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**Title:** Soil Moisture Sensor Irrigation Scheduling in Bermudagrass [*Cynodon dactylon* (L.)] Fairways

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**Objective:**

The study is aimed to identify SMS systems that could reduce the number of irrigation cycles or amount of water applied while maintaining acceptable turfgrass quality, as compared to traditional time-based irrigation scheduling on fairways.

**Start Date:** 2017

**Project Duration:** Three years

**Total Funding:** \$30,000

**Summary text:**

Twelve plots of 3 m x 3m hybrid bermudagrass GN-1 plots would be used. Treatments are three soil moisture sensors (SMS) and one control. The design of the study is a randomized complete block. The study would be started with all plots at similar water content. Main Study Data Collection would be conducted during May – October 2018 and 2019. The parameters are Runtime for each plot and treatment average (by week, month, season), Irrigation applied for each plot and treatment average (by week, month, season), For SMS treatments, number of irrigation events that are bypassed or allowed (by week, month, season), For SMS treatments, amount of saved applied irrigation (actual amount and as a percentage of no SMS control treatment), Visual turfgrass quality and color ratings taken once every four weeks, Soil salinity (bulk electrical conductivity) measured on a continuous basis and summarized, and Soil water content measured on a continuous basis and summarized. ETo precipitation and other climatic data will be accessed from CIMIS station #78 based, about 0.25 miles from the test site.

The results would be expected to provide amount of irrigation applied for all the treatments, along with water savings for the SMS treatments. Water savings calculations will be based on the control treatment and SMS response compared to research grade soil moisture sensors will also be reported. The bermudagrass turfgrass quality rating also be collected and analyzed.

**Soil Moisture Sensor Installation:**

Toro TurfGuard sensors were installed in Bermudagrass plots on Nov 20th, 2017. Sensors were installed in three randomly selected plots. Before the installation, sensors were activated and registered on Toro SMRT Logic Cloud. Toro SiteVision™ software was installed in the office computer to access the data from the cloud. The sensors were placed in the center of each plot using cup cutter. TurfGuard sensors were placed at 3 inch depth, measured from the top of the turf surface to the top of the SMS unit housing. The probes of the sensors were pressed into the sidewall of the hole to ensure contact with undisturbed soil. After the installation, holes were filled and turf plugs were placed back. One of the two Toro Turf Guard® Wireless Repeaters was wired to a power source and installed on the exterior metal wall of the shed at 10 feet height on the field and other repeater was wired inside the office (approx. 100 ft. far from the plots) to facilitate the signals. Research grade golf course-oriented SMS from Rain Bird (wired) and Tucor (wireless) will be installed in the first week of January.

***Turfgrass Management:***

Bermudagrass plots were double cut in opposing directions using a Tru-Cut walk behind reel mower at a 1" height and clippings were removed from the plots. Glyphosate was spot-sprayed utilizing a Solo® 3-gallon backpack sprayer at a rate of 1 oz/ gallon to eradicate broadleaf weeds between rows. SpeedZone Southern® Broadleaf Herbicide was applied on the plots @ 1.5 oz /1000 sq. ft for the post emergent control of broadleaf weeds. Currently, Irrigation is applied at 80% ETo, one day per week.