Stop #7: Evaluation of Products for Alleviation of Salinity

Marco Schiavon, Pawel Petelewicz, Giulio Cremonese, Toan Khuong, and Jim Baird
Department of Botany and Plant Sciences,
University of California, Riverside, CA 92521

Objectives:

To evaluate the efficacy of products on turf to reduce stress caused by irrigation with saline water.

Methods:

The plot area was sodded with 'Tifway II' bermudagrass on 6 August 2012 on a Hanford fine sandy loam with no pre-existing salinity issues. All treatments were applied initially on 6 June 2014. The turf is mowed three times per week at 0.625 inches. Standard bermudagrass cultural practices are maintained throughout the study, including 6 lbs N/M/yr and verticutting once/yr (May). Plots are irrigated at 75% ET_0 with water that matches the same ion composition of Colorado River See table below. Every two weeks, plots were evaluated for turf quality, NDVI and volumetric soil water content. In addition Digital Image Analysis and leachate are collected on the same day. Soil samples will be collected at the end of bermudagrass growing season separately for each combination of chemical treatment and replication to assess salinity accumulation in the root zone.

Chemical properties of saline irrigation water used in this study compared to potable irrigation water used elsewhere at the UCR turfgrass facility.

	Saline Irrigation Water	**Potable Irrigation Water**
pH	7.57	7.82
Hardness	938.23	215.18
Bicarbonate	209.84	214.72
Carbonate	0.01	0.01
EC (dS/m)	4.43	0.61
Na (ppm)	523.9	53.36
Cl (ppm)	996.27	31.13
Boron (ppm)	0.11	0.08
SAR (meq/L)	18.3	3.24
Nitrate Nitrogen (ppm)	5.11	5.18
Phosphate (ppm)	0.4	0.01
Potassium (ppm)	129.76	4.16
Magnesium (ppm)	151.99	12.24
Calcium (ppm)	126.03	66
Sulfate (ppm)	707.62	78.1
Manganese (ppm)	0.01	0.01
Iron (ppm)	0.11	0.05

Treatments:

Treatments are applied by hand or using a calibrated CO_2 boom sprayer (2 gal/M). Treatments are watered in with over 1 cm of water immediately following application. For treatment list see table on next page.

Results:

For the third year in a row, DeSal was the treatment that improved turf quality and Dark Green Color Index (DGCI) the most. However, HM1239 also showed positive effects on turf quality and DGCI (Figure 1). NDVI did not detect any differences among treatments. The combination of ACA 2994 and 3245 was the only treatment that reduced EC in the leachate (Figure 2). Nevertheless, no positive effect on bermudagrass was observed on those plots.

Salinity Alleviation Study Treatment List 2015

No.	Treatment	Company	Rate	Frequency (weeks)
1	Untreated Control	--	--	--
2	ACA 2994	Aquatrols	8 oz/M	2
3a 3b	ACA 3248 ACA 2994	Aquatrols	6 oz/M 8 oz/M	2 8
4 4	ACA 2994 ACA 3245	Aquatrols	8 oz/M 8 oz/M	2 2
5a 5b	ACA 1849 Gypsum	Aquatrols	3 oz/M 5 lbs/M	2 4
6a 6b 6b	MST-1410 SMS-0114 Gypsum	Macrosorb	6 oz/M 64 oz/A 10 lbs/M	2 4 4
7 7 7	DeSal StressRx Exp 5-0-1	Ocean Organics	0.75 oz/M 6 oz/M 6 oz/M	2 2 2
8	Crossover pHacid Revert	Numerator Technologies	5 lb/M 2.5 oz/M 6 oz/M	4 2 2
9	HM9926	Helena	1.5 oz/M	2
10	HM1239	Helena	1.5 oz/M	2

Plot Plan
Salinity Alleviation Study (Field 12F-4)

North

113 1	213 4	313 2	413 5	513 3	613 7
114 2	214 7	314 10	414 4	514 2	614 5
115 3	215 2	315 3	415 7	515 6	615 4
116 4	216 10	316 5	416 10	516 9	616 2
117 5	217 3	317 7	417 1	517 10	617 3
118 6	218 5	318 4	418 8	518 7	618 1
119 7	219 1	319 9	419 2	519 5	619 8
120 8	220 8	320 6	420 9	520 4	620 6
121 9	221 6	321 1	421 3	521 1	621 10
122 10	222 9	322 8	422 6	522 8	622 9

Figure 1. Quality of treatments that performed better than control in at least one rating date.

