Successful Bermudagrass Overseeding is Dependent on Species Selection and Pre-plant Cultivation, and Traffic Timing

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Photo by Jon Trappe

Differences in overseeding treatments

Summary. Overseeding cool-season turfgrass into dormant or semidormant warm-season turf is a practice implemented by turfgrass managers to improve aesthetics and provide an actively growing playing surface. This study was conducted to determine the effects of three pre-plant cultivation techniques and post-seeding traffic on the establishment of five overseeding turfgrass species. In September 2007, five overseeding species, including annual ryegrass, intermediate ryegrass, meadow fescue, perennial ryegrass, and tetraploid perennial ryegrass, were established into Riviera bermudagrass. Pre-plant cultivation techniques included core-aerification, vertical mowing, and an untreated control. Traffic was applied at either 1, 2, or 4 weeks after seeding to determine their effect on overseeding establishment. Plots aerified before seeding resulted in the greatest overseeding turf coverage in November 2007 and March 2008. Perennial and annual ryegrass overseeded plots had the highest turf coverage among overseeding species in November 2007; however, annual ryegrass had less coverage than perennial ryegrass in March 2008. Traffic was more damaging when applied 4 WAP (weeks after planting) than 1 or 2 WAP.

Abbreviations: WAP, weeks after planting; AR, annual ryegrass; IR, intermediate ryegrass; MF, meadow fescue; PR, perennial ryegrass; TR, tetraploid perennial ryegrass; pure live seed (PLS)

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Although some form of pre-plant cultivation technique such as scalping, verticutting, or aerifying is commonly used by turf managers, knowledge of their effectiveness is based largely on anecdotal observations; and thus a need exists to evaluate these methods. Research that has investigated verticutting alone as a pre-plant cultivation technique found that it is more effective for overseeding grass establishment than a non-treated control (Schmidt, 1970). Schmidt and Blaser (1962) concluded that verticutting was a more effective establishment technique for turfgrass coverage than aerification. Recently, researchers have investigated other cool-season turfgrass species for winter overseeding. Richardson et al. (2007) found that meadow fescue (*Festuca pratensis*) and tetraploid perennial ryegrass (*Lolium perenne*) provided acceptable turfgrass quality when overseeded into a bermudagrass stand.

Overseeding turf stands are often subjected to traffic. However, little is known about the effects of traffic as well as timing after seeding and their affect on establishment. It is important to know when play can resume on an overseeded field so that turf managers can more effectively establish an overseeded stand of turf. The objective of this study is to determine the effects of three pre-plant cultivation techniques and traffic on the establishment of five overseeding turfgrass species.

Materials and Methods

On 24 September 2007, five cool-season turfgrasses, including annual ryegrass (*Lolium multiflorum*), intermediate ryegrass (*L. multiflorum* x *L. perenne*), meadow fescue, perennial ryegrass (*L. perenne*), and tetraploid perennial ryegrass were overseeded into a mature (>4 yr) stand of Riviera bermudagrass (*Cynodon dactylon*) turf at the University of Arkansas Agricultural Research and Extension Center at Fayetteville. Species were seeded based on recommended seeding rates (Table 1). Plots were assigned one of three pre-plant cultivation treatments of aerification, verticutting, or an untreated control. Traffic was applied using a Cady traffic simulator (Henderson et al., 2005) making four passes at 1, 2 or 4 weeks after planting (WAP) or an untreated control. Digital image analysis was used to determine turfgrass coverage of the overseeded species when the bermudagrass turf was dormant (Richardson et al., 2001).

Results and Discussion

Perennial and annual ryegrass had the greatest overall turfgrass coverage among the species evaluated in November 2007; however, in March 2008, annual ryegrass had less coverage than perennial ryegrass (data not shown). This may be attributed to the annual life cycle of annual ryegrass. Meadow fescue consistently had the lowest overall turfgrass coverage across all treatments. This may be expected due to its poor traffic and cold tolerance when used as a sports turf (Summerford et al., 2008).

Aerification proved to be a better pre-plant cultivation method for overseeding grass germination and survival than verticutting (Fig. 1). Traffic applied 4 WAP was more detrimental than at 1 and 2 WAP in all overseeding species except perennial ryegrass (Fig. 1). Although previous research has shown tetraploid ryegrass to be similar in traffic tolerance to perennial ryegrass in an established stand of turf (Summerford et al., 2008), perennial ryegrass had greater traffic tolerance during establishment. Aerification was the only pre-plant cultivation technique that helped reduce damage from traffic on seedlings. This may be the result of reduced compaction from the aerification.

These findings will help turfgrass managers to more effectively establish overseeding grasses and ultimately improve the playing conditions of sports fields and golf courses. These results demonstrate that differences exist between overseeding species, pre-plant cultivation technique, and traffic timing and tolerance. Based on these first year results, turfgrass managers would have best overseeding establishment by using aerification as a pre-plant cultivation technique and perennial ryegrass as a species. This study

was repeated in the fall of 2008 and those data will be presented in the 2010 Arkansas Turfgrass Report.

Literature Cited

Henderson, J.J., J.L. Lanovaz, J.N. Rogers, III, J.C. Sorochan, and J.T. Vanini. A new apparatus to simulate athletic field traffic: the Cady traffic simulator. Agron. J. 97:1153-1157.

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 ryegrass–two new species for overseeding dormant bermudagrass turf. Crop Sci. 47:83-90.

