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Turfgrass Establishment on Plastic Utilizing Contrived Growth Media

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Introduction

Turfgrass establishment is as important a practice as any other method of turfgrass management. Today, high quality turfgrass stands on athletic fields and golf courses are in greater demand than ever before. Not only does the quality of turfgrass have to be acceptable, but the pressures of providing a playable turfgrass stand for immediate use also exists. Sodding is a method of turfgrass establishment that has a demonstrated ability to provide an instant turfgrass cover. However, conventional sodding only provides an instant turfgrass cover, and depending on environmental conditions, the newly sodded area, like a soccer field, will only be ready for play once the root systems have regenerated. Sod establishment on plastic is a unique method of turfgrass establishment that posses the ability to provide an instant turfgrass cover with immediate pliability versus conventional sodding. Root shearing is eliminated when sod is produced on plastic which enables the newly laid sod to establish in a much shorter period of time than conventional sodding. Another advantage of sod production on plastic is the ability to grow turfgrasses on a wide variety of growth media. Selecting a specific growth media for turfgrass establishment on plastic possesses many advantages. For instance, selecting a soil less growth media eliminates potential soil layering problems commonly associated with conventional sodding practices. The selection of the growth media can also be cost effective. Refined wood fiber erosion mats, and pine bark mulches are relatively cheap materials that can be used as a growth media for turfgrass establishment on plastic. The objective of this study is to determine what growth media produces the best sod for two turfgrass species. The two turfgrass species selected were *Poa supina* var. 'Supranova' and *Poa pratensis* var. 'Touchdown'. Both species are cool season turfgrasses used for athletic fields. *Poa pratensis* has a rhizomatous growth habit, and *Poa supina* has a stoloniferous growth habit; which, makes them excellent turfgrasses for sod production. The four growth media selected for this study are: pine mulch, sand, refined wood fiber mat, and SportGrass™ back filled with sand. The pine mulch consists of shredded wood pieces that have a relatively low water holding capacity. Wood mulch is a growth media currently used for sod production on plastic. The second media is sand, and is very unstable on the plastic when there is no established turfgrass for support. The refined wood fiber mat (Ecomat™) provides a light weight and stable surface for turfgrass establishment. Finally, SportGrass™ is a woven polyethylene mat with synthetic strands intended to provide additional support for the turfgrass. The four different media were selected because of the current and potential use for athletic fields. A future experiment will be done to compare the effects of the four growth media under athletic field conditions.

Material and Methods

The experimental design was a 2 by 4 factorial randomized complete block design with three replications. Each of the 24 plots were 9 feet by 12 feet, and were set up on 6 mil polyethylene sheeting at the Hancock Turfgrass Research Center, on the campus of Michigan State University. The seeding rate for both turfgrass species was 1.6 lbs seed per 1000 ft^2. The plots were prepared and seeded on 3 June 1996. The sand and pine mulch were applied at at 0.75 inch depth, and the SportGrass™ was back filled with 1 inch of sand. Lebanon Country Club 13-25-12 starter fertilizer was applied at 1 lb. N. per 1000 ft^2 on 3 and 10 June 1996. Unfortunately, 2.8 inches of rain on 17 June 1996 washed out the entire study. The experiment was reestablished on 12 August 1996, using the same procedure as the first experiment. Fertilizer applications were made at the beginning of each week for the first four weeks using the 13-25-12 starter fertilizer at 1 lb. N. per 1000 ft^2. Three fertilizer applications beginning on 13 Sept. 1996 and ending on 11 October 1996, were applied every two weeks using Lebanon Country Club 18-3-18 fertilizer at 0.5 lbs. N. per 1000 ft^2. Irrigation was applied as needed using an automatic irrigation system, and by hand watering. The hand watering was required because, the four growth media each had a different watering requirement. Density ratings (% turfgrass cover) was measure 2, 3, 5, and 10 weeks after seeding. This experiment will be repeated again in the summer of 1997.

Results and Discussion

Table 1 is an ANOVA table indicating the significance of the two treatment effects, for percent turfgrass cover, at 2, 3, 5, and 10 weeks after seeding. The *Poa supina* showed slightly higher turfgrass density at 2, 3, 5, and 10 weeks after seeding; however, the difference in percent cover was only significant at 5 weeks (table 2.). The stoloniferous growth habit of the *Poa supina* may be the reason why it had a greater percent cover after 5 weeks. The spreading by stolons compared to the rhizomes exhibited by the *Poa pratensis* was more visible on the surface of each growth media thus, giving the *Poa supina* a more dense appearance. There was no significant difference between the two turfgrass species after 10 weeks.

