

Year two of Mojave Desert Project with BLM and High Desert RC&D



Tucson Plant Materials Center
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2006 Activities

Year 2006, the second year of a reimbursable project with the BLM and High Desert RC&D, was focused on Vegas germplasm Alkali sacaton (*Sporobolus airoides* Torr.). Vegas germplasm was co-released by the NRCS Tucson Plant Materials Center and the BLM-Las Vegas Field Office as a selected class of certified seed. A second year of data was collected on the original G0 fields established during summer 2005. Both seed and hay bales were harvested from that field twice during the year. Production fields of this release (the G1 generation) were established at two locations in southern Nevada, as well as at the Tucson PMC in Arizona.



Increase Field of Alkali Muhly in June

A field of the second species of this project, Alkali muhly (*Muhlenbergia asperfolia*), which was established in late 2005, began the process of growing into a continuous sod in spring of 2006. Only at the end of the growing season in October of 2006 did seed mature, which suggests seed ripening for this species is day length sensitive.

Continued Evaluation of Foundation Field of Alkali sacaton

Second year of data collection at the PMC

Data were collected and analyzed on growth and reproductive characteristics of the G0 Alkali sacaton field for the second year. Again, only the two center rows were used for data collection and analyzed using Statistix (8.1). Randomized complete block AOV and LSD All-Pairwise Comparisons Tests were conducted.

In early April, informal observations of certain characteristics determined differences early in the growing season. Sacaton Canyon and Moapa accessions were the first to develop inflorescence stalks, thus were the earliest accessions to begin the reproductive process. Size classes continued to follow the trends of last year, with Sacaton Canyon visually largest, Pahrnagat and Moapa medium-sized, and Ash Meadows the smallest.



Crossing block field of Alkali sacaton at the Tucson PMC

In May, a more formal evaluation of early reproductive stages of the four accessions were collected from all individual plants. Data were recorded on the presence of reproductive structures (inflorescence or flower) and presence of seed (Table 1).

Table 1. Early reproductive stages of the four accessions

Accession	Reproductive structures (inflorescence or flowers) ¹ N=400	Seed presence (%) N=400
Moapa	2.95 a	90 a
Pahranagat	2.71 b	11 b
Ash Meadows	1.88 c	1 b
Sacaton Canyon	3.00 a	74 a

¹ Values fall along represent the a likert-like scale of least to greatest maturity, where 1=no inflorescence stalks, 2=presence of stalks, and 3=presence of flowering. Values followed by the same letter are not significantly different ($\alpha=0.05$)

Moapa and Sacaton Canyon were significantly more advanced in their reproductive season than Pahranagat, which was significantly further along than Ash Meadows. Not only were the majority of Moapa and Sacaton Canyon in the flowering stage in May ($p<0.0005$), but the majority were producing seed as well, significantly more than the other two locations ($p<0.0005$). These findings follow the same trends of the previous year.

Data collection also took place during mid-growing season (June) and the end of the growing season (September). Following methodology similar to the evaluation of the previous year, in June randomly selected individual plants from each 10-plant unit were clipped 3 in from the base of the plant in order to measure specific growth characteristics. This year weight, number of inflorescences and rust (scale of 1-6) were evaluated to compare the four accessions.



Leslie and Megan prepare a plant for evaluation

Table 2. Growth Characteristics of the four accessions

Accession	N	Weight (g)	Inflorescences (#)	Rust Score
Moapa	10	424 ab	89.3	2.6 a
Pahranagat	10	333 bc	87.5	1.5 b
Ash Meadows	10	249 c	48.5	3.3 a
Sacaton Canyon	10	533 a	92.8	2.3 ab

Values followed by the same letter are not significantly different ($\alpha=0.05$)

Forage from Sacaton canyon plants was significantly heavier than Pahranaagat and Ash Meadows ($p=0.0014$). Ash meadows had only about half the number of inflorescences than the other three accessions, although the difference was not significant ($p=0.122$). Moapa and Ash Meadows had significantly greater rust scores than Pahranaagat ($p=0.016$), perhaps due to the shading effect of the larger accessions in the field. Data on seed maturity was collected during September prior to the seed harvest. All four accessions had mature seed, and no significant difference was found in amounts of mature seed per accession ($p=0.9825$). The consequence of this variable is crucial to the development of this species release, as genetic material from all four accessions needed to be transferred at harvest to develop the following generation of plants.



