Selection of Turf Type and Seed Production of Inland Saltgrass

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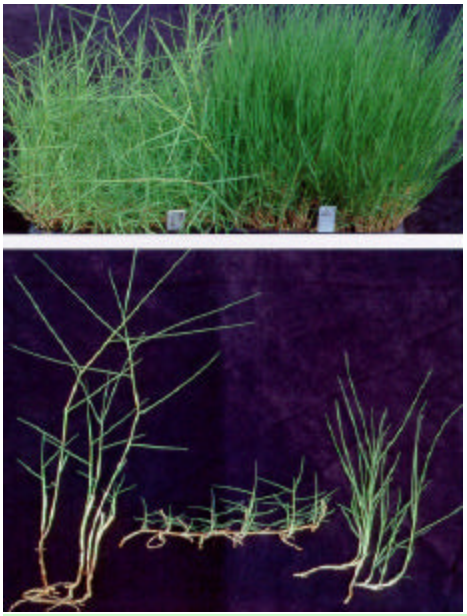
Objectives:

1. Determine turf performance of seven elite CSU-USGA lines, seven elite University of Arizona lines, and seven Great Basin lines from the University of Arizona.
2. Determine the range of stress tolerance (drought, salinity) present in inland saltgrass.
3. Determine seed production of seven elite CSU-USGA lines.
4. Evaluate Kopec collection and Northern Great Plains collection.
5. Evaluate seed germination and seedling vigor of all crosses.
6. Evaluate RAPD as a means of identifying unique genotypes of saltgrass.
7. Determine the relative chromosome number of elite clones.
8. Study the viability and germination requirements of inland saltgrass seed.
9. Evaluate seed priming as a possible method by which germination can be improved.

Start Date: 1998
Project Duration: 5 years
Total Funding: $125,000

Selected lines were evaluated for turf quality and related criteria. The Great Basin lines exhibited winterkill and were replaced by selected lines derived from seed collected from Modoc, California. Clones A138 & A55, collected from the same sight, had the highest shoot densities and overall turf appearance while the CSU-USGA had the lowest shoot densities with the exception of C10 and C8.



Saltgrass plants with 38 or 40 chromosomes. The plant at right in each photograph has 2n = 38 chromosomes, those on the left have 2n = 40 chromosomes. Although saltgrass from different localities is quite variable in appearance and some exceptions have been observed, the different plant habits are remarkably well associated with cytotype among the accessions collected for this study. The large plant at left in the bottom photograph is the 40-chromosome accession from the Gulf coast of Florida, the accession in the center was collected in Fresno, California, and the accession on the right was collected in Denver, Colorado.

We are applying for plant patents on the best line. Seed production of the seven elite CSU-USGA lines was observed to be high although the plants were tall. The application of a burn treatment does not appear to increase seed production.

The germplasm nursery, consisting of 190 clones, has demonstrated good overall seed production. Flowering and green color was apparent in saltgrass in a year when drought conditions resulted in browning and poor flowering in buffalograss, blue grama, crested wheatgrass and bermudagrass plots.

Seed from open pollinated females and single crosses of elite clones showing high raceme number, apparent rust resistance and short height were collected. Many females lines, in 2000 & 2001, showed seed production in excess of 1000 lbs of clean seed per acre. Sickle bar, rotary mower and Yard-Vac harvesters all showed promise for harvesting acreage amounts of saltgrass seed.

Chromosome counts of 160 clones and lines derived from seed have been made. There are broad regional separation of chromosome types with 2n = 4x = 38-chromosome plants found primarily east of the Rocky Mountains with some found in northern California across Nevada into Idaho. The 2n = 4x = 40-chromosome plants are found primarily west of the Rocky Mountains. Higher chromosome counts of 2n = 72+ have been found among both 38- and 40-chromosome regions at greater than 15%.

Saltgrass plants with 40-chromosome and related higher polyploids exhibit in the region west of the Rocky Mountains tend to exhibit more horizontally-oriented leaves, while the plants from the region with 38-chromosome plants were more vertical. Although leaf angles do vary within these regions, there does appear to be this general relationship.

Scarification of seed, either by hand or mechanically, leads to relatively high germination rates of viable seed. In preliminary tests in the laboratory, seed priming speeds germination. Also in preliminary tests, RAPDs appear to provide a means of fingerprinting specific clones of saltgrass.

Summary Points

- Evaluation of 190 clones of saltgrass demonstrated that high seed production is possible with selection of the better lines.
- Selected lines had yields of greater than 1000 lbs/acre.
- Seed scarification is necessary to obtain uniform and high germination percentages.
- Saltgrass exhibited good green color and high flower production under drought conditions when buffalograss, blue grama, crested wheat, and bermudagrass turned brown.
- Saltgrass can be separated into three broad categories based on chromosome numbers of 2n = 4x = 38, 2n = 4x = 40 and higher levels of 72+.
- Saltgrass plants found generally east of the Rocky Mountains (2n = 38-chromosome plant type) appeared to have more vertical oriented leaf angles while those west of the Rocky Mountains (2n = 40-chromosome type) appeared to have more horizontally oriented leaf angles.