Development of Stress-tolerant, Turf-type Saltgrass Varieties

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Objectives:

1. Evaluate new collections and first cycle of population improvement, select parents from the nursery, and intercross for the second cycle of population improvement.
2. Screen salinity tolerance among saltgrass advanced selections and determine the level of salinity tolerance during germination (seeded type only) and as mature turf for potential new cultivars.
3. Quantify cold hardiness of potential varietal releases, advanced lines, and breeding accessions.

Start Date: 2003
Project Duration: three years
Total Funding: $65,842

Clonal Performance under Low Mowing and Simulated Traffic

2004 is the second year that the 1998 replicate turf trials (21 clones) were subjected to closer mowing (7/8") and simulated traffic. The plots were mowed three times weekly, and rolled twice/week using a water-filled, 875-pound Brouer roller. The treatments will terminate in late October, 2004.

At this lower mowing height, 3-4 clones constantly produce good turf quality. Several clones have better turf visual density estimates when rolled. Others are not-affected, while others decline in density and turf performance when rolled.

Well-watered ET Rates

Field plots were established in mid-June, 2004 with 8 replications of 10' x 10' plots of 'A 48' and 'A 119' saltgrass, 'Tifway' bermudagrass, and 'Sea Isle I 'seashore paspalum. The lysimeter liners are in place. Plots are 80% covered. Measurements of field evapotranspiration will be initiated in 2005. Greenhouse ET rates were taken in September, 2004. Results are being tabulated and will be provided in the final report.

Large monolith lysimeters were transplanted to 'Tifway' bermudagrass and 'AZ 138' saltgrass to compare evapotranspiration rates (water use).

Large Monolith Lysimeters

The two large monolith lysimeters were planted to 'Tifway' bermudagrass and A 138 saltgrass. The saltgrass reached 95% cover by late September. The 'A 138' saltgrass was not mowed during the establishment period due to induced scalping. Some data was collected from the tall (10 cm) 'A 138'.

Volumetric Water Content (VWC) Lysimeters

Twelve plots were established vegetatively in mid-June, 2004 consisting of 'A138', 'Tifway' and 'Sea Isle 1'. Twenty-four large lysimeters were constructed in July that feature 10-inch radii and 12-inch-deep liners. The turf will be established in the lysimeters this February in the greenhouse. Liner holes in the plots will be installed in May, 2005. Evapotranspiration measurements will be initiated as soon as plots reach 100% cover.

After several ET cycles, irrigation will cease and ET vs. VWC will be assessed along with visual plant stress and canopy temperatures. A lifting stage will be constructed this winter along with working details for the load cell.

Clonal Salt Tolerance of New Accessions

New clones are being jointly tested by the University of Arizona and Colorado State University. Salinity levels include 0, 20, 34, 48 ds m^{-1}. The first test has been completed and demonstrate saltgrass clonal differences in salinity tolerance.

A replicated clonal turf trial was established in mid-July, 2004. Approximately 55 clones, along with standards selected from the 1998-2002 trials, are included. The clones will be mowed first when dormant in late winter with a rotary mower to 1.0 inch, followed by subsequent mowing at 5/8-inch with a triplex reel mower. The objective is to identify low-growing clones that persist over the next three years. Clones in this nursery were selected from low maintenance golf courses which were approximately 85% saltgrass.

Weighing lysimeters allow for precise volumetric water content and water use determination.

Management Test Sites

Two areas are being developed for management test sites (herbicide tolerance). 'A49' saltgrass is established in a 3000 ft^2 area which now has 95% cover. Another 6000 ft^2 area was planted in August 2004 to 'A49' (15% cover).

Summary Points

- Field plots were established in mid-June, and measurements of field evapotranspiration will be initiated in 2005. Greenhouse ET rates were taken in September, 2004 are are being tabulated.
- Twelve plots were established vegetatively in mid-June, 2004 consisting of 'A138' saltgrass, 'Tifway' bermudagrass, and 'Sea Isle I' seashore paspalum. After several ET cycles, irrigation will cease and ET vs. VWC will be assessed along with visual plant stress and canopy temperatures.
- Two areas are being developed for management test sites (herbicide tolerance).