

Dormant Seeding Bermudagrass into an Overseeded Stand of Ryegrass Turf

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Dew on dormant-seeded bermudagrass plots

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Summary. It has been demonstrated that improved cultivars of seeded bermudagrass can be dormant-seeded during the winter and this approach may provide turf managers with an alternative means to renovate damaged areas of turf. However, bermudagrass sports field are often overseeded with a cool-season grass during times of dormancy and the overseeded grass may prevent establishment of the dormant-seeded bermudagrass. This project was conducted to determine if dormant seeding into a stand of overseeded turf is an effective means of establishment. ‘Riviera’ bermudagrass was seeded on three different dates, including March (dormant seeding), April, and June.

In addition, six herbicides, including an untreated control, were applied to each of those seeding-date treatments to selectively remove competition from the perennial ryegrass. Bermudagrass establishment was improved by herbicide application, but was not affected by seeding date. Roundup and Revolver provided the highest bermudagrass coverage compared to the other herbicide treatments. Establishment of seeded bermudagrass into an overseeded stand of perennial ryegrass turf was improved with herbicide use, regardless of the seeding date.

Abbreviations: PGR (plant growth regulator)

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Bermudagrass (*Cynodon* spp.) sports fields are often overseeded with perennial ryegrass (*Lolium perenne*) to maintain high-quality playing conditions during the dormant season. However, overseeded perennial ryegrass can be a persistent and problematic weed, especially in the transition zone (Horgan and Yelverton, 2001). To combat the persistence of overseeded perennial ryegrass, turf managers often choose to chemically remove (transition) the cool-season grass when bermudagrass initiates growth in the spring. Some of the commonly used herbicides for removing overseeded grasses are from the sulfonylurea class, including Revolver (foramsulfuron), Monument (trifloxysulfuron), and Katana (flazasulfuron) (Willis et al. 2007; Yelverton et al. 2003). Previous studies have demonstrated that seedling bermudagrass is relatively tolerant of a range of post-emergent herbicides, but it is unclear how these herbicides might interact when applied during the establishment of a seeded bermudagrass into an overseeded turf.

Studies have shown that dormant seeding of bermudagrass is an effective means of establishment (Shaver, 2006), with successful establishment occurring when seeding bermudagrass as early as February in Arkansas. However, those studies were conducted on non-overseeded turf and there have been no studies that have attempted dormant seeding of bermudagrass in a turf that has been overseeded with a cool-season grass such as perennial ryegrass. The objectives of this research are to determine if dormant seeding is an effective method of establishing seeded bermudagrass in a turf overseeded with perennial ryegrass and to determine the effects of transition herbicide applications on establishment of seeded bermudagrass.

Materials and Methods

This research was conducted at the University of Arkansas Agricultural Research and Extension Center in Fayetteville, Arkansas, on a sandcapped area where six inches of medium-coarse sand was placed over the native silt loam soil. This site has been developed to simulate a

sand-capped athletic field. Prior to initiating the studies, an area of Tifway bermudagrass was eradicated using Roundup near the end of the summer in 2007. The entire area was seeded with Integra perennial ryegrass on 12 October 2007 at a rate of 12 lb pure live seed/1000 ft². The overseeded perennial ryegrass was maintained as a simulated athletic field, with a mowing height of 0.75 inches.

Plots were seeded with 'Riviera' bermudagrass at a rate of 1.0 lb pure live seed/1000 ft². Three seeding dates were tested in this study, including 6 March, 17 April, and 19 June, 2008. The March seeding date was considered a dormant seeding date, April was considered a spring seeding date, and June considered a summer, post-transition seeding date. Seed was applied using a drop seeder (Gandy Company, Owatonna, Minn.) and then topdressed with 0.25 inch of dry sand. Plots were irrigated twice daily until bermudagrass reached an acceptable percent of emergence. Irrigation was then reduced to three times a week the rest of the growing season.

Herbicide treatments included five herbicides (Roundup, Katana, Revolver, Monument, Kerb) and an untreated control (Table 1). With the exception of Roundup, the herbicide treatments were chosen based on their use in the turfgrass industry as a means of chemically removing perennial ryegrass from a bermudagrass turf. These herbicides were all applied on 25 May 2008, a timing that would reflect a typical time to remove perennial ryegrass from an overseeded athletic field. The Roundup treatment was applied seven days prior to each seeding date to remove all competition from the ryegrass prior to seeding the bermudagrass.

