually through September when it began to increase with the onset of cooler soil temperatures. Buffalograss composition increased during the summer months. This transition was anticipated since fine fescues are cool-season turfgrass species.

Fall overseeded blue fescue had the highest ratings for turfgrass quality and color and quality throughout the study (Figures 1 and 2, respectively). The blue-green color of blue fescue blended well with buffalograss, giving a better season-long performance compared to the other fine-leaved fescue species studied. Buffalograss mixed with Chewings or hard fescues exhibited more summer stress than the blue fescue mixtures, but all turfs expressed a decline in turfgrass quality during the summer stress period (Figure 1). This response may have been due to higher than normal summer temperatures and lower than normal rainfall experienced at the research site during

these trials.

Fall overseeded blue fescue-buffalograss mixtures maintained acceptable quality ratings during summer stress periods. Research conducted in Utah reported similar findings with blue fescue and buffalograss mixtures providing better turfgrass quality when compared to Chewings or creeping red fescue mixed with buffalograss (3). In our studies, Chewings fescue overseeding treatments gave unacceptable turfgrass quality when buffalograss was dormant. The unacceptable ratings were due primarily to the lack of uniformity in turfgrass appearance.

As might have been expected, there was a linear response for increased shoot density and turfgrass quality and color ratings as seeding rates increased from 2.0 to 6.0 lbs/1000 ft² (10 to 30 g/m²) (Figures 4 and 5). Turfgrass quality and color ratings followed similar trends. Turfgrass quality ratings were highest for the 6.0 lbs/1000 ft² (30 g/m²) treatment (Figure 5). In Utah, fine-leaved fescue seeding rates of 2.0 and 4.0

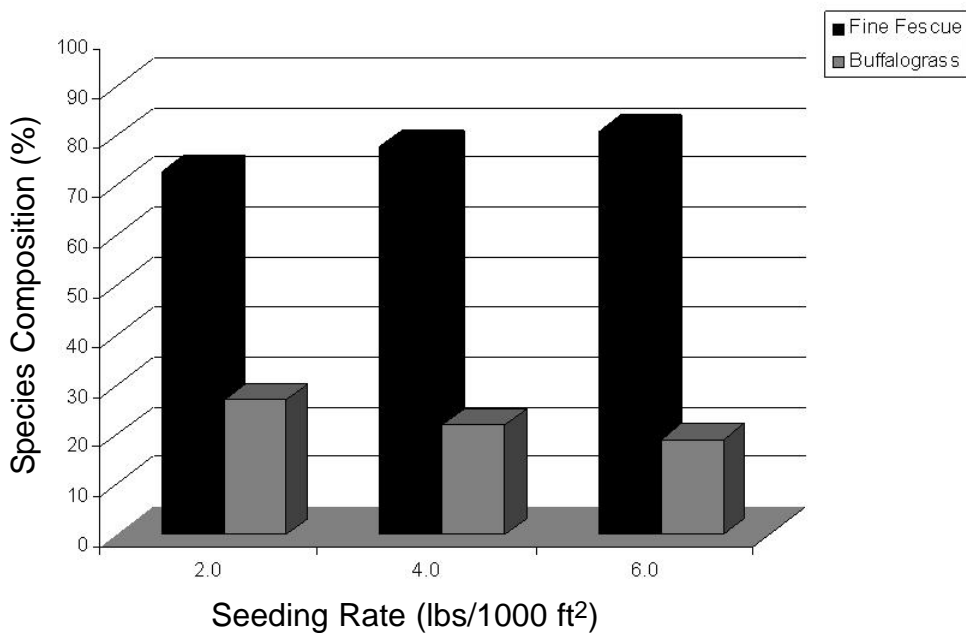


Figure 4. Percentage of turfgrass species composition based on fine fescue seeding rates of 2.0, 4.0, and 6.0 lbs/1000 ft² (10, 20, and 30 g/m²).