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

Schmidt. R.E. 1970. Overseeding cool-season turfgrasses on dormant bermudagrass for winter turf. Proc. First Int. Turf Conf. 1:124-126.

Schmidt, R.E. and R.E. Blaser. 1962. Establishing winter bermuda putting turf. USGA Journal of Turf Management 15:30-32.

Summerford, J.A., D.E. Karcher, M.D. Richardson, A.J. Patton, and J.B. Boyd. 2008. Seeding rate effects on the quality and traffic tolerance of overseeded meadow fescue and tetraploid perennial ryegrass. Arkansas Turf-grass Report 2007. Ark. Ag. Exp. Stn. Res. Ser. 557:91-95.

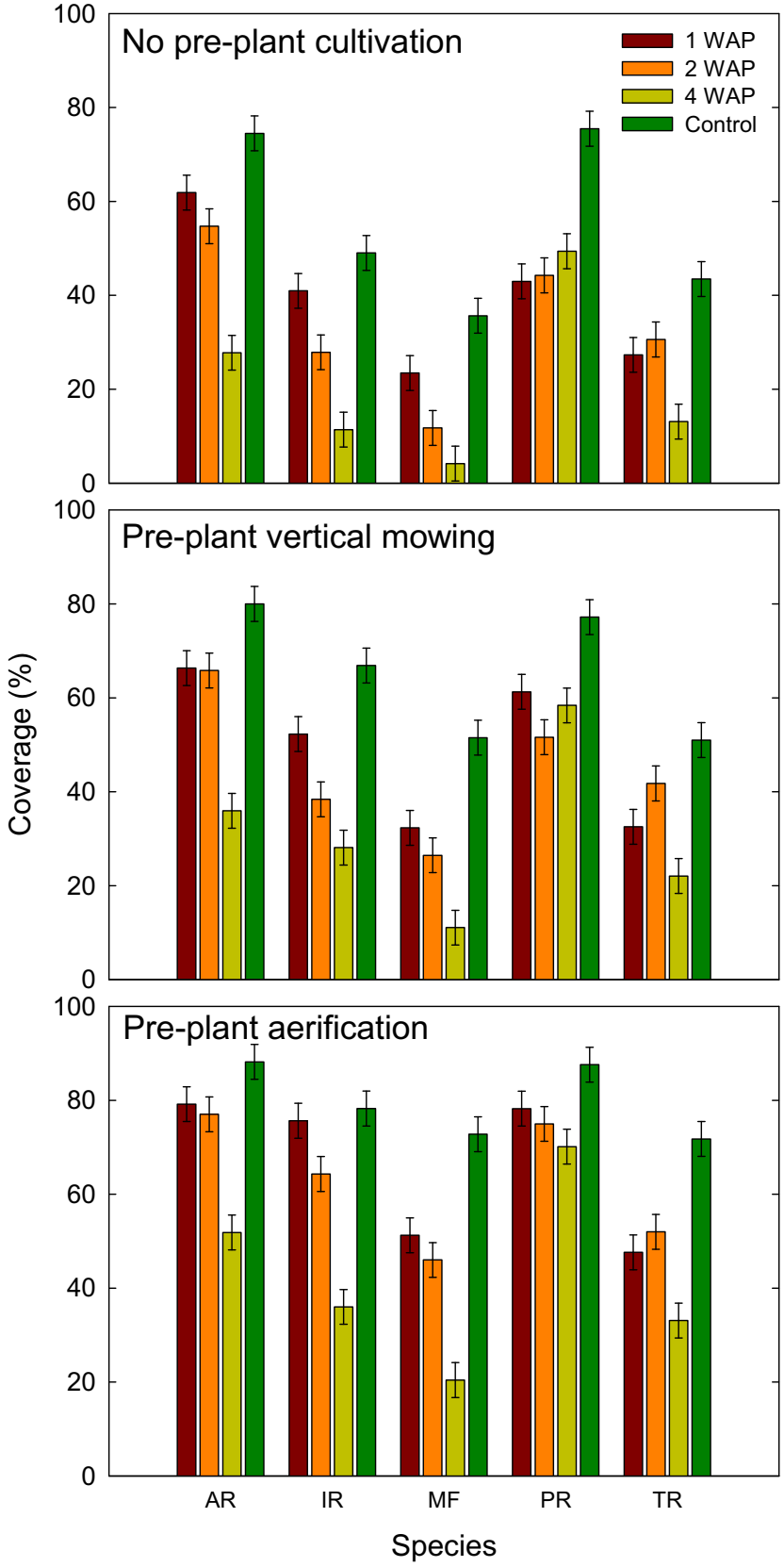

Fig. 1. The effect of three pre-plant cultivation techniques and four traffic timings on November coverage of five overseeding grasses. WAP, weeks after planting; AR, annual ryegrass; IR, intermediate ryegrass; MF, meadow fescue; PR, perennial ryegrass; TR, tetraploid perennial ryegrass.

Table 1. Overseeding species and their corresponding seeding rates.

Species	Seeding rate (lb./1000 ft^2)[z]	Seeds / ft^2[y]
annual ryegrass	14	3150
intermediate ryegrass	13	3150
meadow fescue	13	3150
perennial ryegrass	12	3150
tetraploid perennial ryegrass	19	3150

[z] Seeding rate represents pounds of pure live seed (PLS) per unit area.
[y] Amount of seeds per unit area, displays relative seeding rate for differing species.