Evaluation of Products for Turfgrass Water Conservation Using a Linear Gradient Irrigation System (LGIS)

MARCO SCHIAVON, **JIM BAIRD**, **TOAN KHUONG**, **JACOB GRAY**, and **KATARZYNA ZAK**
Department of Botany & Plant Sciences • University of California, Riverside

Objectives:

1. Determine effective irrigation and chemical management practices to reduce turfgrass water use.
2. Evaluate the ability of products to maintain acceptable turf quality under reduced water use.

Methods:

The LGIS area was sodded with 'Tifway II' bermudagrass on 7 August 2012 and is mowed three times weekly at 5/8 inches. The area receives ½ lb N/M/month during the growing season. Areas of each plot that receive 10, 25, 55, 60, 65, 70, 75, 80, and 85% reference evapotranspiration (ETo) were determined using catch cans to capture irrigation water. This procedure was repeated and validated every two weeks during the experiment. Both irrigation and chemical treatments were applied from September to December 2012 and resumed again on 5 April 2013. Every two weeks, plots were evaluated for turf quality, NDVI (measure of greenness), volumetric soil water content, and surface temperature in the irrigation zones representing 10 to 85% ETo.

Table 1. List of chemicals used in the LGIS study. Riverside, CA.

Number	Treatment	Type	Rate (oz/M)	Interval (d)
1	UCR006P		5.88	14
2	UCR006P		7.35	14
3	UCR006P		8.82	14
4	UCR006P		11.75	14
5	Recovery Rx	Phosphite + Nutrients	5.00	14
6	PK Plus	Phosphite + Nutrients	6.00	14
7	Kelplex	Nutrients +	2.00	7
7	Ultraplex	Surfactant	4.00	7
8	Revolution	Surfactant	6.00	28
9	Neptune	Surfactant	6.00	28
10	Aquaplus	Polyacrylamide	3.00	28
11	Primo Maxx	Plant Growth Regulator	0.30	14
12	Control	—	—	—

*All treatments applied in a carrier volume of 2 gal/M.

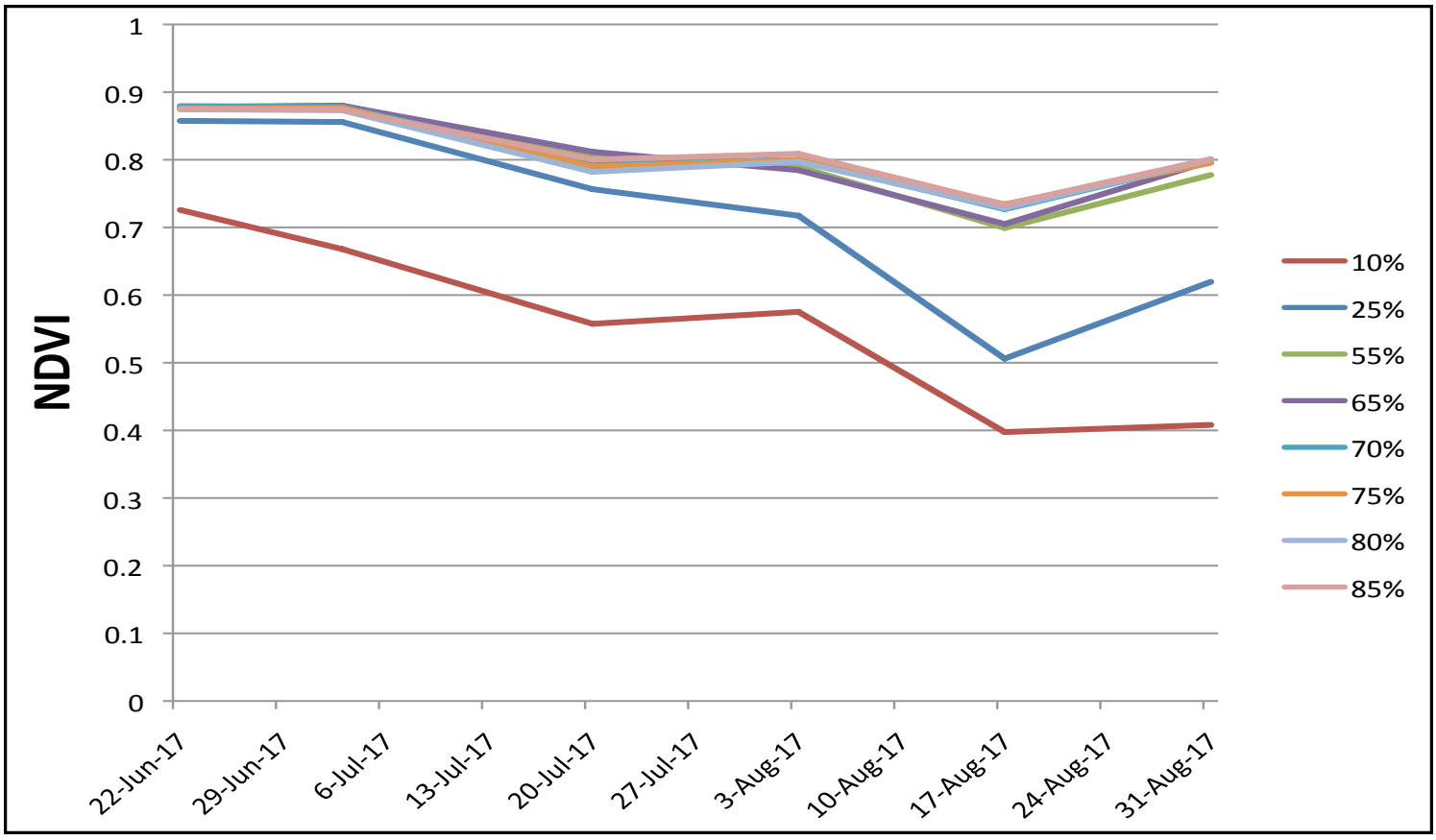

Figure 1. NDVI collected on bermudagrass plots irrigated at 10%, 25%, 55%, 65%, 70%, 75%, 80% and 85% reference evapotranspiration (ETo). Riverside, CA.

