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Surfactant-amended fertilizer improves turfgrass water use efficiency

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Due to increasing efforts for water conservation of amenity turf, irrigation restrictions which reduce irrigation flexibility and increase the intervals between irrigations have become routine regulatory ordinances in communities. Although there are millions of hectares of irrigated residential turf areas there has been no investigation of the relationship of soil water repellency impacts such as impaired soil water retentions and availability and lawn performance in the USA The objective of this experiment was to evaluate commercial fertilizer, an experimental fertilizer containing a surfactant, and a non-fertilized control for the alleviation of soil water availability, time to wilting, and improvement of residential lawn turfgrass quality. The experiment was initiated on October 24, 2006 with the application of the above treatments (application rate of 4.5 g N/m2) on 4 replications of 1m x 2m 'Floratam' St. Augustinegrass. A custom automated clear plastic rain shelter was constructed for this experiment which covered the plots from 4:00 pm to 8:00 am each day and during any rainfall event (a rain sensor was installed which when wet automatically moved the shelter over the plots and back off the plots when the sensor was dry). Plots received no water (rainfall or irrigation) for the duration of the experiment except when fertilizer was applied at initiation and at the end of a wilt cycle to bring plots back to field capacity. Pre-treatment soil cores were taken with a 5 cm diameter cup cutter for thatch measurement and thatch dry weight. Soil cores were taken with a 2 cm diameter soil probe pre-treatment and after irrigation on each wilt cycle for water drop penetration time (WDPT). Three dry-down cycles were repeated. Turfgrass quality/color ratings (scale of 1-10 with 10=dark green turf, 1=dead/brown turf, and 6=minimally acceptable turf) and visual percent wilt ratings (when evident) were taken throughout the test. Percent soil moisture was also taken using a TH20 theta probe coupled with an HH2 soil moisture meter (Dynamax, Inc.). Normalized difference vegetative index (NDVI) and RED/NIR readings were taken following protocol using a Model 505 GreenSeeker hand held optical sensor unit (NTech Industries, Inc.). Weather data was received through the Florida Automated Weather Network (FAWN) station at University of Florida's FLREC site. Weather conditions during the trial were warm with the trial bracketing the end of the wet season with drier weather occurring as the project proceeded. There were significant differences for turf quality over the two dry-down cycles in the trial on most observation dates. Over time with repeated dry-down cycles, there were treatment differences for visual observations of wilting and for soil moisture was monitored with a portable Theta-Probe and there were no significant differences in treatments over the first dry-down cycle with soil moisture declining from approximately 30% to about 9% before irrigation was applied. The WDPT was greater in the control. GreenSeeker readings were significant on all dates for NDVI and RED/NIR parameters with both fertilizer treatments having higher NDVI readings than the control. The experimental fertilizer had lower RED/NIR readings than the control.