Impact of Common Annual Bluegrass Control Programs on Overseeded Meadow Fescue and Tetraploid Ryegrass

Ryan Rolfe[1], Mike Richardson[1], John McCalla[1], John Boyd[2], Aaron Patton[3], and Doug Karcher[1]

Additional index words: *Lolium perenne, Festuca pratensis, Poa annua,* fairway

Rolfe, R., M. Richardson, J. McCalla, J. Boyd, A. Patton and D. Karcher. 2008. Impact of common annual bluegrass control programs on overseeded meadow fescue and tetraploid ryegrass. Arkansas Turfgrass Report 2007, Ark. Ag. Exp. Stn. Res. Ser. 557:71-75.

Photo by Mike Richardson

Overseeded grasses treated with herbicides during establishment

Summary. Because of its long dormancy period, bermudagrass is often overseeded with a cool-season grass species in the fall to provide a green surface during cool weather. Recently, two new grass species, meadow fescue and tetraploid perennial ryegrass, have shown promise for use in overseeding situations. The objective of this study was to determine how typical annual bluegrass management strategies used on overseeded perennial ryegrass will perform on these new species. Several annual bluegrass control programs commonly used on diploid perennial ryegrass were tested on tetraploid perennial ryegrass and meadow fescue. Meadow fescue was more sensitive to ethofumesate, foramsulfuron, and fenarimol, which were relatively safe on other species. Meadow fescue was also significantly injured by bispyribac-sodium, having an almost 50% reduction in cover compared to the untreated control.

Abbreviations: DBS, days before seeding; WAE, weeks after emergence

[1] University of Arkansas, Department of Horticulture, Fayetteville, Ark. 72701
[2] University of Arkansas, Cooperative Extension Service, Little Rock, Ark. 72201
[3] University of Arkansas, Cooperative Extension Service, Department of Horticulture, Fayetteville, Ark. 72701

Bermudagrass (*Cynodon* spp.) is a warm-season grass that grows best under high temperatures and mild winters. When average temperatures drop below 50°F, growth stops and the turf begins to discolor as it enters winter dormancy. In many regions where bermudagrass is used, this species can be partially or completely dormant for up to 6 months, which is undesirable for many sporting activities. To combat this problem, the practice of overseeding a cool-season turfgrass immediately prior to the start of the dormant period can produce a dense green playing surface for use when the bermudagrass is dormant. The overseeded turfgrass is treated like an annual plant and is managed during the cool periods of the growing season and then removed chemically or culturally when bermudagrass resumes active growth in late spring.

Recently, two new overseeding species, tetraploid perennial ryegrass (*Lolium perenne*, 2n = 4x = 28) and meadow fescue (*Festuca pratensis*), have shown promise as alternatives to traditional overseeding grasses (Richardson et al., 2007). These two new overseeding species show promise because of their desirable transition characteristics. However, very little is known about the management of these species compared to diploid perennial ryegrass (*L. perenne*, 2n=2x=14), which is the major turfgrass species for overseeding bermudagrass athletic turf. The objective of this study was to determine how annual bluegrass (*Poa annua*) control strategies that are commonly used for overseeded perennial ryegrass will affect the establishment and performance of these new species.

Materials and Methods

A field study was conducted during the 2006-2007 season at the University of Arkansas Research and Extension Center in Fayetteville, Arkansas. The study was conducted on two different soil types, including a native soil and a sand-capped rootzone. The sand-capped site had a 5-inch base of medium-coarse sand over a native Captina silt loam. Three overseeding species, including diploid perennial ryegrass (cv. Integra), tetraploid perennial ryegrass (cv. T3), and meadow fescue (Expt. AMF29) were compared to a non-overseeded control. Overseeding grasses were established in a mature Tifway bermudagrass turf on both soil types and were seeded at rates designed to produce equal seeding densities for each species (Table 1). The plots were maintained before and after overseeding under simulated fairway conditions, with a mowing height of 0.5 inch.