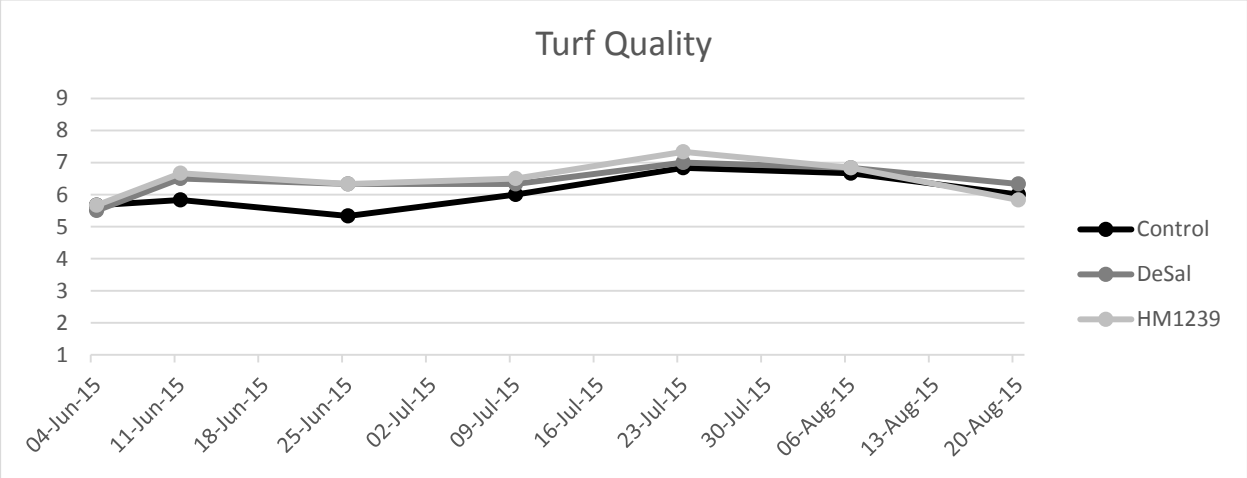

Figure 2. Quality of treatments that performed better than control in at least one rating date.

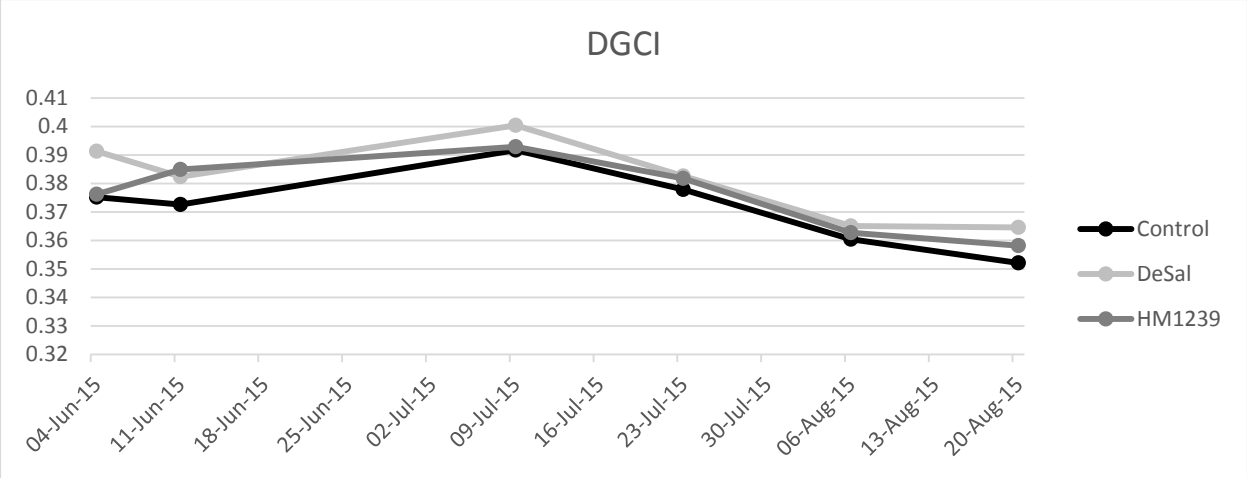

Figure 3. EC of leachate collected from plots that decreased salinity in comparison to control in at least one rating date.