

Final Report

Title: Evaluation of Commercial Products for Improving Tall Fescue Quality Under Drought Stress

Investigators: Jim Baird, Brent Barnes, and Alea Miehls
Department of Botany and Plant Sciences
2137 Batchelor Hall
University of California
Riverside, CA 92521
951-827-5630 (Office)
951-333-9052 (Cell)
jbaird@ucr.edu

Cooperators: Jere White, Green As It Gets
Michael Gentile, RootGel West

Objectives: Compare two commercial products and a standard nitrogen fertilizer for improving tall fescue turf quality in response to drought stress.

Location: UCR Turfgrass Research Facility, Riverside

Soil: Hanford fine sandy loam (coarse-loamy, mixed, superactive, nonacid, thermic Typic Xerorthent)

Experimental Design: Randomized complete block; 3 replications

Plot Size: 5 ft. x 15 ft.

Species/Cultivar: Tall Fescue (*Festuca arundinacea* Schreb.) ‘Crossfire 2’

Mowing Height: 2.25 inches; once/week

Spray Information (RootGel): CO₂ Bicycle Sprayer
TeeJet 8002 DG Nozzles
19” Nozzle Spacing
21” Boom Height
Speed: 2 mph
Output: 100 GPA
Pressure: 55 psi at tank
Calibration: 1213 ml/nozzle/minute

- Application Dates:** 8/12/2009 (all treatments applied pre-drought stress symptoms) and 8/27/2009 (second application of RootGel applied post-drought stress symptoms)
- Irrigation Regimes:** 80% ET_o/DU until first application on 8/12/09; lowered to 60% ET_o/DU thereafter.
- Data Collected:** Turf color and quality (1-9 scale, 1 = dead turf, 6 = minimally acceptable turf and 9 = best; leaf fire (0-100%); leaf tissue chlorophyll using Spectrum Field Scout CM 1000 Chlorophyll Meter (higher number = darker green turf).
- Treatments:**
1. Untreated control
 2. RootGel (GelTech Solutions; Jupiter, FL) applied post-stress on 8/27/09
 3. RootGel applied on 8/12/09 and 8/27/09
 4. TurfMax (Green As It Gets; Bakersfield, CA) applied on 8/12/09
 5. 1 lb Nitrogen from methylene Urea (40-0-0) applied on 8/12/09

Results:

- ✓ No significant differences were found among treatments for leaf firing over all rating dates, except on 9/9/09 where TurfMax produced significantly less firing compared to all treatments except nitrogen (data not shown).
- ✓ TurfMax resulted in significantly higher turf quality and chlorophyll content (i.e., darker green color) in response to drought compared to all other treatments (Tables 1 and 2). RootGel and 1 lb of nitrogen had little or no effect on turf quality or color in response to drought.
- ✓ Tall fescue turf in this study could be categorized as under fertilized prior to application of treatments. While fertilizer (i.e., nitrogen and iron) can help mask the onset of drought symptoms, previous research clearly substantiates the deleterious effects of excessive fertilization on turfgrass health and drought tolerance, not to mention the environment. It appeared that TurfMax contained considerably more nutrients that are responsible for imparting a turfgrass color response as evidenced by comparison with the standard nitrogen treatment.
- ✓ Caution should be exercised when using nutrition as a means of maintaining or protecting turf under drought or deficit irrigation. Products that are purported to save water or improve turfgrass drought tolerance should be evaluated for effects on factors such as shoot growth, rooting, and water use that were not measured in this study.

Table 1. Tall fescue turf quality ratings (1-9, 9 = best, 6 = minimally acceptable) in response to drought stress and commercial products or fertilizer. Applications were made on 8/12/09 (pre-drought stress). Second application of RootGel was made on 8/27/09 (post-drought stress).

Treatment	Rate	8/19/09	8/26/09	9/3/09	9/9/09	10/6/09
Control	-	6.3	6.0	6.3	6.0	5.7
RootGel 1 application	1 lb/A	6.0	6.0	6.0	5.7	4.7
RootGel 2 applications	1 lb/A	6.3	5.6	5.7	5.7	4.7
TurfMax	1.5 yds ³ /1000 ft ²	6.3	8.0	8.0	8.0	6.8
40-0-0	1 lb N/1000 ft ²	6.0	6.3	6.3	6.0	5.3
LSD (P=0.05)*		NS	1.5	1.2	1.0	1.0

*Treatment mean differences in columns greater than or equal to LSD are significantly different, Fisher's Protected LSD, P=0.05.

Table 2. Tall fescue chlorophyll measurements (higher value = darker green color) in response to drought stress and commercial products or fertilizer. Applications were made on 8/12/09 (pre-drought stress). Second application of RootGel was made on 8/27/09 (post-drought stress).

Treatment	Rate	8/19/09	8/26/09	9/3/09	9/9/09	10/6/09
Control	-	295	277	275	268	268
RootGel 1 application	1 lb/A	287	275	262	233	219
RootGel 2 applications	1 lb/A	295	259	252	275	264
TurfMax	1.5 yds ³ /1000 ft ²	331	422	452	421	411
40-0-0	1 lb N/1000 ft ²	318	309	300	281	266
LSD (P=0.05)*		NS	39	68	51	62

*Treatment mean differences in columns greater than or equal to LSD are significantly different, Fisher's Protected LSD, P=0.05.