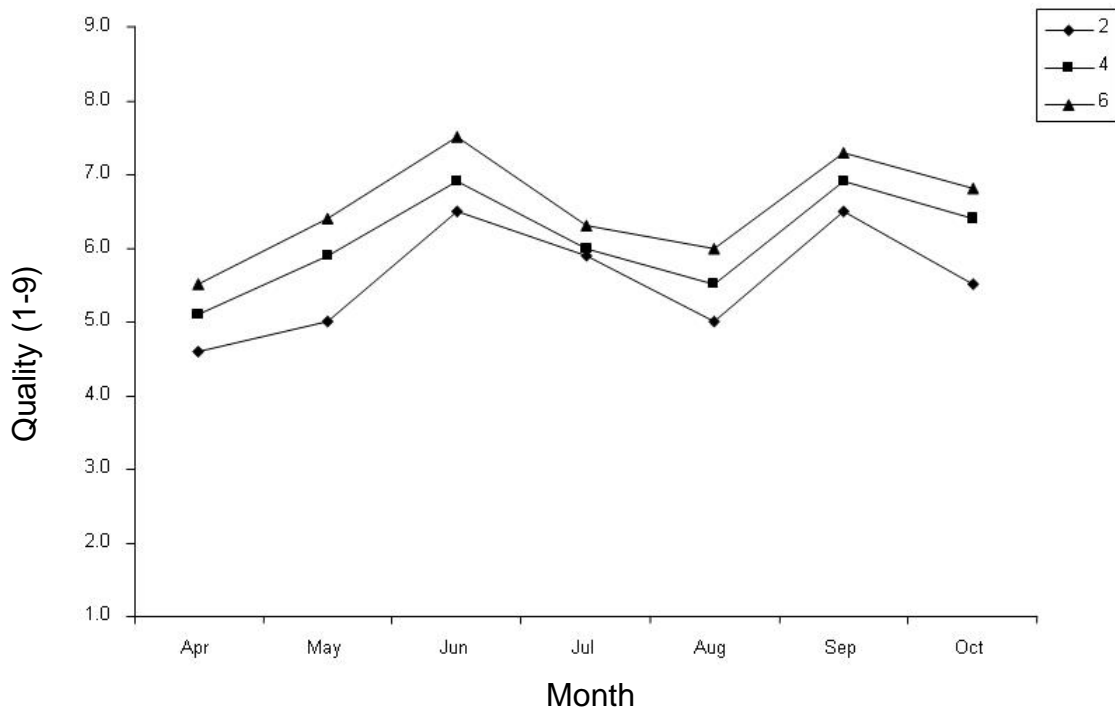


Figure 5. Turfgrass quality ratings of overseeded buffalograss when fine fescue was overseeded at 2.0, 4.0, or 6.0 lbs/1000 ft² (10, 20, and 30 g/m²) (i.e. 1-9 visual rating scale with 1= poorest and 9= best).

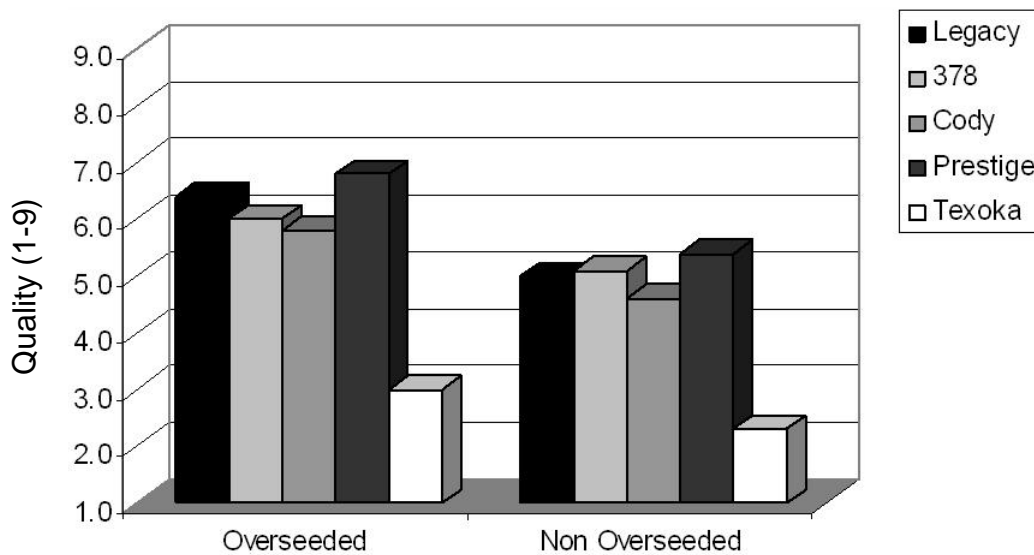


Figure 6. Mean turfgrass quality ratings for buffalograss cultivars overseeded with 'Bighorn' blue fescue in the fall 2004 compared to those same buffalograss cultivars not overseeded with "Bighorn" blue fescue.