Results:

No treatment differences have been found with respect to drought response in 2012 or to date in 2013. Although chemical treatment differences are not yet detected in any of the ratings collected, ETo has a significant effect on turf quality and NDVI or "greenness." Ratings differ when ETo drops below 55%, with the 25% and 10% ETo treatment showing the lowest NDVI and turf quality. Both NDVI and turf quality decreased until 16 August. However, after a rainfall event that amounted for 1.5 inches of rain on 29 August, higher NDVI and quality were collected on the plots on 30 August (Figures 1 and 2). Overall these data support the use of warm-season (C4) turfgrass species for water conservation in southern California such as bermudagrass, which requires significantly less water (55% ETo) to maintain color and quality compared to cool-season turfgrass species. This study will continue through 2014.

Acknowledgments:

We thank the Metropolitan Water District of Southern California, California Turfgrass & Landscape Foundation (CTLF), Toro, and participating chemical companies for their continued support of this research.

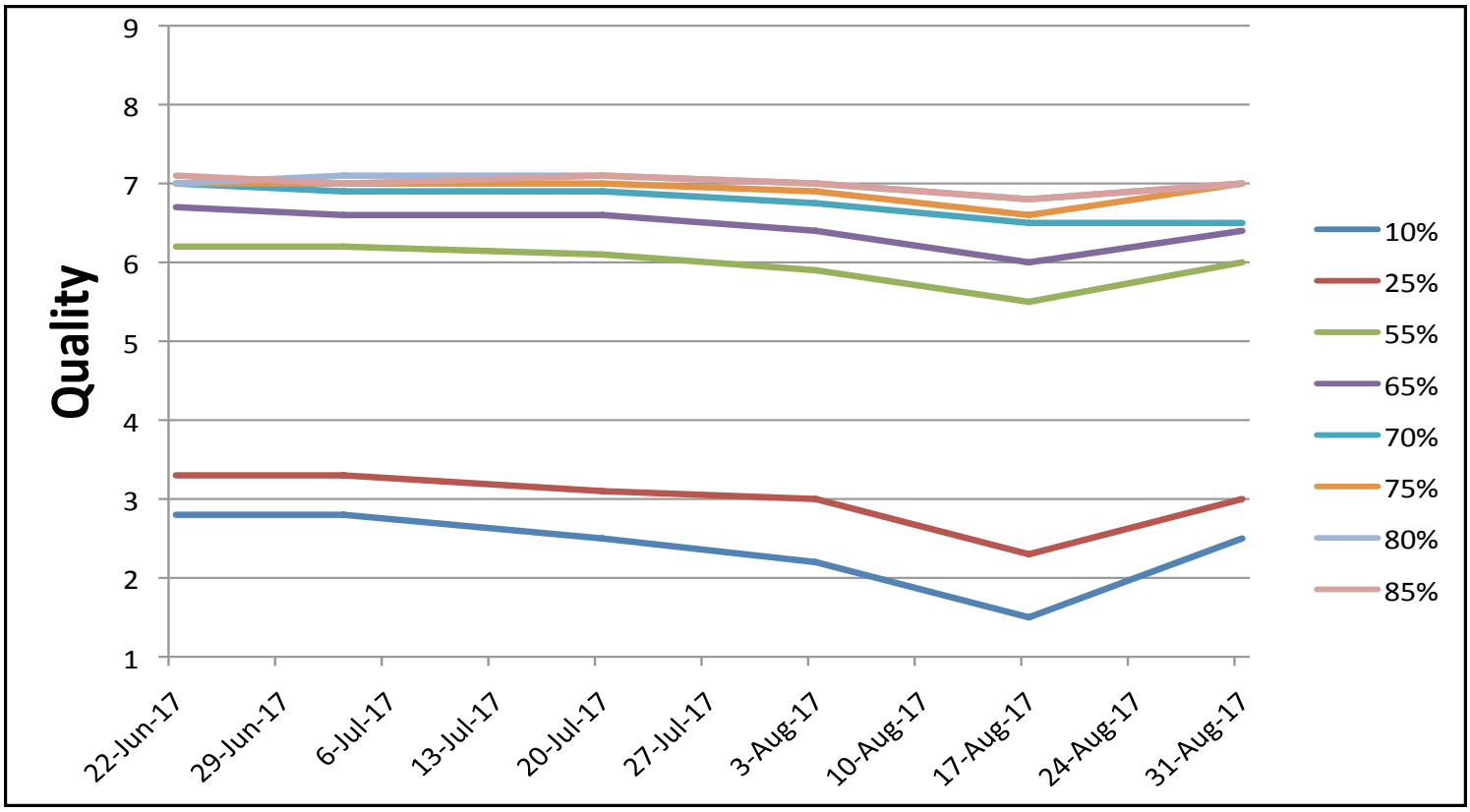

Figure 2. Turf quality (1 to 9 scale, 9 = best) of bermudagrass plots irrigated at 10%, 25%, 55%, 65%, 70%, 75%, 80% and 85% reference evapotranspiration (ETo). Riverside, CA.