The dates for first germination were determined by daily visual evaluation of each seeded plot. Two weeks after germination was observed, a seedling stand count was determined for each specific treatment. Small rings were made from PVC pipe (3-inch diam.) and were tossed into each plot and seedlings within each ring were counted. The rings were tossed four times into each plot with the average of each seedling count taken.

Four weeks after germination, percentage bermudagrass coverage was determined and continued until full coverage was reached or until bermudagrass dormancy. A 2 by 2-ft grid was constructed that contained 121 intersects of string. The grid was randomly tossed into each plot and the presence or absence of bermudagrass was determined at each intersection and converted into a coverage percentage. The experimental design for the study was a split-plot design with four replications. The whole-plot treatment was seeding date, and plot size was 15 by 15 ft. Herbicide treatments were applied as the split-plot in 5 by 5-ft plots.

Results and Discussion

There was a significant herbicide x seeding date interaction for both dates of first germination (Fig. 1) and seedling density (Fig. 2). For both the dormant (March) and spring (April) seeding dates, germination was first observed in the Roundup-treated plots (Fig. 1). Bermudagrass germination also occurred earlier in plots treated with Katana, Revolver, Kerb, and Monument compared to the untreated control, but germination in those treatments was delayed compared to the Roundup treatment. Roundup-treated plots had the highest seedling density in the dormant-seeded (March) plots but were not statistically different from Revolver, Monument, and Katana in the April and June seeding dates (Fig. 2). Kerb reduced seedling density for all seeding dates compared to the Roundup and was only different from the untreated plots on the March seeding date (Fig. 1). Kerb tends to be persistent in the soil and will affect any plant tissue with which the compounds come in contact. Therefore, seedling development may be negatively affected. Williams and Burrus (2002) suggested that Kerb, when compared to plant growth regulators (PGRs), was an effective means of renovating from perennial ryegrass to seeded bermudagrass, but Kerb-treated plots didn't reach full coverage.

Bermudagrass establishment was significantly influenced by herbicide application but was not affected by seeding date. There was no seeding date x herbicide interaction. All herbi-

cides enhanced turfgrass coverage over the untreated control (Fig. 3). Roundup and Revolver provided the highest bermudagrass coverage when compared to other treatments. At the end of the data collection period, the sulfonylurea herbicides and Roundup provided greater turfgrass coverage than the untreated control and Kerb; however, the Kerb enhanced bermudagrass establishment when compared to the untreated control. Roundup was the most effective treatment as it eliminated all competition from the ryegrass (Fig. 4) and allowed normal germination and development of the bermudagrass, regardless of seeding date.

Regardless of the seeding date, seeding into an overseeded stand of turf will not be an effective means of establishment without some form of herbicide use; however, all of the sulfonylureas improved bermudagrass establishment when compared to the untreated control and were more effective than Kerb at reducing ryegrass competition and enhancing bermudagrass establishment. Applying Roundup prior to seeding resulted in an excellent stand of bermudagrass with all seeding dates, including the dormant seeding, due to the fact that competition was completely removed.

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.
- Shaver, B.R., M.D. Richardson, J.H. McCalla, D.E. Karcher, and P.J. Berger. 2006. Dormant seeding bermudagrass cultivars in a transition-zone environment. *Crop Sci.* 46:1787-1792.
- Williams, D.W. and P.B. Burrus. 2004. Renovation of perennial ryegrass fairways with seeded bermudagrasses. *USGA Turfgrass and Environmental Research Online* 1(7):1-6.
- Willis, J.B., D.B. Ricker, and S.D. Askew. 2007. Sulfonylurea herbicides applied during early establishment of seeded bermudagrass. *Weed Tech.* 21:1035-1038.
- Yelverton, F. 2003. A new herbicide for weeds in bermudagrass and zoysiagrass. *Golf Course Mgmt.* 71:119-122.

Table 1. Herbicide treatments used in study.

