Cultural Practice Effects on the Transition of Overseeded Meadow Fescue and Tetraploid Ryegrass

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Photo by Josh Summerford

Overseeding trials at the University of Arkansas in Fayetteville

Summary. Overseeding is a common practice used by turf managers in the southern and transition zone to provide actively growing, green turf surfaces during the winter dormancy of warm-season grasses such as bermudagrass. The most commonly used turf species for overseeding is perennial ryegrass due to its excellent turf quality and rapid establishment. Continued improvements in perennial ryegrasses have resulted in cultivars that persist into the summer and interfere with the spring green-up of bermudagrass. Two new turf species, meadow fescue and tetraploid perennial ryegrass, have demonstrated good turf characteristics in overseeding as well as easier spring transition. Turf managers often employ various cultural practices to hasten the spring transition of an overseeded species back to bermudagrass. The objective of this study was to determine the effect of some commonly used cultural practices, including aerification, scalping, vertical mowing and a combination of scalping and vertical mowing, on the transition of these new species. Cultural practices did not improve spring transition period to bermudagrass regardless of the overseeding species.

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The demand for year-round, high quality sports turf surfaces has resulted in the practice of overseeding becoming more common at all levels of turf management. The most common turf species used in overseeding is perennial ryegrass (*Lolium perenne*). Overseeding is commonly done in the fall when hybrid bermudagrass (*Cynodon dactylon*, *C. dactylon* x *C. transvaalensis*) enters dormancy, and ideally, the overseeded species will naturally die out in the spring when temperatures increase and bermudagrass breaks dormancy. In such cases, perennial ryegrass acts as an annual species; however, improvements in the heat tolerance of perennial ryegrass cultivars have increased the tendency of this species to act as a perennial when overseeded, and persist late into the summer interfering with the spring green-up of bermudagrass (Horgan and Yelverton, 2001).

Currently, there are two solutions for the problem of overseeded perennial ryegrass persisting into the summer. An overseeding species with less heat tolerance, such as annual ryegrass (*Lolium multiflorum*), can be used but annual ryegrass produces inferior turf quality compared to perennial ryegrass. Alternatively, a spring application of herbicide to remove perennial ryegrass from the bermudagrass is a more expensive solution for species transition.

Recent breeding efforts have resulted in two overseeding species that have turf characteristics more similar to those of perennial ryegrass, but with a much earlier and complete spring transition. Both tetraploid perennial ryegrass (*Lolium perenne*, 2n=4x=28) and meadow fescue (*Festuca pratensis*) have shown promise for use as overseeding species due to good turf quality and early spring transition (Richardson et al., 2007). Although these species have proven to transition earlier than diploid perennial ryegrass there may still be a need to hasten the transition in an effort to increase the number of growing days for the bermudagrass. Chemical transition can be very costly; therefore, an alternative means of speeding up the spring transition would be beneficial. The objective of this study was to determine the effect of four common cultural practices on the spring transition of overseeded turf to bermudagrass.

Materials and Methods

This study was conducted at the University of Arkansas Research and Extension Center, Fayetteville, Ark., on a native Captina silt loam soil. On 20 September 2006, diploid perennial ryegrass (cv. Integra), tetraploid perennial ryegrass (cv. T3), and meadow fescue (Expt. AMF29) were each seeded into 6 by 20 ft. plots at a rate 3150 pure live seeds / ft^2 (12.4, 23.4, and 13 lbs. PLS / $1000ft^2$ for diploid ryegrass, tetraploid ryegrass, and meadow fescue, respectively). An unseeded control was also used in this study as a comparative standard for bermudagrass green-up. Five cultural practices, including core-aerification, scalping, vertical mowing, and scalping + vertical mowing, and an untreated control were applied to each overseeding species beginning on 22 March 2007, and continuing every two weeks until the conclusion of the study on 29 June 2007. All species and cultural practice treatments were applied in four replicate plots. Digital image analysis was used to determine percent green turf cover (Richardson et al., 2001) and assess turf injury, and visual estimates of the amount of bermudagrass present in the plots was assessed bi-weekly as a measure of transition (1 = little to no bermudagrass, 5 = 50% bermudagrass, 9 = 100% bermudagrass).

Results and Discussion

Bermudagrass presence. Cultural practices had little effect on hastening the transition to bermudagrass in this study (Fig. 1). The only significant differences among cultural practices occurred on the 6 June evaluation, when bermudagrass presence was rated significantly higher (~ 7) in meadow fescue and tetraploid ryegrass plots receiving vertical mowing treatments. In contrast, bermudagrass presence for these species was rated at 5 or below where no cultural practices were applied. However, by mid-June, bermudagrass presence was similar within species, regardless of cultural practice treatment.

