

UCRTRAC Accumulative Research Summary
Section A: Irrigation Water Use Efficiency Including Utilization of Effluent Water
Project 9

Title: Characterization of Markers for Leaf Firing Resistance Among Turf-Type Bermuda-grasses.

Objective: To identify biochemical, physiological, and whole-plant markers that are closely associated with leaf firing resistance (LFR) among six bermudagrass cultivars. Midiron, FloraTex, and Texturf 10 (LFR cultivars) and Vamont, Tufcote, and Tifway (non LFR cultivars) were grown in containers and field, subjected to drought, and measured for: whole-plant characteristics including percent leaves rolled and wilted, percent leaves brown and fired, visual turfgrass quality and color, clipping yields, and root mass density to a depth of 7.9 ft; and biochemical and physiological characteristics including dehydrin protein accumulation, photosynthesis, and leaf relative water content.

Location: A specially constructed root column facility (individual columns were 4.0-inch diameter x 8.0-ft deep) and a specially constructed irrigation plot with 12 independently, operated 20.0- x 20.0-ft irrigation cells, which defined main plots. Each main plot was divided into six 6.2- x 9.6-ft subplots and one cultivar was planted in each subplot. The column and field facilities were located at the UCR Turfgrass Field Research Facility.

Duration: 2+ years

Funding Source: Southwest Consortium on Plant Genetics and Water Resources

Findings:

- LFR cultivars had significantly less percent leaves rolled and wilted than non LFR cultivars in both environments. Unexplainably, LFR and non LFR cultivars did not differ for percent leaves brown and fired.
- At key depths, LFR cultivars had significantly greater root mass densities than non LFR cultivars. This was most evident in the field plots.
- For bermudagrass, it appears that the biochemical and physiological characteristics follow leaf hydration, which follows water absorption via an extensive and deep root system. Please note that not all turfgrass species may primarily rely on rooting characteristics to avoid drought stress symptoms. Other turfgrass species may rely more on tissue-tolerance (hardiness) mechanisms.

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Status: A 2-year study was completed. Information associated with this study was presented at annual meetings of American Society of Agronomy and Southwest Consortium of Plant Genetics and Water Resources. Information associated with this study was published in abstracts from the presentations. We plan to prepare a technical article for a scientific journal.