Herbicide	Trade name	Rate oz / acre	Application timing
glyphosate	Roundup	32	7 days before seeding
foramsulfuron	Revolver	12	25-May
trifloxysulfuron	Monument	0.2	25-May
pronamide	Kerb	16	25-May
flazasulfuron	Katana	2	25-May

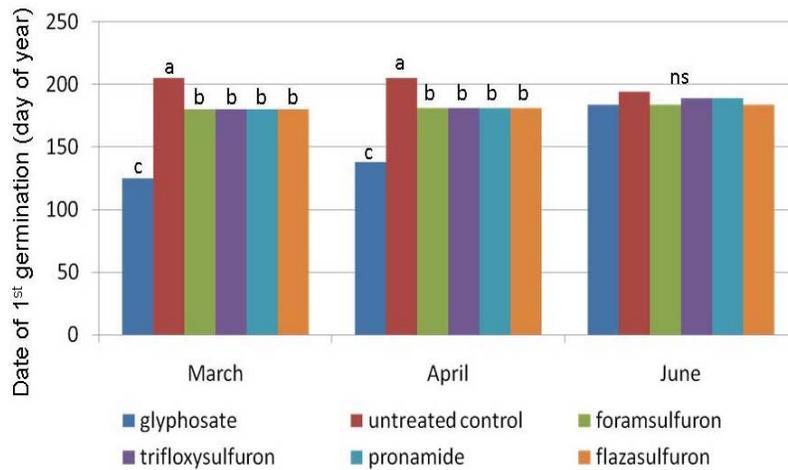


Fig. 1. Herbicide x seeding date effects on date (day of year) of first observed germination of bermudagrass seedlings. Different letters within a seeding date indicate a significant effect of herbicide (P=0.05). ns – not significant

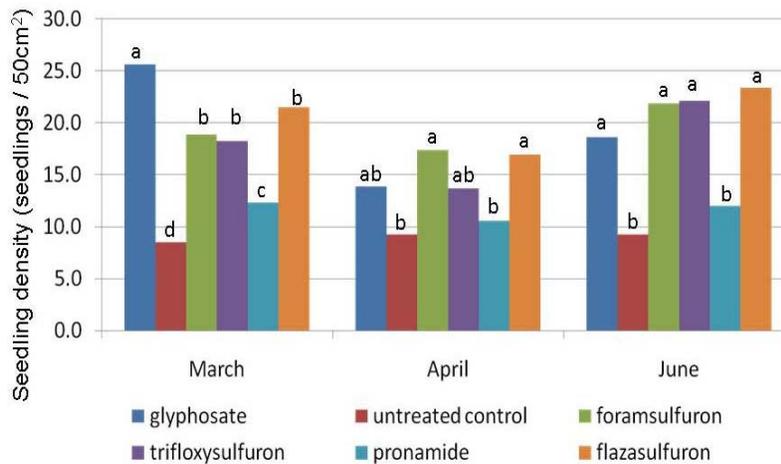


Fig. 2. Herbicide x seeding date effects on bermudagrass seedling stand density at two weeks after first germination was observed. Different letters within a seeding date indicate a significant effect of herbicide (P=0.05).

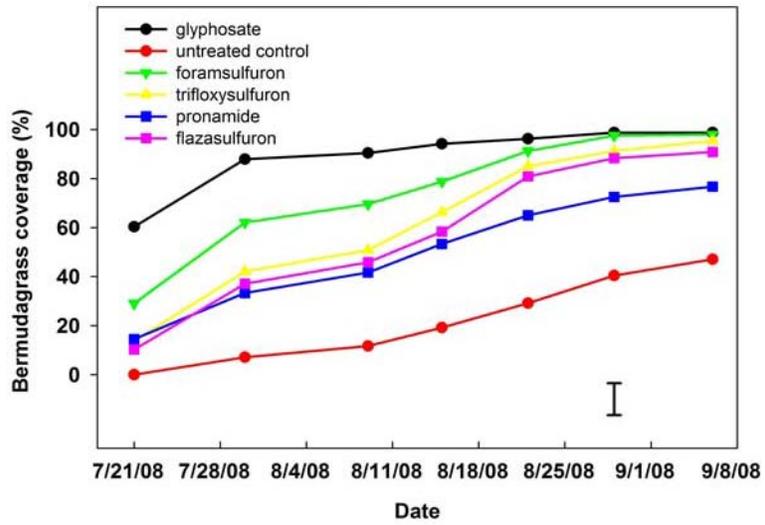


Fig. 3. Bermudagrass coverage as affected by date and herbicide treatment. Error bar can be used to separate differences in date or herbicide (LSD=0.05).



Fig. 4. Perennial ryegrass control with Roundup in dormant seeding treatments. Photo taken 19 March 2008.