Stop #8a: Best Management Practices for Water Conservation on Bermudagrass Turf

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Objectives:

Evaluate management practices including use of plant growth regulators (PGRs), wetting agents, the choice of a correct fertilizer, or combinations thereof can help maintain acceptable turf quality under deficit irrigation.

Methods:

The study was conducted on mature 'Princess 77' bermudagrass turf. The 60' x 90' field was divided into six 30' x 30' plots. Beginning May 18, the plots received either 40% or 70% of previous week ET_0, as determined by an on-site CIMIS station. Treatments were arranged in a split-plot design with 3 different factors randomized within ET_0 replacement plots and 3 replicates. Plant Growth Regulator (Primo Maxx) serves as split plot; wetting agent (Revolution) as split-split-plot; finally, fertilizer products (see Table below) were randomized inside the wetting agent plots (plot size 24 ft^2) and applied monthly beginning May 19, 2017. Each treatment received an equivalent of 1 lb N/M/month. Every two weeks, plots were evaluated for turf quality, volumetric soil water content, Normalized Difference Vegetation Index (NDVI), and Digital Image Analysis (DIA).

Results:

When bermudagrass was watered at 70% ET_0 replacement, plots that were not treated with Primo Maxx or Revolution showed the lowest quality, while greatest quality was achieved by plots that received both Primo Maxx and Revolution (Fig. 1). Fertilizer type did not have an effect at 70% ET_0; however, surrounding turf that received no N showed drastically lower turf quality than any plot that received N fertilization. At 40% ET_0, Revolution had the greatest impact on bermudagrass performance (Fig. 2). In absence of Revolution, ACA 1935 and 5000 showed consistently improved quality, and were followed by SeaBlend + Stress Rx+ XP Micro (Fig. 3), suggesting that biostimulants may have a positive effect on bermudagrass response to deficit irrigation.

Acknowledgments:

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Table 1. PGR, wetting agent, and fertilizer study treatment list and plot plan. Riverside. 2016-17.

Plot	Treatment	Company	Rate	Frequency (wks)
Whole Plot	ET_0 replacement	---	40%-70%	Mon-Wed-Fri
Split	Primo Maxx	Syngenta	0.25 oz/M	2
Split-split-plot	Revolution	Aquatrols	6 oz/M	4
Split-split-split-plot	Gro-Power (5-3-1)	Gro-Power	1 lb N/M	4
Split-split-split-plot	SeaBlend (12 4 5) + StressRX + XP Micro	Ocean Organics	1 lb N/M + 6 oz/M + 6 oz/M	4 2 2
Split-split-split-plot	Turf Royale (21-7-14)	Yara	1 lb N/M	4
Split-split-split-plot	Yara Liva (15.5-0-0)	Yara	1 lb N/M	4
Split-split-split-plot	Turf Royale (21-7-14) + ACA 1935	Yara Aquatrols	1 lb N/M + 4 oz/M	4 4
Split-split-split-plot	Turf Royale (21-7-14) + ACA 5000	Yara Aquatrols	1 lb N/M + 4 oz/M	4 2

Plot Plan (North ↑)

Rep 1	70% ET_0	19	20	12	9		13	18	4	3	40% ET_0
		21	22	11	7		15	16	1	2	
		23	24	8	10		17	14	6	5	
		14	18	5	2		9	8	19	21	
		13	17	1	6		11	7	22	24	
		16	15	3	4		10	12	23	20	

Rep 2	70% ET0	5	6	15	16		5	3	13	17	40% ET0
		2	3	17	14		6	2	14	16	
		1	4	18	13		1	4	18	15	
		23	19	10	12		9	11	22	19	
		21	22	8	9		10	12	20	21	
		24	20	7	11		8	7	23	24	

Rep 3	40% ET_0	13	16	2	5		23	19	7	11	70% ET_0
		15	17	1	3		22	21	10	12	
		14	18	6	4		20	24	9	8	
		11	8	20	19		2	3	18	14	
		10	7	24	23		1	6	13	17	
		9	12	22	21		4	5	16	15	

