Seed Covers and Germination Blankets Influence Seeded Warm-Season Grass Establishment–Year 2

Photo by Aaron Patton

Various seed cover technologies

Aaron Patton[1], Jon Trappe[1], and Mike Richardson[2]

Additional index words: bermudagrass, buffalograss, centipedegrass, seashore paspalum, zoysiagrass, *Cynodon dactylon, Buchloe dactyloides, Eremochloa ophiuroides, Zoysia japonica, Paspalum vaginatum*

Patton, A., J. Trappe, and M. Richardson. 2009. Seed covers and germination blankets influence seeded warm-season grass establishment–year 2. Arkansas Turfgrass Report 2008, Ark. Ag. Exp. Stn. Res. Ser. 568:69-72.

Summary. Covers and blankets are often used to reduce erosion, retain soil moisture, increase soil temperature, and enhance plant germination and establishment rates. There are reports of various effects of seed cover technology on the germination and establishment of warm-season grasses. The objective of this study was to determine how diverse seed covers influence the establishment of seeded bermudagrass, buffalograss, centipedegrass, seashore paspalum, and zoysiagrass. Plots were seeded on 9 June 2007 with various species and covered with seed-cover technologies including Curlex, Deluxe, Futerra, jute, poly jute, polypropylene, straw, straw blanket, thermal blanket, and an uncovered control. Overall, Curlex, Deluxe, Futerra products, jute, poly jute, straw blankets, thermal blankets and the untreated check allowed for the greatest establishment of these seeded warm-season grasses. Uncovered plots performed well in 2008 suggesting that seed covers are not always needed for successful establishment. Typically, most seed-cover technologies are useful for the establishment of warm-season grasses from seed, especially for reducing erosion during establishment.

Abbreviations: PLS (pure live seed)

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

Covers and blankets are often used to protect turf during winter and spring, to warm the soil and increase germination rates, and also to reduce erosion. Seed germination blankets allow light penetration and gas exchange, facilitate soil warming, and increase soil moisture-holding capacity, all of which increase germination rates without the risk of excessive temperature build-up. It is known that germination of warm-season turfgrasses increases as temperatures rise, with maximum germination rate occurring between 86 and 95°F (Portz et al., 1981; Zuk et al., 2005).

Yu and Yeam (1967) reported that the germination rate of zoysiagrass (*Zoysia japonica*) seed could be doubled by using a polyethylene film, and Portz et al. (1993) found that clear polyethylene covers placed over the seedbed for 7 or 14 days after seeding increased germination and zoysiagrass coverage in Illinois and Maryland. Other materials tested such as straw (80 lb/1000 ft^2), did not enhance germination because they excluded light and reduced soil temperatures (Portz et al., 1993). Organic fiber mats increased establishment when used in non-irrigated areas, likely due to increased soil moisture retention, but did not increase establishment when used in irrigated plots (Hensler et al., 2001). Anecdotal evidence suggests that porous germination blankets could also be useful for increasing bermudagrass and zoysiagrass germination and coverage (Patton et al., 2004).

Overall, past research shows different effects from cover technologies, but no broad comparison has been made between different cover technologies. Additionally, no cover research has been done with seeded seashore paspalum (*Paspalum vaginatum*), and very little work with seeded bermudagrass (*Cynodon dactylon*), buffalograss (*Buchloe dactyloides*), and centipedegrass (*Eremochloa ophiuroides*). The objective of this study is to determine how various seed covers influence the germination and establishment of five seeded warm-season grasses.

Materials and Methods

Research was conducted at the Arkansas Agricultural Research and Extension Center, Fayetteville, Ark. Experiments were seeded 1 July 2008 with bermudagrass at a rate of 1.0 lb. pure live seed (PLS)/1000 ft^2, zoysiagrass at a rate of 2.0 lb. PLS/1000 ft^2, seashore paspalum at a rate of 1.0 lb. PLS/1000 ft^2, centipedegrass at a rate of 0.5 lb. PLS/1000 ft^2, and buffalograss at a rate of 8.0 lb. PLS/1000 ft^2. Prior to seeding, the experimental area was tilled and raked to prepare the soil for seeding. The plot area was fumigated with methyl bromide in the spring of 2007, which provided a weed-free site on which establishment of various grasses could be closely monitored.

