

Stop #6: Best Management Practices for Turf under Drought or Water Use Restrictions

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Objective:

Determine if management practices such as the use of plant growth regulators (PGRs), wetting agents, proper fertilization, or combinations of the three can help maintain acceptable turf quality under deficit irrigation.

Methods:

The study was conducted on mature bermudagrass 'Princess-77' turf. The 60' x 90' field was divided into six 30' x 30' plots. Beginning August 3, the plots received either 40% or 70% of previous week's 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 ft²) and applied monthly beginning July 31, 2014. Each treatment received an equivalent of 1 lb N/M/month except for Yara Vera (urea), which received ½ lb N/M/month and served as control. Prior to application of fertilizer treatments, the entire field received no N in 2015. Every two weeks, plots were evaluated for turf quality, volumetric soil water content, Normalized Difference Vegetation Index (NDVI), and Digital Image Analysis (DIA).

Results:

All ratings collected at the beginning of the study showed that bermudagrass was significantly affected by lack of N fertilization (Figs. 1-3). However, one month after the first application of N was applied, grass recovered and no differences between ET_0 replacements were found (data not shown). After 3 rating dates, only fertilizer products had an effect on turf visual quality, with 4 products (Best Nitra King, Gro-Power, Loveland, and Turf Royale) performing better than the ½ rate urea control (Fig. 1), and achieving acceptable quality despite deficit irrigation. These results were corroborated by those of Dark Green Color Index (DGCI) and NDVI, where Best Nitra King, Loveland, and Gro-Power all performed better in comparison to urea. No beneficial effect of Primo Maxx was detected one month after the beginning of the study, while application of Revolution had a positive effect on turf visual quality (data not shown). Preliminary results so far suggest that proper N management during the summer months could help save 30% water to irrigate bermudagrass.

PGR, wetting agent, and fertilization Study Treatment List 2015

Plot	Treatment	Company	Rate	Frequency (weeks)
Whole Plot	ET ₀ replacement	---	40%/70%	Mon-Wed-Fri
Split	Primo Maxx	Syngenta	0.3 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	WIL-GRO with Infiltrate (16-16-16)	Wilbur-Ellis	1 lb N/M	4
Split-split-split-plot	Vera (46-0-0)	Yara	½ lb N/M	4
Split-split-split-plot	Best Nitra King (21-2-4)	Simplot	1 lb N/M	4
Split-split-split-plot	Loveland (5-29-12)	Loveland	1 lb N/M	4
Split-split-split-plot	Turf Royale (21-7-14)	Yara	1 lb N/M	4

PGR Wetting Agent and Fertilization Study Treatment List and Plot Plan

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% ET ₀	5	6	15	16		5	3	13	17	40% ET ₀
		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	WIL-GRO			14	WIL-GRO		x
3	Yara Vera			15	Yara Vera		x
4	Best Nitra King			16	Best Nitra King		x
5	Loveland Mini			17	Loveland Mini		x
6	Yara Turf Royale			18	Yara Turf Royale		x
7	Gro-Power	x		19	Gro-Power	x	x
8	WIL-GRO	x		20	WIL-GRO	x	x
9	Yara Vera	x		21	Yara Vera	x	x
10	Best Nitra King	x		22	Best Nitra King	x	x
11	Loveland Mini	x		23	Loveland Mini	x	x
12	Yara Turf Royale	x		24	Yara Turf Royale	x	x

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

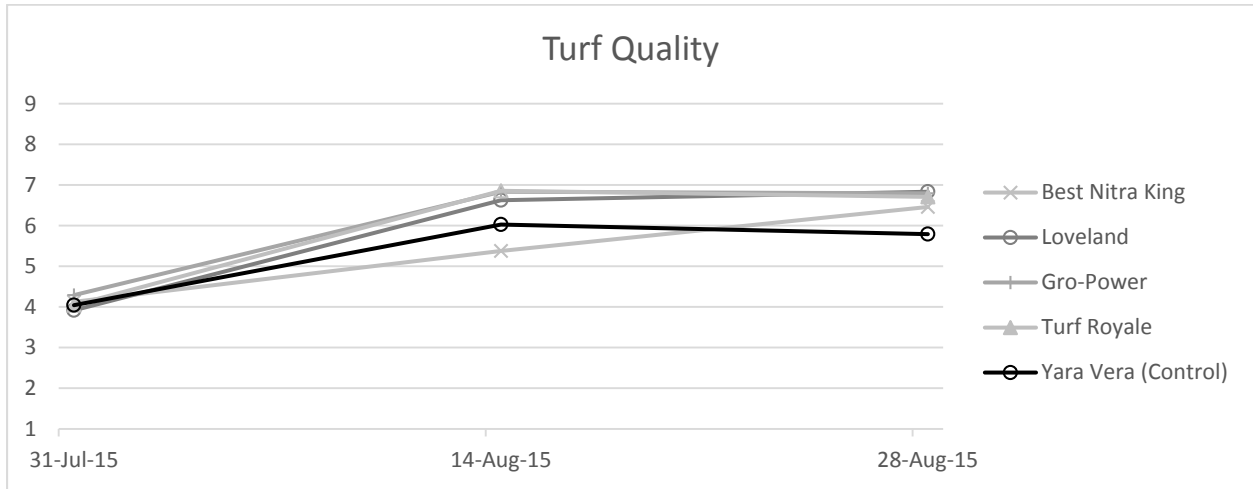


Figure 2. DGCI of fertilizer products that performed better than control in at least one rating date.

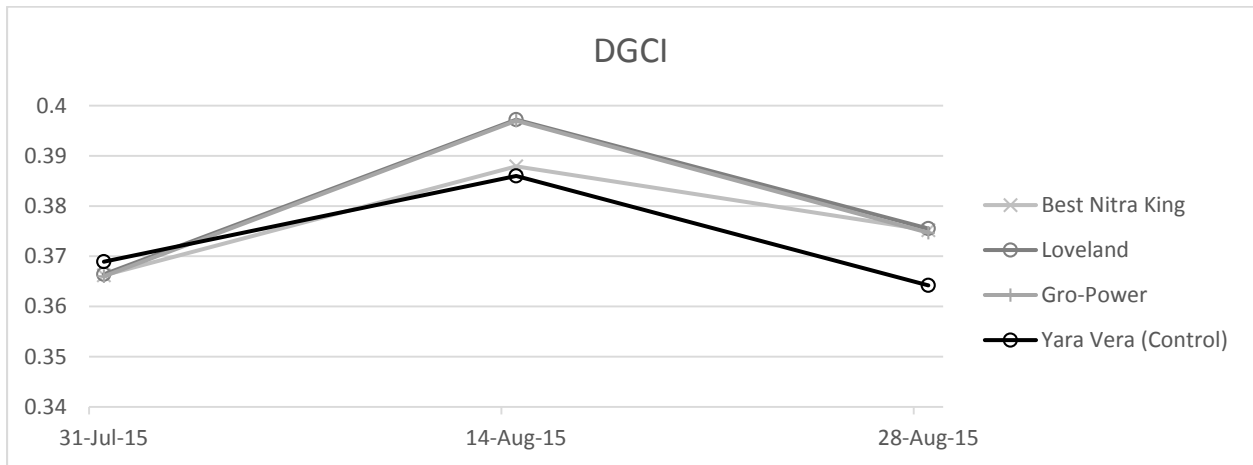


Figure 3. NDVI of fertilizer products that performed better than control in at least one rating date.