Trt #	Fertilizer	Primo Maxx	Revolution	Trt #	Fertilizer	Primo Maxx	Revolution
1	Gro-Power			13	Gro-Power		x
2	SeaBlend + StressRX + XP Micro			14	SeaBlend + StressRX + XP Micro		x
3	Yara Turf Royale			15	Yara Turf Royale		x
4	Yara Liva			16	Yara Liva		x
5	Yara Turf Royale + ACA 1935			17	Yara Turf Royale + ACA 1935		x
6	Yara Turf Royale + ACA 5000			18	Yara Turf Royale + ACA 5000		x
7	Gro-Power	x		19	Gro-Power	x	x
8	SeaBlend + StressRX + XP Micro	x		20	SeaBlend + StressRX + XP Micro	x	x
9	Yara Turf Royale	x		21	Yara Turf Royale	x	x
10	Yara Liva	x		22	Yara Liva	x	x
11	Yara Turf Royale + ACA 1935	x		23	Yara Turf Royale + ACA 1935	x	x
12	Yara Turf Royale + ACA 5000	x		24	Yara Turf Royale + ACA 5000	x	x

Figure 1. Quality of plots irrigated at 70%ET_0 treated with either Primo Maxx, Revolution, a combination of the two or untreated.

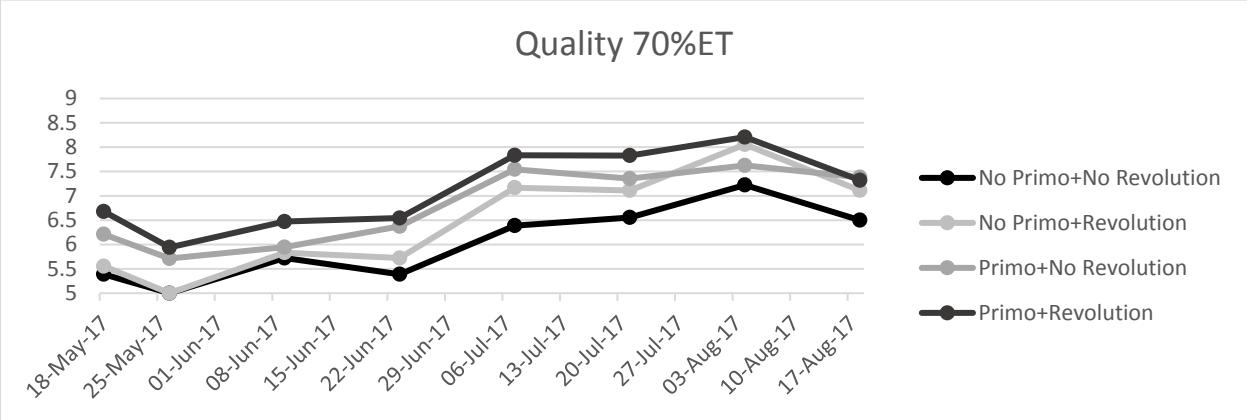

Figure 2. Quality of plots irrigated at 40%ET_0 treated with either Revolution or untreated.

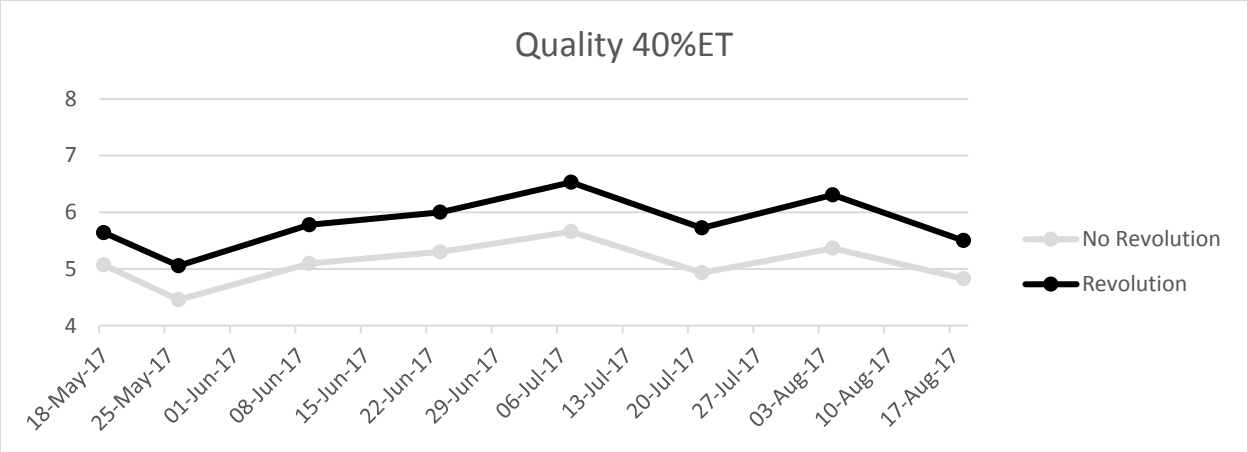

Figure 3. Quality of plots irrigated at 40%ET_0, not treated with Revolution and fertilized with 6 different sources of N.