

Interactive Effects of Salinity and Mowing Height on the Growth of Various Inland Saltgrass Clones

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Objectives:

1. To find the most salinity and mowing stress tolerances of various saltgrass clones for their use with saline soils or low quality/saline water.

Start Date: 2003

Project Duration: three years

Total Funding: \$65,842

Twelve inland saltgrass (*Distichlis spicata* L.) clones [A37, A49, A50, A60, 72, A86, A107, A126, A128, A138, 239, and 240], collected from several western states of the United States were studied in a greenhouse to evaluate their growth responses in terms of shoot (clippings) and root dry weights, and general grass quality under salinity stress conditions at various mowing heights.

The grasses were grown as vegetative propagules in cups, 9 cm diameter and cut to 7 cm height. Silica sand was used as the rooting medium. The cups were fitted in plywood lid holes and the lids were placed on 42 cm X 34 cm X 12 cm polyethylene tubs containing half strength Hoagland nutrient solution. Three replications of each treatment were used in a randomized complete block (RCB) design in this investigation.

The grasses were grown in this nutrient solution for 12 weeks in the spring of 2006. The harvested plant materials were discarded. The culture solutions were changed biweekly to ensure adequate amount of plant essential nutrient elements for normal growth and development. During this period, the plant shoots were harvested weekly. At the last harvest (12th week), roots were also cut to have plants with uniform roots and shoots for the salinity stress at various mowing heights phase of the experiment.

The salt treatments were initiated by raising the EC (electrical conductivity) of nutrient solutions to 6 and 20 dS m⁻¹ by adding Instant Ocean salt. The EC of the culture solutions were raised by increments of 6 (first day) and 7 dS m⁻¹ every other day until the desired EC levels (6 and 20 dS m⁻¹) were reached. The culture solution levels in the tubs were 10 liter volume,

Grass Clone	Salinity/Mowing Height Treatment (dS m ⁻¹)			
	6 at 5 cm	20 at 5 cm	6 at 2.5 cm	20 at 2.5 cm
	-----Quality (1-9 rating)-----			
A37	7.6bc	5.2d	4.1d	3.8bc
A49	7.8bc	6.6c	5.3bc	4.8ab
A50	8.5ab	7.2bc	5.6bc	5.0a
A60	8.0b	5.8cd	4.5cd	3.9bc
72	9.0a	7.5b	6.1b	5.1a
A86	8.7ab	6.8bc	5.4bc	4.9ab
A107	7.5bc	5.7cd	4.4cd	4.1b
A126	6.5c	5.2d	4.2d	3.9bc
A128	7.2bc	6.5c	5.5bc	5.1a
A138	8.5ab	7.7b	6.4b	4.5ab
239	8.9a	8.7a	6.9a	5.4a
240	9.1a	8.6a	7.1a	5.3a

** The values followed by the same letters in each column are not statistically significant at the 0.05 probability level.

Table 1. Average turfgrass quality (1-9 rating) of saltgrass clones under salt stress at two mowing heights.

and solution conductivities were monitored/ adjusted to maintain prescribed salinity (6 and 20 dS m⁻¹) levels. After the final salinity levels were reached, the shoots were cut at 2.5 and 5 cm and roots were also harvested. The harvested plant materials were discarded prior to beginning the data collection of the stress period of the experiment which lasted 12 weeks (6 bi-weekly harvests).

Then, plant shoots (clippings) were harvested bi-weekly for the evaluation of the dry matter production. The harvested plant materials were oven dried at 60° C and dry weights were measured and recorded. The recorded data were considered the bi-weekly plant dry matter production. At the termination of the experiment, plant roots were also harvested, oven dried at 60° C, and dry weights were determined and recorded. Also, general grass quality was weekly evaluated and recorded. All above shoots were maintained for re-growth observation purposes.

Summary Points

- Saltgrass shoot dry matter decreased with increased salinity and decreased mowing ht. for all clones. However, there were significant differences among the dry matter of various clones at either level of salinity or mowing ht.
- For most clones, there was no difference among the root dry matter of the grass at either salinity level or mowing height. As observed for the shoots, there were significant differences in root dry matter of various clones at each level of salinity or mowing height.
- Grass quality followed the same pattern as the shoot dry matter, decreasing linearly with increased salinity level or decreased mowing height for all clones. However, general quality of various clones were significantly different than each other at all levels of salinity or any mowing height.
- Decreases in mowing height had more effect than increased salinity stress on all study parameters.