Table 3 describes the significance of the growth media for percent turfgrass cover. The greatest differences were caused by the sand and SportGrass™ media. The pine mulch and Ecomat™ showed similar growth. The sand did the poorest of the four media selected probably because of it was very unsatabile on the plastic surface where, it was easily washed when it rained or irrigated. The SportGrass™ did much better than the other three media selected. The one inch sand top layering on the SportGrass™ provided an adequate growing surface for the establishing turfgrass. However, unlike the sand media alone, the synthetic strands of the SportGrass™ provided the necessary support during establishment. After 10 weeks the SportGrass™ had almost 100% cover (97.6) and was mature enough to be moved. The pine mulch and Ecomat™ after 10 weeks only had 35.8 and 36.7 percent cover, respectively. However, the areas with turfgrass were very dense while, the rest of the media had little or no growth. The areas where there was little or no growth were most likely a result of two extremes. The first extreme being washed by excessive rain and irrigation, and the second by drying out too fast during establishment. In order to keep one of the four media at the optimum moisture level for turfgrass establishment meant that the other three would be affected by either too much or too little water, from either the irrigation system or by rain. As a result, the SportGrass™ proved to be the most adaptable media with the varying water levels.

Table 1. Significance of Treatment Effects for Turfgrass Cover

	Weeks after seeding			
Source	2	3	5	10
Turf species (T)	n/s	n/s	*	n/s
Growth media (G)	*	**	**	**
T x G	n/s	n/s	n/s	n/s
$LSD_{(0.05)}$				

*, ** Significant at the 0.05, 0.01 probability levels, respectively

Table 2. Turfgrass Density of 2 Turfgrass Species (Averaging Growth Media)

	Weeks after seeding			
Turfgrass sp.	2	3	5	10
	Pecent cover (%)			
Poa pratensis	2.1	5.3	30.6	42.8
Poa supina	2.2	6.9	37.9	51.8
$LSD_{(0.05)}$	n/s	n/s	5.6	n/s

Table 3. Turfgrass Density on 4 Growth Media (Averaging Turf species)

Growth media	Weeks after seeding 2	3	5	10
	Percent cover (%)			
Pine mulch	1.8	5.0	15.2	35.8
Sand	1.3	2.8	12.0	18.8
Ecomat™	2.0	3.3	19.5	36.7
SprotGrass™	3.3	13.2	90.3	97.8
$LSD_{(0.05)}$	n/s	2.4	7.9	14.4

Effect of seeding ratio of Supina bluegrass and Kentucky bluegrass and fertility on turf subjected to simulated sports traffic.

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Introduction

Supina bluegrass (*Poa supina* Schrad.) has been recognized for its exceptional wear tolerance, disease resistance, and aggressive competitive ability for many years in Germany and other areas of Europe (Berner, 1980; Pietsch, 1989). Unfortunately the cost of Supina bluegrass seed is quite high, approximately $25/lb, so the practicality of seeding monostands of the grass is often economically unfeasible. Evidence from Germany suggests relatively low rates (e.g., less than 10%) of Supina bluegrass seed can be mixed with other cool season grasses and after several years of heavy traffic the stand will be predominantly Supina bluegrass, providing superior cover compared to stands without Supina bluegrass. The objective of this project was to determine the effect of seeding ratios of Supina bluegrass:Kentucky bluegrass on turf characteristics. A long-term objective is to determine the changes in stand composition over time.

Materials and Methods

Plots were established June 1995 on a sand based root zone (80:10:10, sand:peat:soil). Individual plots (10 x 18 ft) were seeded by hand (1.25 lb seed/1000 ft^2) and the seed was raked lightly into the surface. Plots were covered with hydromulch and kept moist during the germination and establishment processes. Following establishment all plots were mowed at 1.25" height with a riding triplex mower; clippings were returned. Plots were irrigated daily, or as needed in the spring and fall, using an automated irrigation system to prevent moisture stress. All plots were fertilized equally during 1995 with approximately 2.75 lb additional N/ 1000 ft^2, approximately 1 lb/1000 ft^2 additional P, and 1.5 lb/1000 ft^2 additional K. Fertilizer was applied on six dates between June through October with no more than 0.6 lb N/1000 ft^2 applied at any date. On 17 Nov. 1995 a dormant application of 1 lb/1000 ft^2 N was applied using SCU (40-0-0).

A factorial experiment was used to evaluate the effect of seeding mixtures and monostands of Supina bluegrass (SB) 'Supra' and Kentucky bluegrass (KB) 'Touchdown' on turf characteristics and eventually, changes in stand composition over time. The experimental design was a split-plot, randomized complete block with three replications. Main plots were the six seeding treatments: Trt 1=100% SB, Trt 2=50%SB:50% KB, Trt 3=75% SB:25%KB, Trt 4=10% SB:90%KB, Trt 5=5% SB:95% KB, and Trt 6=100% KB. Plots were split to evaluate the effects of low (4 lb N/1000 ft^2/year) and high (6 lb N/1000 ft^2/year) fertility levels. Nitrogen was applied at approximately a 1:1 ratio with potassium on most dates using an 18-3-18 fertilizer (Table 1).