

# **Bentgrass Establishment in Sand-based Rootzones Using Subsurface Drip Irrigation**

## **J.D. Weeaks<sup>1\*</sup>, M.A. Maurer<sup>1</sup>, R.E. Zartman<sup>1</sup>, and J.G. Surles<sup>2</sup>**

Department of Plant and Soil Science, Texas Tech University, Lubbock, TX1

Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX2



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### ***Abstract***

Greenhouse studies were performed to evaluate the feasibility of establishing seeded bentgrass in sand-based rootzones using subsurface drip irrigation (SDI). Several commercially available products were investigated. Products were mixed at several percentages by volume. Percentages by volume were 10, 20, 30, and 40. Study investigated the use of subsurface drip irrigation with tubing buried at 15 cm. All treatments contained one tube per container. Each study was conducted for six weeks and percentage coverage, moisture content, root length and plant biomass data were collected. Percentage coverage and fresh weight biomass data are presented. Data analysis confirms that seeded bentgrass can be established using subsurface drip irrigation. Many of the treatments retained consistent moisture content for the duration of the study at various soil depths. Some treatments with higher percentages of additives had greater biomass and higher percentage coverage. However, this trend did not follow for all additives. Root length followed a similar trend. Establishment of seeded bentgrass in sand-based rootzones is possible using subsurface drip irrigation.

### ***Objectives***

Several experiments were conducted to determine if a suitable rootzone mix could be used when establishing seeded bentgrass using SDI. Various amendments and sand textures were used. Each experiment differed slightly in its materials since these were initial studies. Materials used in each experiment are detailed in Table 1.

### ***Materials and Methods***

Study consisted of several commercially available amendments (Table 1) that are common in golf course putting green rootzone mixes. These products were mixed at 10, 20, 30, 40-% by volume with golf sand or finer textured golf sand. Also, one experiment contained native soil mixed at 20, 40, 60-% by volume with golf sand. Treatments consisted of using 19 liter containers for establishment. Drip irrigation tubing was placed 15 cm deep. System was designed as a loop and grid. Drainage holes were drilled in the bottom of containers. A layer of pea gravel was placed in container then rootzone mixture was added. Containers were tamped to settle contents. Containers were seeded with Dominant Plus creeping bentgrass, *Agrostis stolonifera*. Weekly moisture content and percentage coverage were taken. At the conclusion of the study fresh weight of clippings were taken as well as root length.

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Table 1. Experiment and Rootzone Mixture

Experiment	Treatment	Sand	Levels of Treatments (% of Material)
1		golf sand	
	Peat Moss (PM)		10, 20, 30, 40, 60
2		golf sand	
	Western Pozzolan-lassenite (WP)		10, 20, 30, 40
	Profile Greens (GR)		10, 20, 30, 40
	PermO <sub>2</sub> Pore (PP)		10, 20, 30, 40
	Peat Moss (PM)		10, 20, 30, 40
3		cyclone sand	
	Western Pozzolan-lassenite (WP)		10, 20, 30, 40
	Profile Greens (GR)		10, 20, 30, 40
	PermO <sub>2</sub> Pore (PP)		10, 20, 30, 40
	Peat Moss (PM)		10, 20, 30, 40

Table 2. Experiment Means at Six Weeks

Experiment 1		
Treatment	Cover (%)	Biomass (g)
PM 10	10	0.37
PM 20	20	0.56
PM 30	40	0.7
PM 40	40	2
PM 60	60	5.43
Control-Pure Sand	0	0.23

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Table 2. Experiment Means at Six Weeks (cont.)

## Experiment 2

<b>Treatment</b>	<b>Cover (%)</b>	<b>Biomass (g)</b>
WP 10	43.3	1.43
WP 20	50	1.63
WP 30	33.3	1.3
WP 40	13.3	0.73
GR 10	35.5	0.56
GR 20	5	0.1
GR 30	5	0.1
GR 40	5	0.1
PM 10	0.3	0.2
PM 20	40	2.7
PM 30	18.3	1.6
PM 40	50	5.6
Control-Pure Sand	19	0.86

## Experiment 3

<b>Treatment</b>	<b>Cover (%)</b>	<b>Biomass (g)</b>
WP 10	53.3	0.16
WP 20	36.6	0.2
WP 30	40	0.2
WP 40	58.3	0.43
GR 10	12	0.1
GR 20	7	0.1
GR 30	4	0.13
GR 40	1	0.1
PP 10	16	0.1
PP 20	18	0.1
PP 30	11	0.1
PP 40	14	0.03
Native 20	11.6	0.13
Native 40	45	2.13
Native 60	65	0.93
Control-Pure Sand	35	0.1

