



Empowering Turf to  
**FIGHT BACK**  
Against Drought.





## Reduced Irrigation

This is a fight you can win.

CIVITAS TURF DEFENSE™ is a fungicide, insecticide, and plant protection product with an innovative ability to increase turf's tolerance to both biotic and abiotic stresses.

CIVITAS TURF DEFENSE works both with and through the plant to stop threats from taking hold in the first place, **reducing the effect stress has on your turf**. In addition, the active ingredient in CIVITAS TURF DEFENSE is a white mineral oil with a chemical structure that resembles the natural paraffins found on the surface of leaves to provide maximum turf benefits.

### Here's how it works.

CIVITAS TURF DEFENSE applied prior to the onset of disease symptoms provides a barrier preventing pathogens from accepting or using the host plant, slowing disease progression. This same application enables the ability of the plant to tolerate both biotic and abiotic stressors while providing treatment benefits simultaneously. CIVITAS TURF DEFENSE provides turf managers with a tool to enhance both their resistance management strategies and integrated pest management (IPM) programs. The end result is increased turf quality and disease control during the most stressful times of the year.

### Reduces water usage by up to 25%

The CIVITAS TURF DEFENSE protective barrier enables the plant to be more tolerant during periods of limited water availability. Since 2012, multiple university and independent research trials have proven turf managers can reduce overhead irrigation by up to 25% while maintaining acceptable turf quality.



Seeing is believing: The response of a healthier plant

Try CIVITAS TURF DEFENSE. Compare your treated vs. untreated turf. Look for unique plant responses like delayed leaf senescence and percentage of live green leaf tissue, indicative of a healthier plant, a stronger plant better able to withstand the effects of stresses.



## Drought Tolerant.

CIVITAS TURF DEFENSE delivers maximum turf quality by enhancing stress tolerance.

Here are CIVITAS TURF DEFENSE benefits you can appreciate:

- ✓ Allows turf managers to use less water and lower costs.
- ✓ Shortens the time to complete an irrigation cycle, as less water volume is required.
- ✓ Helps control the amount of moisture applied and conditions that favor disease development.
- ✓ Provides a tool to maintain firmer, faster and more consistent playing conditions throughout the day.
- ✓ Expands watering window between periods of rainfall.
- ✓ Decreases labor associated with supplemental irrigation and spot watering.
- ✓ Reduces the amount of poor quality water applied.

CIVITAS TURF DEFENSE applied as part of an IPM program



Untreated



Treated with CIVITAS TURF DEFENSE



## Reduced Irrigation

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# Proven to perform:

Independent studies demonstrate CIVITAS TURF DEFENSE effectiveness in protecting warm- and cool-season turf in drought or reduced irrigation conditions.

## 1. Reduced Irrigation Program for Warm Season Turfgrass

*Benjamin Wherley, Ph.D., Texas A&M University*

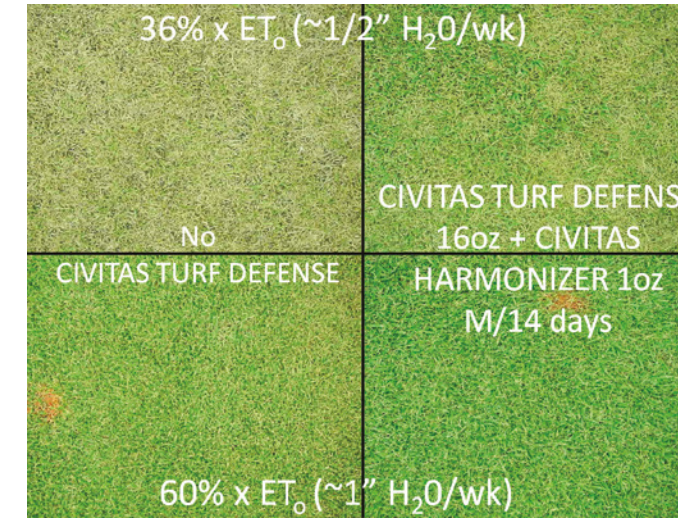
**TARGET:** Non-uniform, high value, water stressed areas on your valuable golf course turf

**SOLUTION:** Increase turf quality through applications of CIVITAS TURF DEFENSE

**FAIRWAYS:** Moderate Stress: Pre-stress applications of 17 oz. CIVITAS TURF DEFENSE Pre-M1xed/28d  
Heavy Stress: Pre-stress applications of 17 oz. CIVITAS TURF DEFENSE Pre-M1xed/21d

**GREENS:** Pre-stress applications of 8.5 oz. CIVITAS TURF DEFENSE Pre-M1xed/14d

Back to back drought studies conducted through Texas A&M University showed improved turf performance with CIVITAS TURF DEFENSE under deficit irrigation programs. Deficit irrigation was applied to replace either 60% of evapotranspiration (60% x ETo, mild water stress) or 36% of evapotranspiration (36% x ETo, moderate water stress). Where CIVITAS TURF DEFENSE was applied, zoysiagrass performance improved. CIVITAS TURF DEFENSE treated plots receiving only 36% x ETo (40% reduction) were comparable to non-treated plots receiving 60% x ETo.