Eight herbicide treatments were applied at a rate and timing consistent with manufacturers' recommendations (Table 2). Herbicides and timings included prodiamine (Barricade) at 45 days before seeding (DBS), dithiopyr (Dimension) at 45 DBS, pronamide (Kerb) at 45 DBS, fenarimol (Rubigan) at two applications 14 days apart with last application at 14 DBS, two rates of foramsulfuron (Revolver) at 7 DBS, ethofumesate (Prograss) at 2 weeks after emergence (WAE), bispyribac-sodium (Velocity) at 8 WAE and a non-treated control. All herbicides were applied in a spray volume of 39.4 gallons / A at a spray pressure of 30 psi with a CO_2-propelled backpack sprayer.

Days to germination were assessed by visually checking plots daily and recording the germination date. Germination vigor was visually assessed weekly and recorded on a scale of 1 to 9 with 1 = poor germination vigor and 9 = excellent germination vigor. Visual herbicide phytotoxicity ratings were taken on all plots weekly and rated on a 1 to 9 scale with a 1 = no injury and a rating of 9 = dead turf. Turfgrass establishment rate was quantified weekly using digital image analysis (Richardson et al., 2001).

Results and Discussion

None of the herbicides tested in this study delayed germination of tetraploid ryegrass (Table 2). The two rates of foramsulfuron slightly delayed germination of diploid ryegrass and meadow fescue, but the short delay (< 1 day) from these herbicides did not reduce establishment (Fig. 1). Prodiamine also delayed germination in the meadow fescue by 1 day (Table 2) but did not reduce establishment (Fig. 1).

Turfgrass coverage was assessed weekly and was not affected in any species by fenarimol, dithiopyr, or pronamide (Fig. 1). Turfgrass coverage of tetraploid ryegrass was affected by two herbicides, foramsulfuron_high and bispyribac-sodium, and coverage of diploid ryegrass was slightly reduced by bispyribac-sodium at one observation date (Fig. 1). Several herbicides significantly reduced coverage of meadow fescue, including ethofumesate, foramsulfuron, prodiamine, and bispyribac-sodium (Fig. 1). The most damaging herbicide on all species was bispyribac-sodium, which reduced the coverage of meadow fescue nearly 50% compared to the untreated control.

In summary, many annual bluegrass control herbicides that have been commonly used on diploid perennial ryegrass behaved similarly on tetraploid perennial ryegrass and meadow fescue. However, meadow fescue was more sensitive to specific herbicides that are relatively safe on other species, including ethofumesate, foramsulfuron, and fenarimol. Meadow fescue, diploid perennial ryegrass, and tetraploid perennial ryegrass were significantly injured by bispyribac-sodium, with meadow fescue having an almost 50% reduction in cover compared to the untreated control. Therefore, bispyribac-sodium should not be used on newly overseeded turf for the control of annual bluegrass based on these findings.

Literature Cited

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.

Table 1. Number of pure live seeds per pound and seeding rates for the three overseeding grass species.

Species	Seed counts	Seeding rate	Seeding density
	pure live seeds / lb	lb / 1000 ft^2	PLS / ft^2
Tetraploid ryegrass	135097	23.4	3158
Meadow fescue	242245	13	3158
Diploid ryegrass	254089	12.4	3158

Table 2. Effects of various annual bluegrass control programs on days until germination of three overseeding grasses.

Herbicide	Product Rate	Diploid ryegrass	Tetraploid ryegrass	Meadow fescue
	per acre	---------- germination (days after seeding) ----------		
prodiamine (Barricade)	12 oz	8.5	8.6	9.3
dithiopyr (Dimension)	8 fl oz	8.3	8.5	8.4
pronamide (Kerb)	2 lbs	8.5	8.5	8.5
ethofumesate (Prograss)	0.75 gal	8.4	8.6	8.3
fenarimol (Rubigan)	261 fl oz	8.4	8.5	8.3
foramsulfuron-low (Revolver)	13 fl oz	8.9	8.5	8.9
foramsulfuron-high (Revolver)	26 fl oz	9.0	8.6	8.6
byspiribac-sodium (Velocity)	2 oz	8.4	8.5	8.4
untreated control		8.4	8.5	8.5
LSD (0.05)		0.4	ns	0.4