Mary inspects an inflorescence for presence of mature seed (June 2006)

Harvest of Plant Materials

Seed and hay bales were harvested from the foundation field; both are plant materials of value for commercial growers and land managers. Seed was harvested twice during the year: 10.5 lb in June and 11.8 lb in September. The field was mowed twice during the year, and the second cut was baled into 8 hay bales.

Seed was cleaned using the Hammermill, followed by the Clipper (Top screen 1/18, bottom screen 6 x 50). There was a noticeable difference in seed size when put through the clipper, so seed were separated into “small” and “large” seed, to ensure that equal amounts of each size were represented in the following generation of plants.



Leslie cleans Alkali sacaton seed with the clipper

Increase of Vegas Germplasm Alkali sacaton

Establishment of Commercial Production Fields in Nevada

Approximately 18,000 plugs of Vegas germplasm Alkali sacaton were grown in July to establish increase fields in Arizona and Nevada. Roughly equal numbers of “small” and “large” seed types were grown. During the week of September 25, plugs were transported from the Tucson PMC to two southern Nevada farms in Overton (in the Moapa Valley) and Pahrump. The two farms were selected to grow seed commercially for this project by the High Desert RC&D. Although they had no prior experience with native seed production, their enthusiasm was promising. Both farms were in close proximity to some of the original seed collections that were used to develop the release, and presumably, good adaptability for the seed (Fig 1). This is a pilot project, so the process of establishing first-time native seed growers through a collaborative project between two federal agencies and the local RC&D is completely experimental.



Ramona and Megan assemble plugs into crates for transport to Nevada

It was apparent immediately that inexperience in farming would require additional assistance by all of the partners involved. Explanation of field preparation remotely, through phone and email, was not sufficient. The first planting took place in Pahrump, at the size of 0.5 ac. Unfortunately the soil was not ripped sufficiently (16 in) prior to the planting thus the plugs could not be planted efficiently with the planter. The great majority of plugs had to be re-planted by hand; limiting the planter’s utility to spacing of plugs at 1.5 ft apart.



Planting at Sunrise Acres Farm in Pahrump

The planting at Moapa School of 1.5 ac was more encouraging; assistance was provided and the soil was properly prepared, however immediate problems were apparent.

Although the soil was worked more deeply and the planter functioned at this location more efficiently, Bermuda grass, a noxious weed, had not been controlled and was distributed throughout the field. Although instructions had been given to kill the Bermuda grass by spraying the field prior to

planting, the producer apparently assumed that disking the field would be sufficient. With trepidation on part of the partners, the planting took place, with instructions to keep the Bermuda grass out of the planting through manual control. Considering the labor force available at this farm (students), and the incentive payments provided to pay for it, this task would be difficult but still possible. The cooperators left the second site as frustrated as the first. A trip report was written describing the experience, as well as additional suggestions for each site to solve the current problems.



Students drove the tractor and used the planter at Moapa School

Increase Fields at the Tucson PMC in Arizona



Increase fields of Vegas germplasm alkali sacaton at the PMC (October 2006)

Far too many plugs were grown to use for the plantings in Nevada, so the majority of extra plugs were returned to the PMC. Sufficient plugs were available to plant two borders of a total of 0.65 ac of Vegas germplasm at the PMC in mid-October. Seed from this release would be available no matter what resulted at the new production fields in Nevada.

Figure 1. Alkali sacaton (*Sporobolus airoides*) and Scratchgrass (*Muhlenbergia asperifolia*) collections and planting locations

