

The Effects of AquaSmart Polymer Coated Sand Products on Turfgrass Establishment and Growth

Magdalena F. Vinson, J.C. Cole, and J. Q. Moss.

Oklahoma State University, Department of Horticulture, Stillwater, OK



Background

The turfgrass industry is one of the fastest growing segments of U.S. agriculture with approximately 50 million acres of land currently being managed as turf. A growing challenge facing the turfgrass industry is limited availability of water for irrigation.

AquaSmart Enterprises, LLC is currently marketing a super-absorbent, polymer coated sand product to the turfgrass industry. There is need for peer-reviewed research to evaluate AquaSmart's statement that their product will increase water-holding capacity, germination, and growth rates.

Research Objectives and Hypotheses

Evaluate the effects of AquaSmart on

- Establishment
- Root growth
- Soil moisture

Assess against various bermudagrass plots

- Newly seeded
- Newly sodded
- Well-established

We want to establish efficacy and ideal application of AquaSmart.

Methods

This study was conducted at the Oklahoma State University (OSU) Turfgrass Research Center in Stillwater, OK. Research plots were fertilized according to the results of soil tests run prior to the study, and were provided adequate irrigation based on reference evapotranspiration (ET). Using the reference ET data, a bermudagrass crop coefficient of 0.75 was used to irrigate all three plots.

There were 24 plots per study and treatments were assigned using a randomized complete block.

Treatments were as follows:

- Untreated Control
- Topdressing sand at 40lbs/1000 ft²
- AquaSmart at 10lbs/1000ft²
- AquaSmart at 20lbs/1000ft²
- AquaSmart at 40lbs/1000ft²
- AquaSmart at 60lbs/1000ft²



Photo 1: Newly Seeded (left) and Sodded (right) Plots two weeks post-application.

Experimental Setup and Data Collection Methodology

1. Bermudagrass New Seed Establishment

Riviera bermudagrass seed (85% germination), was seeded with a drop seeder at a rate of 11b/1000ft², with an application of N at 11b/1000ft² directly following seeding, and was then covered with seed cloth and watered (Photo 1).

2. Bermudagrass New Sod Establishment

Latitude 36 sod was placed over the treatments, fertilized with N at 11b/1000ft² and watered (Photo 1).

3. Well-Established Riviera Bermudagrass Quality and Drought Response

The research plot was aerated and cores were removed. Treatments were applied and brushed into the plot.

For all three studies the following data was collected:

- Digital images analyzed via SigmaScan software to calculate green vs. brown/black pixels.
- Soil Volumetric Water Content
- Soil Temperature
- Normalized Difference Vegetation Index (NDVI) ratings on a scale of 0-1.
- Visual quality ratings on a scale of 1-9.

For the drought study, irrigation was withheld for six weeks and plots were covered with tarps during rain events (Photo 2).



Photo 2: Drought plots with tarp setup.

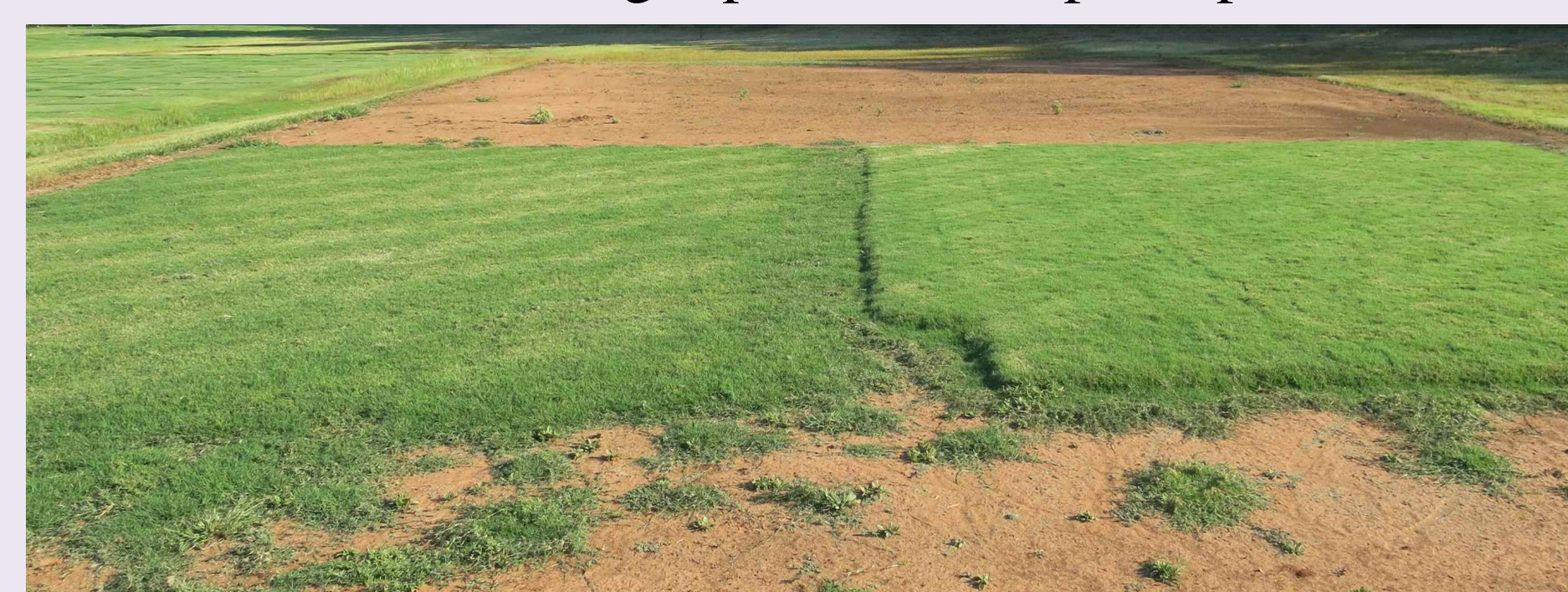


Photo 4: Seeded (right) and sodded (left) treatment plots at end of study.

Root Core Collection

On 25 September 2014 3 root cores were taken from each plot. These root cores will be analyzed for differences in root volume using a scanner and WinRhizo software and total root dry weight (Photo 3).



Photo 3: Root core

On 9 October 2014 3 root cores were collected from each new seed and new sod plot with plans to analyze them in the same manner (Photo 4).

Results and Discussion

Preliminary data analysis of new seed (Table 1) and new sod (data not shown) percent cover using a Least Significant Difference (LSD) test at the 95% confidence level for paired comparisons shows no significant differences between treatments. However, other analyses, including root core analyses, are still to be run.

Table 1: Mean Percent Cover of New Seed Establishment Under AquaSmart Treatments.

Treatment	Week 1	Week 2 Mean %	Week 3 Cover	Week 4
Control	38.301	84.82	97.597	95.456
Sand 40lbs/1000ft ²	33.969	76.27	85.075	95.423
AquaSmart 10lbs/1000ft ²	30.374	84.37	97.656	99.723
AquaSmart 20lbs/1000ft ²	26.129	73.69	96.264	99.727
AquaSmart 40lbs/1000ft ²	32.432	80.05	97.651	99.414
AquaSmart 60lbs/1000ft ²	29.841	84.61	98.280	99.328
LSD ¹	NS ²	NS ²	NS ²	NS ²

¹Least Significant Difference test between planned paired comparisons

²NS=Not Significant