The tetraploid perennial ryegrass and meadow fescue had similar transition during the final month of the study regardless of cultural practice (Fig. 1). The diploid perennial ryegrass had the slowest transition and had the least bermudagrass present in the plots during the same period. The improved transition of meadow fescue and tetraploid ryegrass was very evident beginning on the 6 June evaluation date when both species had significantly higher amounts of bermudagrass present than the diploid perennial ryegrass regardless of treatment. This trend continued for the remainder of the trial.

Turf cover. Cultural practice treatments and overseeding species had minimal effects on turf coverage in this study (Fig. 2). The more aggressive cultural practices reduced turf coverage slightly on the first evaluation date; however, once the bermudagrass began to green-up, turf cover remained near 100% regardless of treatment. Also, on the earliest evaluation date, the non-overseeded control had less green turf cover than overseeded plots, due to the fact that the bermudagrass was still in the process of breaking winter dormancy. There were no species differences in green turf coverage throughout the remainder of the study.

In summary, cultural practices did very little to improve the transition of overseeding grasses back to bermudagrass, similar to earlier studies (Horgan and Yelverton, 2001). Implementing these cultural practices was very labor intensive when considering the time required to both treat the turf and remove excess debris. Therefore, there is little evidence that cultural practices provide a significant benefit over natural transition. However, this study further demonstrates the improved transition that occurs with the two new species, tetraploid perennial ryegrass and meadow fescue.

Literature Cited

Horgan, B.P. and F.H. Yelverton. 2001. Removal of perennial ryegrass from overseeded bermudagrass using cultural methods. Crop Sci. 41:118-126.

Richardson, M.D., D.E. Karcher, and L.C.Purcell. 2001. Quantifying turfgrass cover using digital image analysis. Crop Sci. 41:1884-1888.

Richardson, M.D., K.W. Hignight, R.H. Walker, C.A. Rodgers, D. Rush, J.H. McCalla, and D.E. Karcher. 2007. Meadow fescue and tetraploid perennial ryegrass-two new species for overseeding dormant bermudagrass. Crop Sci. 47:83-90.