After seeding, plots were covered with various germination blanket technologies (Table 1). Plots were irrigated as needed to maintain a moist seed bed for four weeks after seeding based upon the frequency of natural rainfall. Temporary covers (Table 1) were removed 14 days after seeding. The experimental design was a split block with three replications. Both cover technology and species were applied as strips. Turfgrass coverage was determined by visual estimates.

Results and Discussion

There was a significant cover x species interaction and thus cover data will be presented separately by species. Bermudagrass coverage was greatest for plots covered with Deluxe, Futerra, Futerra netless, jute, poly jute, thermal blanket, and the untreated check. Bermudagrass coverage was least for straw-covered plots. These results are similar to those recorded in 2007 except for the uncovered check, which had less coverage than most cover technology treatments (Patton et al., 2008).

Buffalograss coverage was greatest for plots covered with Curlex, Deluxe, Futerra, Futerra netless, jute, poly jute, straw blanket, thermal blanket, and the untreated check. Buffalograss coverage was least in the polyethylene- and straw-covered plots. These results are similar to previous results except for the uncovered check and the thermal blanket, which had less coverage than most cover technology treatments in 2007 (Patton et al., 2008).

Centipedegrass coverage was greatest for plots covered with Curlex, Deluxe, Futerra, Futerra netless, Jute, Poly Jute, straw blanket, thermal blanket, and the untreated check. Centipedegrass coverage was least in the polyethylene- and straw-covered plots. These results are similar to previous results except for the uncovered check, Deluxe, and the thermal blanket, which had less coverage than most cover technology treatments in 2007 (Patton et al., 2008). Thus, polyethylene and straw are not recommended for centipedegrass establishment.

Seashore paspalum coverage was greatest for plots covered with Deluxe, Futerra, Jute, Poly Jute, and the untreated check. Seashore paspalum coverage was least for plots covered with Curlex, Futerra netless, polyethylene, straw, straw blanket, and the Thermal blanket. In 2007, seashore pasaplum establishment was least for Curlex, straw, straw blankets, and the uncovered check (Patton et al., 2008). Based on data for both years, avoid the use of straw, straw blanket, clear polyethylene (based on poor 2008 results), uncovered soil (poor results in 2007), and Curlex to establish seashore paspalum from seed, and instead use Futerra original, Futerra netless, poly jute, jute, or Deluxe to establish seashore paspalum from seed.

Zoysiagrass coverage was similar for all cover treatments except for straw-covered plots, which had significantly lower coverage. In both years, Futerra products and Curlex allowed for the most zoysiagrass establishment (Patton et al., 2007) and thus are recommended for use in establishing zoysiagrass, although other technologies will provide acceptable results.

Overall, Curlex, Deluxe, Futerra products, jute, poly jute, straw blanket, thermal blanket and the untreated check allowed for the greatest establishment of these seeded warm-season grasses in 2008. Across years, Deluxe, Futerra products, jute, poly jute, and thermal blanket allowed for the greatest establishment of these seeded warm-season grasses. Polyethylene-covered plots reduced coverage in 4 of the 5 species in 2008, which was likely due to temperature build-up under these covers (data not shown). Straw-covered plots reduced establishment in both years of the study, likely due to shading of seedlings. Uncovered plots performed well in 2008 and poorly in 2007, suggesting that seed covers are not always needed for successful establishment but that they are useful. Typically, most seed cover technologies are useful for the establishment of warm-season grasses from seed, especially for reducing erosion during establishment.

Literature Cited

Hensler, K.L., B.S. Baldwin, and J.M. Goatley. 2001. Comparing seeded organic fiber mat with direct soil seeding for warm-season turfgrass establishment. HortTechnology 11:243-248.

Patton, A.J., G.A. Hardebeck, D.W. Williams, and Z.J. Reicher. 2004. Establishment of bermudagrass and zoysiagrass by seed. Crop Sci. 44:2160-2167.

