

TURF SCREEN RESEARCH REPORT

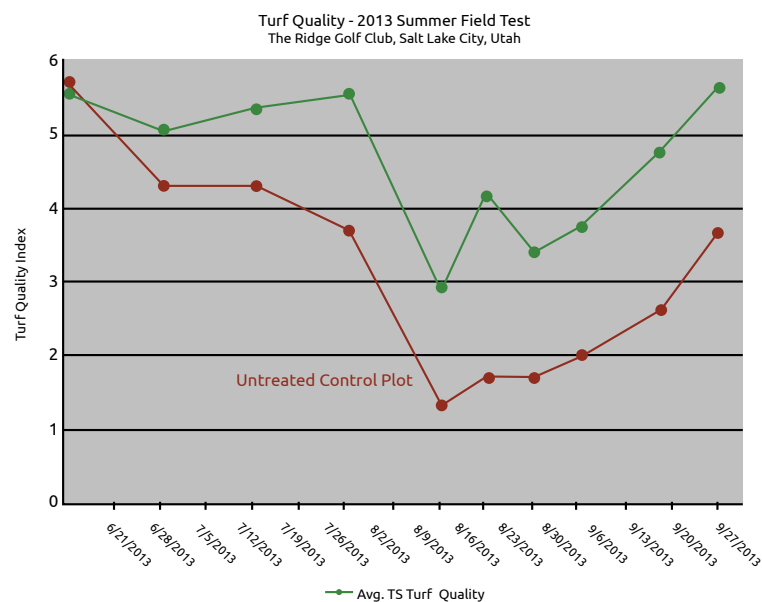
IMPACT OF TURF SCREEN ON DROUGHT TOLERANCE & RECOVERY OF TURF

The latest Turf Screen research, conducted by Professional Turfgrass Solutions LLC (West Jordan, UT) provides further verification of what superintendents from all over the country have been finding, namely, that Turf Screen significantly increases overall turf quality during summer stress conditions.

The research was done from June 21 to September 28, 2013 in one of the most arid areas of the country in order to assess the effects of Turf Screen on drought tolerance and recovery of turfgrass. The field trial was conducted on a mixture of predominantly Kentucky bluegrass (*Poa pratensis* L.) with some perennial ryegrass (*Lolium perenne* L.) maintained under golf course conditions at The Ridge Golf Club in Salt Lake City, UT. Turf Screen was applied to turf at four different rates: 1.25 oz/1000 sq. ft. every 7 days; 3 oz every 14 days; 4 oz every 21 days; and 6oz every 28 days. An untreated control was used for comparison.

In the hotter, drier month of August when maximum temperatures hovered around 90 degrees F, chronic drought conditions were simulated by reducing irrigation to 1 day per week early in the month and then shutting off irrigation entirely for 11 days beginning on August 16th. Resuming irrigation at the end of August, coupled with more frequent rainfall and cooler temperatures in September allowed the turf to recover during the last month of the study.

As shown in the graph below, Turf Screen plots maintained significantly better quality for 6 weeks in the field than untreated turf during acute drought stress when irrigation replaced about 60% of ET on average. Drought symptoms were severe in all plots in August as turf was dry and brown, but grass receiving Turf Screen fared better compared to untreated turf, which only had about 30% green cover.



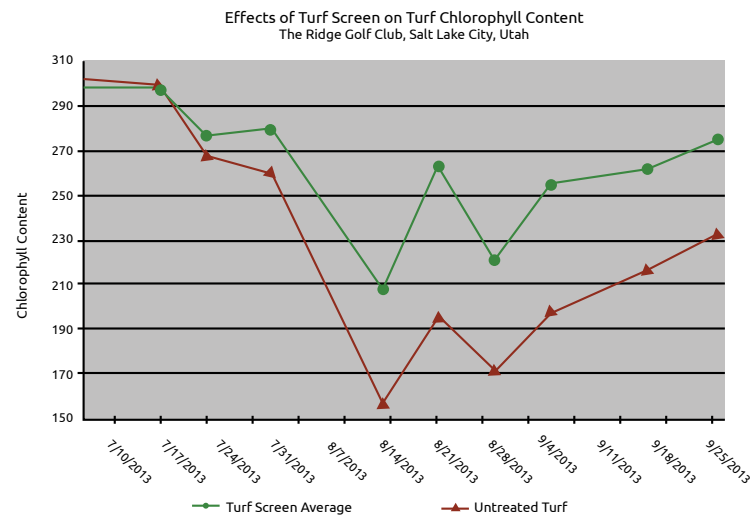
Turf quality of turfgrass treated with Turf Screen rated 81% higher than untreated turf during August and September.



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Treated turfgrass plots also had higher levels of chlorophyll measured in the leaves (see graph below) which supports the idea that Turf Screen helps maintain plant metabolic functions enough to prevent necrosis and boosts recovery when water and more favorable climatic conditions returned.



Turf Screen plots recovered to nearly 90% green cover vs. untreated turf that was mostly brown & never fully recovered.

SUMMARY OF RESEARCH CONCLUSIONS:

1. Turf Screen significantly improved turf quality under both well-watered and drought conditions, and provided significantly quicker recovery from acute drought stress.
2. Turf Screen produced “great turf quality” at 60% ET replacement – a 40% water reduction – while untreated turf quickly entered dormancy and never fully recovered.
3. Turf Screen significantly reduced drought stress and delayed dormancy. Chlorophyll production was significantly higher in Turf Screen treated plots and as a result, significantly more green tissue was visible in the canopy compared to untreated plots.
4. When irrigation was reduced 60%, Turf Screen treated plots acclimated better and stayed alive far longer than untreated plots. Untreated turf rapidly entered dormancy and never fully recovered when recovery irrigation resumed.
5. During the 11 day non-irrigating period, Turf Screen treated plots produced significantly greener canopy with higher chlorophyll content in the leaves – this led to quicker recovery when rainfall and cooler fall temperatures returned.

Professional Turfgrass Solutions’ report concluded that: “These results suggest Turf Screen enhanced metabolic functions during acute drought stress and sustained them during chronic stress, boosting photosynthetic efficiencies that kept the turf alive until more favorable conditions returned. This must be linked to more efficient uses of water by the plant under severe drought conditions.”

