Characterization of Water Use Requirement and Gas Exchange of Buffalograss Turf

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Goals:

- To determine water use requirements of buffalograss.
- To examine genotypic variation in water use.
- To determine the effect of nitrogen fertilization on water use.
- To determine the relationship between photosynthesis and growth of buffalograss under drought stress.

Since irrigation accounts for nearly half of urban water use, considerable savings could be realized by planting turfgrasses with low water use requirements. Buffalograss may be the ideal species for both water savings and aesthetics, but water use data are scarce and one can only speculate on water requirements. This study will generate irrigation crop coefficients for buffalograss and identify intraspecific water use differences, if any, among a diverse selection of genotypes.

A field project was established at the University of Nevada, Reno (UNR) Valley Road Field Station to determine water use requirements of seventeen buffalograss genotypes representing a diverse genetic background. This project utilizes a line source water gradient designed to provide a continuum of irrigation volumes ranging from a value slightly exceeding potential evapo-transpiration (ET) to essentially zero. By planting the buffalograss varieties in strips perpendicular to the irrigation line, turf performance can be measured at any given irrigation amount. Further, minimum irrigation requirements are indicated by that point in the gradient beyond which the turf cannot survive.

Plots were planted and established during the summer of 1992. The total experimental plot area measures 153 by 88 feet, and is surrounded by a 43 ft border planted to 'Vegas' tall fescue. Plugs of 17 buffalograss selections, representing three ploidy levels, were planted on 15 inch centers in individual plots measuring 4.5 by 44 ft. The experimental design was a randomized complete block design with four replicates.

Four mini-lysimeters (6 inches in diameter, 12

inches deep and each with a drain hole and removable plug to stop drainage) were established in the greenhouse for each genotype. Cores for the lysimeters were drilled in each plot 6.5 ft. from the main irrigation line. These will be used to determine ET gravimetrically under non-limiting conditions.

By October, 1993, all genotypes, except the three planted late, were fully established. Both the diploid and tetraploid genotypes were maintaining good color as late as October 12, while the hexaploids were well into dormancy.

It is planned to establish the line source gradient beginning July 1, 1994. Both outside lines will be adjusted to water only the tall fescue border. Irrigation will be scheduled based on ET (Penman) as determined with an on-site weather station. Performance, actual ET, and plant water status data will be collected during the 1994 and 1995 growing seasons.