Patton, A.J., J.M. Trappe, and M.D. Richardson. 2008. Seed covers and germination blanket technologies influence the establishment of seeded warm-season grasses. Arkansas Turfgrass Report 2007, Ark. Ag. Exp. Stn. Res. Ser. 557:42-46.

Portz, H.L., J.J. Murray, and D.Y. Yeam. 1981. Zoysiagrass (*Zoysia japonica* Steud.) establishment by seed. Int. Turfgrass Soc. Res. J. 4:113-122.

Portz, H.L., K.L. Diesburg, J.J. Murray, and M.J. Dozier. 1993. Early establishment of zoysiagrass with seed under covers. Int. Turfgrass Soc. Res. J. 7:870-876.

Yu, T.Y. and D.Y. Yeam. 1967. Effects of stratification, coverings of sand and cover of polyethylene film on germination of *Zoysia japonica* seeds. Seoul National Univ. J. of Agric. and Biology series (B) 18:18-25.

Zuk, A.J., D.J. Bremer, and J.D. Fry. 2005. Establishment of seeded zoysiagrass in a perennial ryegrass sward: Effects of soil-surface irradiance and temperature. Int. Turfgrass Soc. Res. J. 10:302-309.

Table 1. Cover technologies tested in the trial.

Cover technology	Cover construction	Cover type
Clear polyethylene cover 4 mil (0.1 mm, 4/1000")	Polyethylene	Temporary
Curlex, natural color	Curled excelsior aspen wood fiber mat	Permanent
Deluxe (0.5 oz crop protection fabric), Dewitt Company	[z]	Temporary
Futerra F4 Netless, natural color, Profile Products LLC (6.5' × 90')	[z]	Permanent
Futerra original, natural color, Profile Products LLC (82" × 135')	[z]	Permanent
Jute mesh erosion control mat (mesh fabric)	[z]	Permanent
Poly Jute erosion control blanket, Dewitt Company	Polypropylene multifilament yarn	Permanent
Straw [y], (Portz et al., 1993)	[z]	Permanent
Straw blanket with polypropylene netting	Straw and polypropylene	Permanent
Thermal blanket (3 oz.) Dewitt Company	Polypropylene	Temporary
Uncovered check		

[z] Information about the material used to construct the covers was not readily available on company websites.
[y] 80 lbs / 1000ft^2.

Table 2. Turfgrass coverage for various seeding blankets five weeks after planting.

Cover treatment	Species					Average
	Bermudagrass	Buffalograss	Centipedegrass	Seashore	Zoysiagrass	
	---------- turfgrass coverage (%) ----------					
Deluxe	92.6 a [z]	88.3 a	63.3 a	66.7 a	50.0 a	72.2
Jute	83.3 ab	83.3 ab	58.3 ab	53.3 abc	46.7 a	65.0
Uncovered check	86.6 ab	78.3 ab	53.3 ab	60.0 ab	41.7 a	64.0
Futerra	75.0 ab	73.3 abc	60.0 ab	51.7 abc	41.7 a	60.3
Poly Jute	85.0 ab	73.3 abc	41.7 ab	53.3 abc	33.3 ab	57.3
Thermal blanket	73.3 ab	71.7 abc	51.6 ab	40.0 bcd	48.3 a	57.0
Futerra F4 Netless	71.6 ab	68.3 abc	53.3 ab	41.7 bcd	41.7 a	55.3
Curlex	68.3 b	73.3 abc	58.3 ab	31.7 cd	40.0 ab	54.3
Straw blanket	65.0 b	78.3 ab	45.0 ab	28.3 d	31.7 ab	49.7
Polyethylene	68.3 b	53.3 c	18.3 c	28.3 d	46.7 a	43.0
Straw	35.0 c	61.7 bc	38.3 bc	20.0 d	18.3 b	34.7
Average	73.1	73.0	49.2	43.2	40.0	55.7

[z] Within columns, means followed by the same letter are not significantly different (LSD, α= 0.05).