

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. This study involves initial collection and description of growth characters of native range grasses as mowed and unmowed plants. The research may result in populations of native grasses that are suitable for use in turf plantings in the southwestern U.S. Procedures we perfect in this research may be used in projects to evaluate native plants for potential turf development.

From July to September 2007, almost 300 clones from seven species of perennial range grasses were collected from a 150-mile radius of Tucson, Arizona from rangelands with a known history of intensive livestock grazing. Collections included the sod-forming grasses, curly mesquite, and false grama, and the bunch-grasses 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) overall turf quality (1-5, 5 = best for the latter traits). During this phase of our research, clones noted by mere subjective observations were identified as "flagged" clones.

Height/width ratios (lower values suggest a more "wider" than "taller" growth habit) before and after defoliation were relatively consistent up to a value of



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5, for pre- and post-defoliation measurements, respectively. Interestingly, subjectively "flagged" clones were very close to the 1:1 line of best fit.

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. In this case again, the "flagged" clones were again close in fit to the 1:1 line of H/W vs. the mean quality and density scores. This data set shows that that plant height alone is not related to turf quality or density, but the height/width ratio is a better predictor of turf quality.

The next phase of research includes the establishment of clonally replicated spaced-plant nurseries (accomplished in August 2008) that include clones selected based on greenhouse performance. Field evaluations will involve the same measurements taken in the greenhouse, but also the response of these clones to regular mowing events. In addition to the identification of clones appropriate for use in turf plantings, results from this component of the projects should allow for determination of the utility of greenhouse-based measurements for predicting actual turf quality in the field.

Summary Points

- From July to September 2007, almost 300 clones from seven species of perennial range grasses were collected from a 150-mile radius of Tucson.
- There may be considerable useful variation for growth habit in curly mesquite, wolftail, and sprucetop grama.
- Plant height alone is not related to turf quality or density. The height/width ratio is a better predictor of turf quality.