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## *Results*

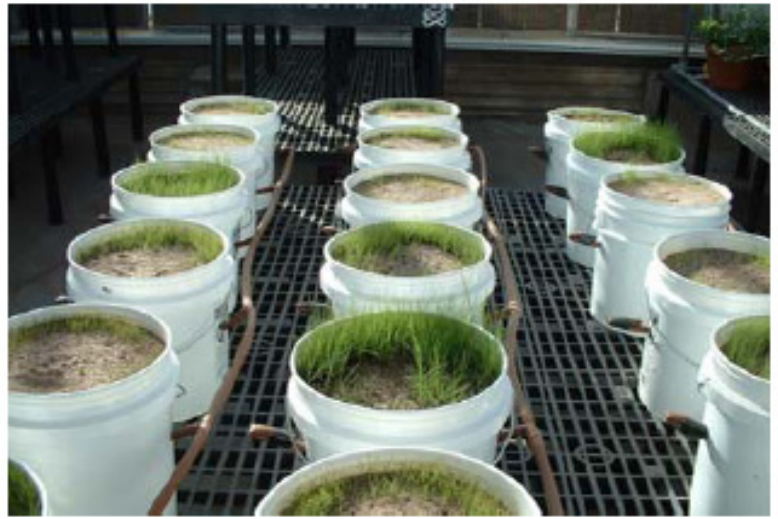
During this research a series of attempts were made to establish bentgrass using SDI (Table 2). During the course of the experiment difference texture of golf sand was used. Although many treatments did yield germination by the end of the study, the cover was quite low. Pictures of each study are shown below indicating the lack of uniformity and undesirable coverage at 6 weeks.

## *Conclusion*

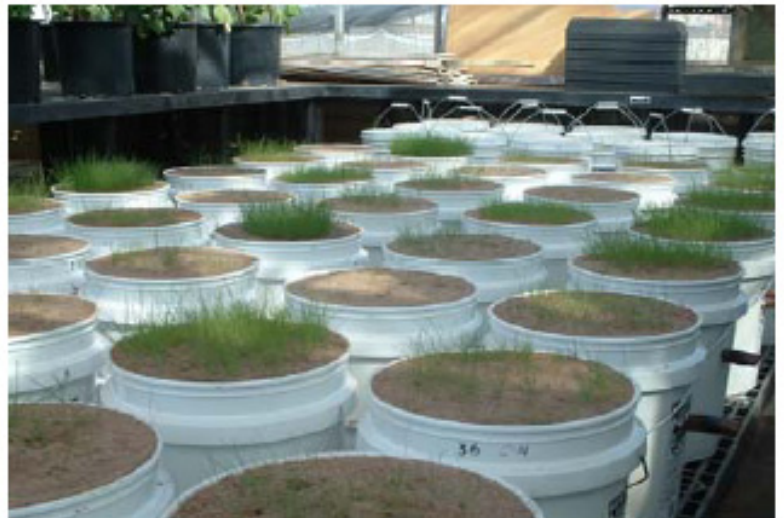
The most promising treatment in these and subsequent studies was Western Pozzolan at 30%.



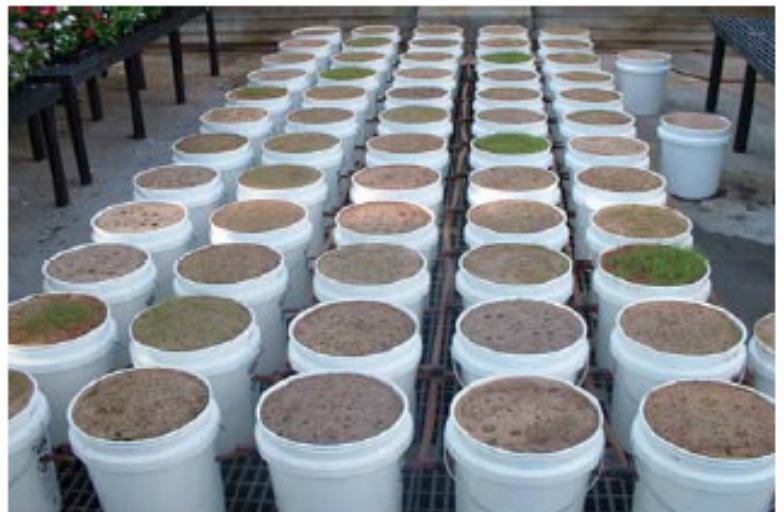
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Exp. 1 (PM at 6 weeks)



Exp. 2 (WP, GR, PM at 6 weeks)



Exp. 3 (WP, GR, PP, Native at 6 weeks)