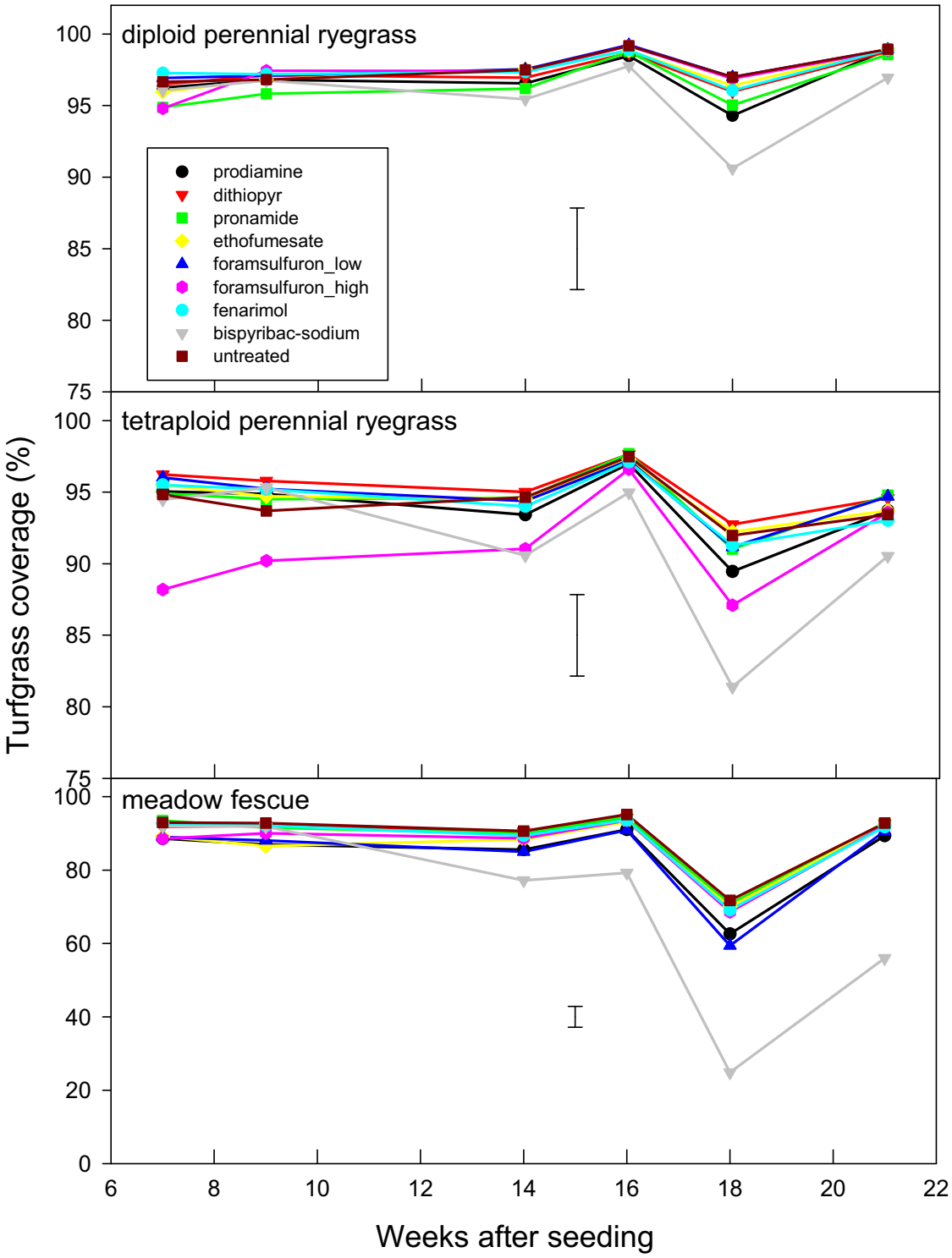

Fig. 1. Turfgrass coverage of three overseeding grass species, as affected by various *Poa annua* control programs. Error bars can be used to determined statistical differences (P=0.05) between treatments within a species and rating date.