## 2. Drought Response Trial Cool Season Turfgrass

*Michelle DaCosta, Ph.D., University of Massachusetts*

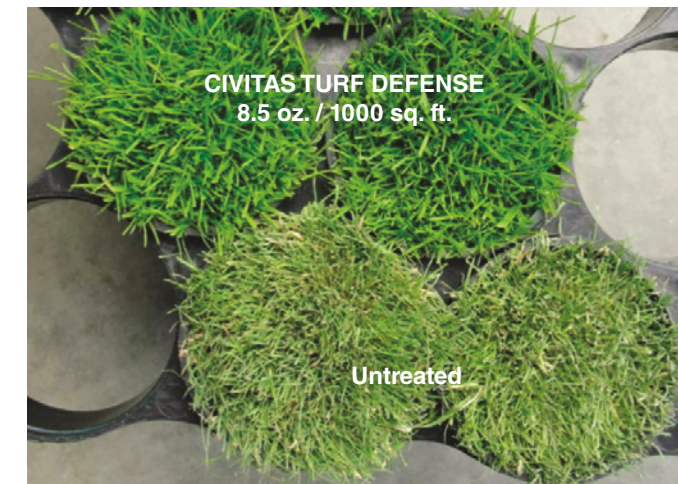
**TARGET:** Non-uniform, high value, water stressed areas on your valuable golf course turf

**SOLUTION:** Use CIVITAS TURF DEFENSE so your turfgrass can better tolerate drought stress conditions

Greenhouse study evaluating the performance of creeping bentgrass pre-treated with CIVITAS TURF DEFENSE Pre-M1xed and subjected to dry down conditions (no water).

Two applications of CIVITAS TURF DEFENSE Pre-M1xed were made at 14-day intervals prior to initiation of dry down, followed by a 3rd application 3 days after initiation of dry down.

Treatment	Rate	TURF QUALITY (1-9) DAYS POST DRY DOWN				
		0 d	6 d	7 d	8 d	10 d
Untreated Control	N/A	8.0 a	6.7 c	6.2 b	5.3 c	1.3 b
CIVITAS TURF DEFENSE	8.5 fl. oz./1000 sq. ft.	8.0 a	7.3 b	8.0 a	7.1 ab	6.7 a



## 3. Reduced Irrigation Program for Cool Season Turfgrass

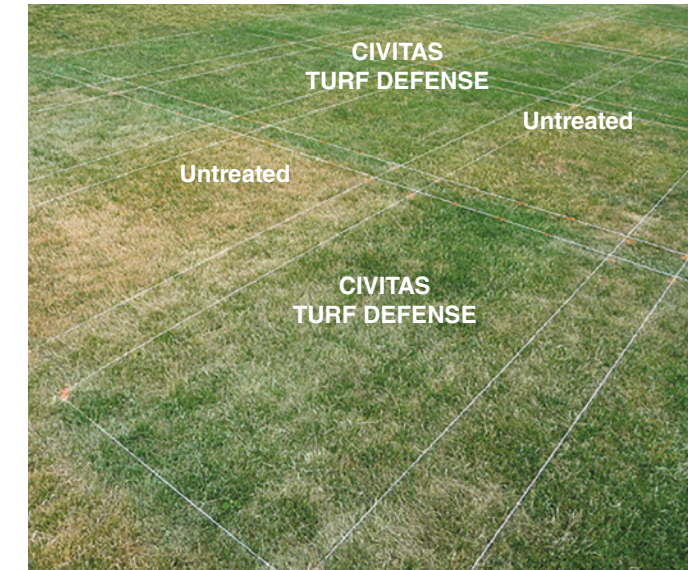
*Adam Van Dyke, Professional Turfgrass Solutions LLC, Salt Lake City, Utah*

**TARGET:** Non-uniform, high value, water stressed areas on your valuable golf course turf

**SOLUTION:** Use CIVITAS TURF DEFENSE so your turfgrass can better tolerate drought stress conditions

Lawn-height Kentucky Bluegrass and Perennial Ryegrass. Maintained at low level of water regime at (60% ETo) CIVITAS TURF DEFENSE treatments every 2 weeks June through October.