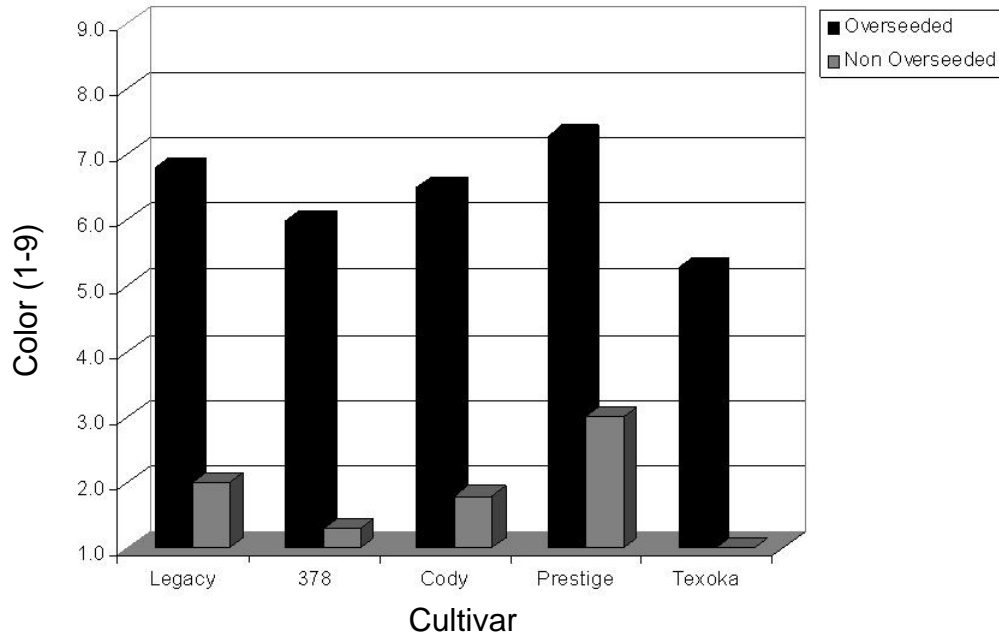


Figure 7. Turfgrass color rating of buffalograss cultivars overseeded with blue fescue and compared to those same buffalograss cultivars not overseeded. Ratings were made in November, 2005 (i.e. 1 to 9 visual rating scale with 1= straw brown and 9= dark green).

lbs/1000 ft² (10 to 20 g/m²) in a buffalograss overseeding study resulted in similar shoot density and quality responses (3).

In this study, shoot density seemed to stabilize around a 3:1 ratio of fine fescue to buffalograss shoots when overall seeding rates and the entire growing season are considered (Figure 4). As in the seeding date study, fine-leaved fescue composition was highest in May. Fine-leaved fescue composition decreased while buffalograss increased from late spring to early fall. This response reflects the anticipated growth responses from a cool- and warm-season turfgrass mixture, but the stability in the ratio of fine fescue to buffalograss shoots over the entire growing might not have been as readily anticipated.

Early attempts to mix warm- and cool-season turfgrass were met mostly with failure (1, 2). Certainly location, establishment conditions, and management approaches may have been factors influencing the success or failure of these earlier attempts. Recent trends in developing more aggressive, high temperature tolerant cool-season turfgrass cultivars may decrease the competitive

advantage of warm-season turfgrasses during summer stress periods (5).

In this study, blue fescue-buffalograss mixtures maintained higher turfgrass quality during summer stress periods than did buffalograss mixtures with Chewings or hard fescues. Two years after establishing these studies, fall overseeded blue fescue comprised 75% and buffalograss 25% of the turfgrass stand. This composition was slightly less than the >80% fine fescue reported in the Utah study (3). The high percentage of fine-leaved fescue could cause concern for the long-term management of these mixtures. However, turfgrass quality and color were acceptable or better under the conditions of these studies.

Fairway Overseeding Results

Overseeding buffalograss cultivars maintained under fairway mowing heights with 'Bighorn' blue fescue resulted in improved turfgrass quality when compared to non-overseeded

grasses (Figure 6). The 'Bighorn' blue fescue seemed to blend well with the buffalograss from a color perspective. Turfgrass color and quality ratings were higher for turfs overseeded with 2.0 versus 1.0 lbs/1000 ft² of 'Bighorn' blue fescue. Turfgrass quality ratings over the growing season differed by cultivar with 'Prestige' having the highest mean quality rating for the season (Figure 6). 'Prestige' is a tetraploid cultivar that is planted vegetatively and has demonstrated earlier spring green-up when compared to the other cultivars tested in this trial. It also tends to hold its green color longer into the fall season. This growth response likely contributed to its higher quality ratings on a season-long basis, even when overseeded with the blue fescue.

Turfgrass color ratings taken in November, 2005 demonstrated the benefit of overseeding buffalograss with blue fescue (Figure 7). The non-overseeded buffalograss color ratings ranged from 1.0 to 2.9 and represents the typical color of dormant buffalograss turfs, while the overseeded turfs had color ratings ranging from 5.0 to 7.1. Overseeded turfs had a similar appearance to Kentucky bluegrass turfs growing in areas adjacent to this study.

The results from the seeding rate and date studies and those from the fairway buffalograss trials indicate that buffalograss turfs overseeded with blue fescue in the fall provide improved quality and color and extend the green appearance both earlier and later in the growing season. Overseeding with blue fescue in the fall resulted in the best turfgrass color and quality. Spring overseeding resulted in poor turfgrass establishment, lack of uniformity, and lower turfgrass quality ratings than fall or fall/spring overseedings. Turfgrass quality, color, and shoot density responded linearly to fine fescue overseeding rates for buffalograss maintained at rough heights of cut.

In the later fairway study, lower seeding rates of 1.0 to 2.0 lbs/1000 ft² (10 to 20 g/m²) of blue fescue provided satisfactory turfgrass quality ratings and extended turfgrass green cover well into November. Blue fescue overseeded in the fall extended the green cover response by more than

two months in the rough height of cut study. The results obtained in these trials support the use of blue fescue and buffalograss mixtures as a means of enhancing turfgrass color retention and prolonging the green cover response compared to that of non-overseeded buffalograss turfs.

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