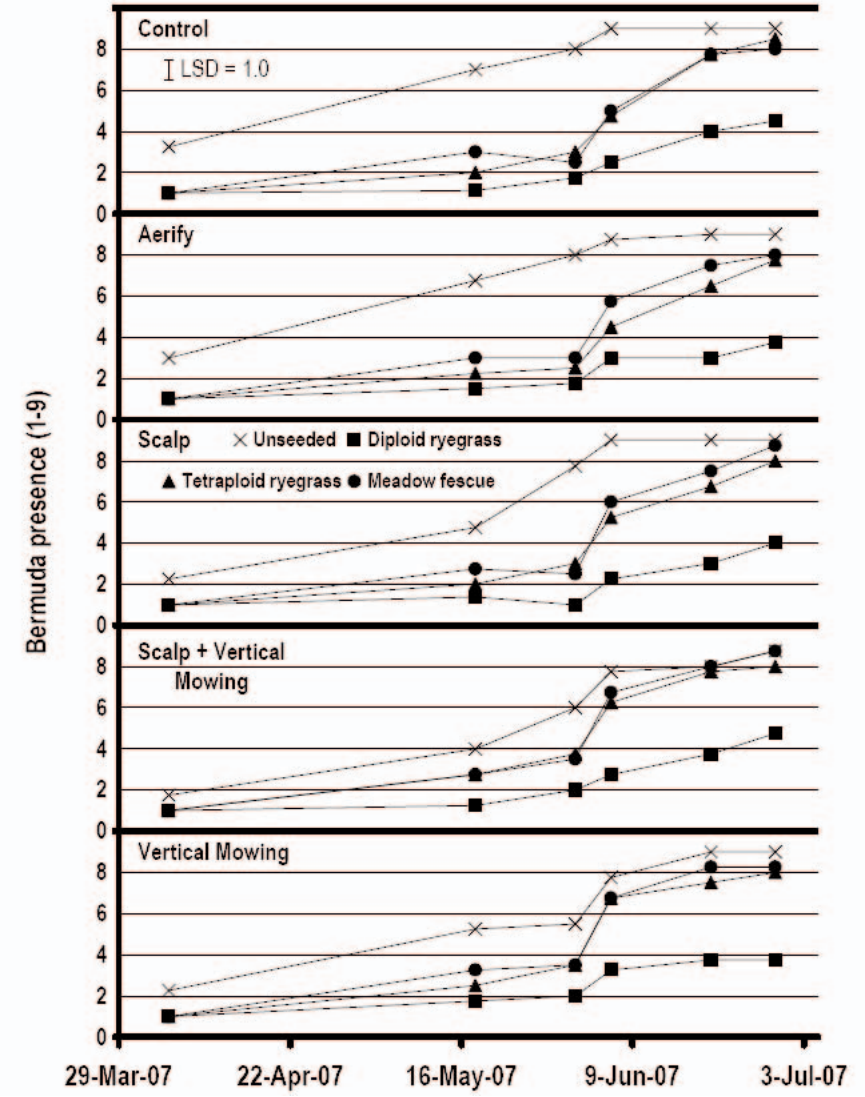

Fig. 1. Bermudagrass presence (1-9, 1 = little to no bermudagrass, 5 = 50% bermudagrass, 9 = 100% bermudagrass) within an overseeded turf as affected by a species x cultural practice interaction. Error bar represents Fisher's least significant difference value, within cultural practices and dates ($\alpha = 0.05$). Cultural practices included untreated (Control), core-aerification (Aerify), scalping (Scalp), scalping + vertical mowing (Scalp + Vertical), and vertical mowing (Vertical Mowing).

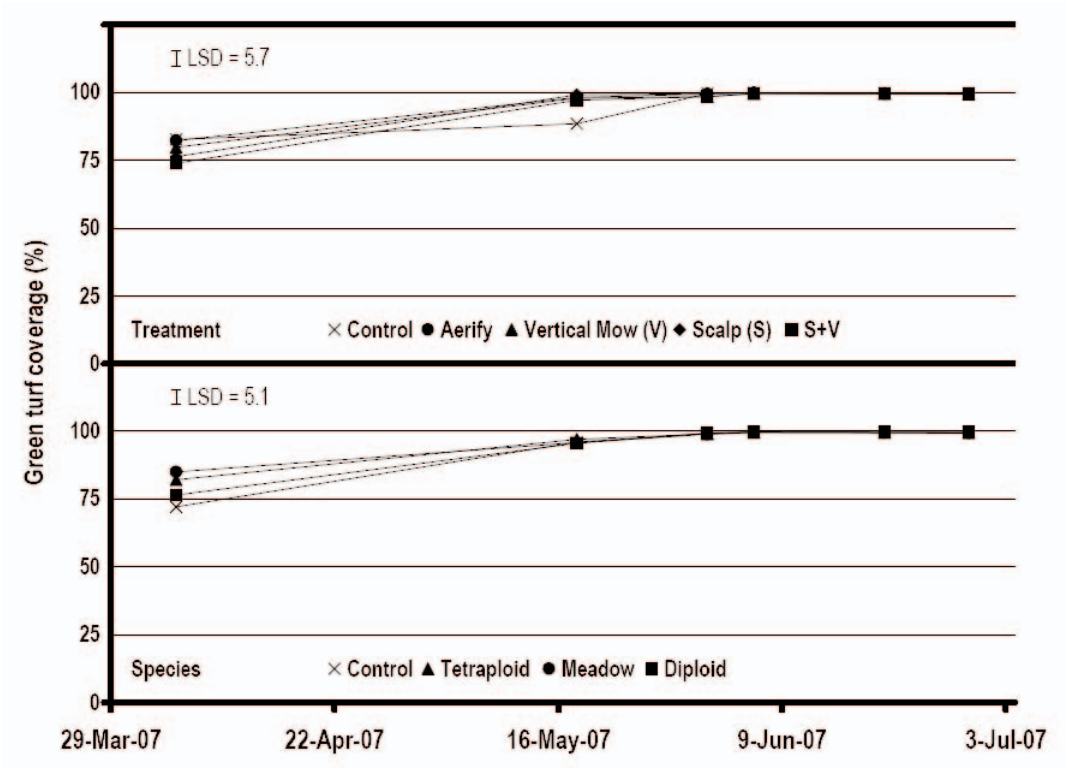

Fig. 2. Turf coverage as affected by overseeding species (bottom) and cultural practice (top). Cultural practices included untreated (Control), core-aerification (Aerify), scalping (S), scalping + vertical mowing (S+V), and vertical mowing (V). Species displayed were bermudagrass (Control), tetraploid perennial ryegrass (Tetraploid), meadow fescue (Meadow), and diploid perennial ryegrass (Diploid). Error bar represents Fisher's least significant difference value, within dates ($\alpha = 0.05$).