	% TURF GREEN COVER			
	Aug. 9	Aug. 23	Sept. 6	Sept. 16
CIVITAS TURF DEFENSE 8.5 fl. oz.	91.6 a	91.1 a	92.3 a	93.9 ab
Untreated Control	69.1 b	44.1 b	51.0 b	55.3 c



## 4. Long Term Deficit Response Warm Season Turfgrass

*Jim Baird, Ph.D. & Mingying Xiang, Ph.D., University of California Riverside*

**TARGET:** Tifway II Bermudagrass Fairway Height of Cut  
**SOLUTION:** CIVITAS TURF DEFENSE applications at 8.5 fl. oz. every 14 days

At 55% ETo replacement, CIVITAS TURF DEFENSE showed better turf quality on most rating dates compared to the untreated control. All CIVITAS TURF DEFENSE ratings were greater than the acceptable turf quality level of 6.0. Plots treated with CIVITAS TURF DEFENSE also improved the percentage of turf canopy coverage compared to the untreated control during the study.

Treatment	Rate	TURF QUALITY @ 55% ETo					
		8/11/20	8/25/20	9/9/20	9/25/20	10/6/20	10/20/20
Untreated Control	N/A	6.5	5.5	5.5	5.4	4.3	5.3
CIVITAS TURF DEFENSE	8.5 fl. oz./1000 sq. ft.	6.5	6.3	6.0	6.1	6.9	6.1

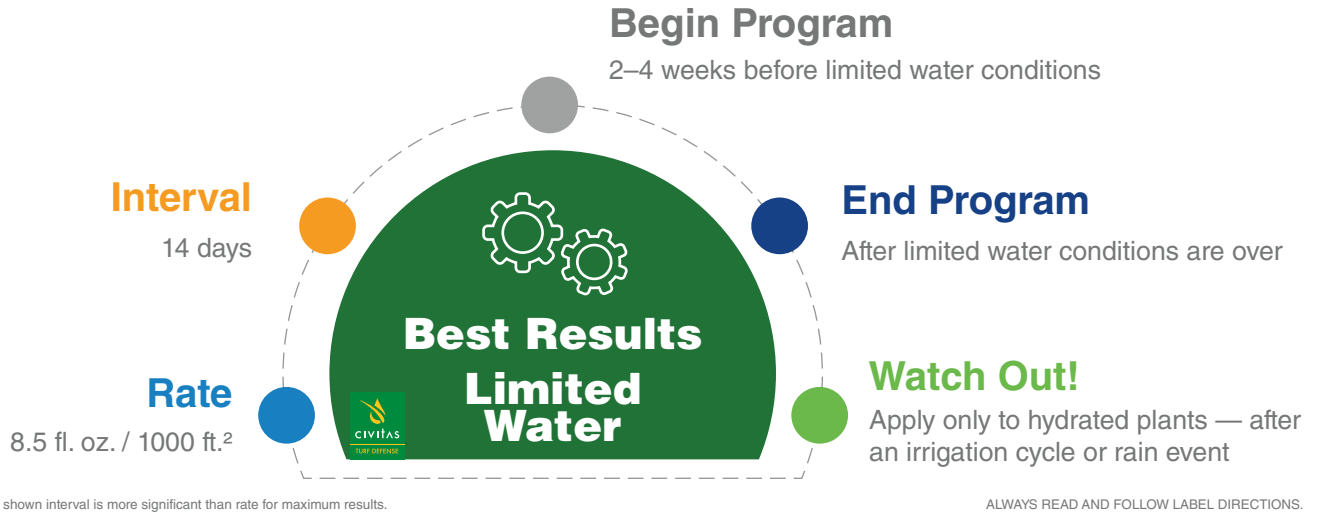
Treatment	Rate	% (0-100%) CANOPY COVERAGE @ 55% ETo					
		8/11/20	8/25/20	9/9/20	9/25/20	10/6/20	10/20/20
Untreated Control	N/A	87.8	81.3	70.0	67.5	73.8	75.0
CIVITAS TURF DEFENSE	8.5 fl. oz./1000 sq. ft.	94.8	89.0	90.5	87.0	95.0	84.0





# CIVITAS TURF DEFENSE for Limited Water Conditions

## Best Management Practices



## CIVITAS TURF DEFENSE: Results you can appreciate

### Warm Season



UNTREATED



TREATED with CIVITAS TURF DEFENSE twice a month with 20% water reduction

### Bermudagrass Warm Season



UNTREATED



TREATED with CIVITAS TURF DEFENSE after only two applications

### Rye Grass Cool Season



UNTREATED



TREATED with CIVITAS TURF DEFENSE at 80% water



Visit [civitasturf.com](http://civitasturf.com) for additional research and other information.

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