

Collection and Evaluation of Native Grasses from Grazed Arid Environments for Turfgrass Development

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Objectives:

1. Collect native grasses from rangelands with long history of livestock grazing in southern Arizona.
2. Evaluate primary growth habit-related characteristics of collected clones.
3. Evaluate relationships among characteristics in clones evaluated and select clones for field evaluation based on a simple index involving independent culling levels.

Start Date: 2008

Project Duration: three years

Total Funding: \$29,993

There is a nationwide effort to use native grass species in turf systems, as most species used now are typically non-native.

From July to September 2007, almost 300 clones from seven species of perennial range grasses were collected in Arizona which included curly mesquite, false grama, sprucetop grama, wolftail, blue grama, black grama, and hairy grama. These clones were propagated and grown under near-optimal conditions in a greenhouse.

In early January 2008, and again six weeks after a "grazing" (severe defoliation) event, data were collected from plants actively growing in the greenhouse. These included (1) plant height (2) plant diameter in two directions, and visual scores for (3) innate plant density, and (4)



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overall turf quality (1-5, 5 = best for the latter traits).

Height/width ratios (lower values suggest a "wider" than "taller" growth habit) before and after defoliation were relatively consistent up to a value of 5, for pre- and post-defoliation measurements, respectively. Stem and box plot data show that there may be considerable useful variation for growth habit in curly mesquite, wolftail, and sprucetop grama.

These species had a low H/W ratio before defoliation. After a single defoliation event, most clones exhibited increased height, with some variation remaining for low H/W ratio growth response for curly mesquite, wolftail, and sprucetop grama. Other species showed very little variation for H/W ratios following defoliation. When plotted against the average of turfgrass quality and density scores after defoliation, clones with the lower height/width ratio values had the greatest numerical mean quality-density averages.

Based on the greenhouse results, 100 clones across all species were selected and planted as replicated plant propagules in a mowed spaced-plant nursery. Plants were mowed 3 times per weekly at a 3.0-inch height. Plant width data showed good growth in plant size from August 2008 to

May 2009, with many bunch grass species having girths of 80-120 cm, or more, along with high shoot densities.

By June, the overwhelming majority of clones developed necrotic centers, which seriously detracted from turf quality. Among the bunchgrasses, sprucetop grama (*B. chondoisoides*) had the least expression of this trait. Both blue and black grama selections did not produce satisfactory quality turf parameters under the high heat conditions realized, but sprucetop grama did.

Most wolftail clones (*Wolfii tailii*) exhibited extreme lateral growth, but produced too many necrotic stems for turf acceptance. Seed collection efforts of spruce top grama have increased.

Summary Points

● 300 clones from seven species of perennial range grasses were collected from a 150-mile radius of Tucson. 100 bunchgrass and 100 stoloniferous grasses were selected for field evaluation under regular mowing.

● Most bunchgrass species either had poor shoot density or produced concentric necrotic "straw rings" within the first year's growth. After one summer of field screening, sprucetop grama has the largest percentage of its selected plants with good turf quality under mowed field conditions.