

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

M. Pessaraki and David Kopec
University of Arizona

Objectives:

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

Start Date: 2006

Project Duration: two years

Total Funding: \$20,000 (current cycle)

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 general grass quality under drought stress conditions at 2.5- and 5-cm mowing heights.

The grasses were grown as vegetative propagules in cups, 9-cm diameter and cut to 7-cm height. Cups were placed in stainless steel cans (45.7-cm diameter, 55.9-cm height), filled with fritted clay as plant anchor medium. Two mowing heights (2.5 and 5 cm) and 3 replications of each mowing height were used in a split-plot design trial in this investigation. The grasses were grown under normal conditions (daily irrigation, weekly fertilization, and weekly clipping) for 6 months to produce equal size and uniform plants before initiation of the stress period.

The drought stress started by completely saturating the cans, then

Grass ID	Quality (1-9)	
	5-cm height	2.5-cm height
A37	6.5bcd	6.5bcd
A49	5.9cd	7.6a
A50	5.8d	5.4ef
A60	5.9cd	4.8f
72	7.5a	7.9a
A86	6.5bcd	5.9de
A107	6.4bcd	6.5bcd
A126	5.8d	6.2cde
A128	5.9cd	6.2cde
A138	7.1ab	7.0abc
239	7.1ab	7.2ab
240	6.6bc	7.2ab

*The values are the means of 3 replications of each treatment at 14 weekly (7 bi-weekly) evaluations.
** The values followed by the same letters in each column are not statistically different at the 0.05 probability level.

Table 2. Saltgrass quality under drought stress at 2 mowing heights.

depriving the grasses from water and fertilizer for a period of 4 months. During the stress period, shoots were clipped bi-weekly for the evaluation of growth and dry matter (DM) production. The harvested plant materials were oven dried at 60° C and DM weights were measured and recorded. The recorded data were considered the bi-weekly plant DM production.

Grass general quality was weekly evaluated and recorded.

Two months after initiation of the drought period, the first sign of stress (leaf curling) was shown. Grasses gradually showed more signs of wilting (finally, permanent wilting, and eventually death or dormancy). At the end of the 4-month drought stress period, the majority of the plants were dead or gone to dormancy stage. All the grasses were re-watered for the recovery rate determination.

The results for the dry matter (DM) production and the grass general quality are presented here in this research summary in Tables 1 and 2.

Summary Points

- For all clones, at either mowing heights, saltgrass shoot length and shoot (clippings) dry matter (DM) wt. decreased linearly as drought period progressed. However, there were significant differences among the shoot lengths and DM wt. of different clones at any mowing height and at each harvest (bi-weekly growth).
- For most clones, there was no difference among the shoot lengths or clipping DM wt. between the two mowing heights. For all clones, general quality of the grass followed the same pattern as the shoot (clippings) DM wt. It decreased linearly as drought period progressed. However, general qualities of various clones were significantly different than each other at either mowing height and at any weekly evaluation.
- Most of the clones at the 2.5-cm mowing height maintained their green color for a longer period.
- Considering all the study parameters together, there was a wide range of drought and mowing tolerance found among the various saltgrass clones.
- Among all the studied clones, clone 72 was superior and the most tolerant to combined effects of drought and mowing stress, while clone A60 was the least tolerant.

Grass ID	Shoot length (cm)		Shoot D.M. (g)	
	5-cm ht.	2.5-cm ht.	5-cm ht.	2.5-cm ht.
A37	3.8ab	2.6ab	0.15bc	0.12bc
A49	3.1bc	2.5abc	0.20ab	0.23a
A50	2.0de	2.1bcd	0.18ab	0.24a
A60	2.0de	2.1bcd	0.05d	0.07c
72	2.6cd	2.8a	0.23a	0.26a
A86	2.7cd	1.8de	0.12c	0.15b
A107	2.3cde	2.0cd	0.10cd	0.12bc
A126	2.7cd	1.7de	0.12c	0.13b
A128	4.4a	2.9a	0.18ab	0.23a
A138	1.9de	1.9d	0.19ab	0.26a
239	1.7de	1.7de	0.23a	0.26a
240	1.4e	1.3e	0.20ab	0.23a

*The values are the means of 3 replications of each treatment at 7 bi-weekly harvests.
** The values followed by the same letters in each column are not statistically different at the 0.05 probability level.

Table 1. Saltgrass shoot length (cm) and dry matter (DM, g) under drought stress condition at 5- and 2.5-cm mowing heights.