Development of Seeded Turf-type Saltgrass Varieties

Dana Christensen and Yaling Qian
Colorado State University

Objectives:

1. Evaluate new collections and Cycle 2 population. Select parents from these and intercross for the Cycle 3 population.
2. Screen the collection for rhizome depth.
3. Evaluate selection's potential for commercial seed harvest.
4. Correlate meristems to plant size.

Start Date: 2006
Project Duration: three years
Total Funding: $78,822

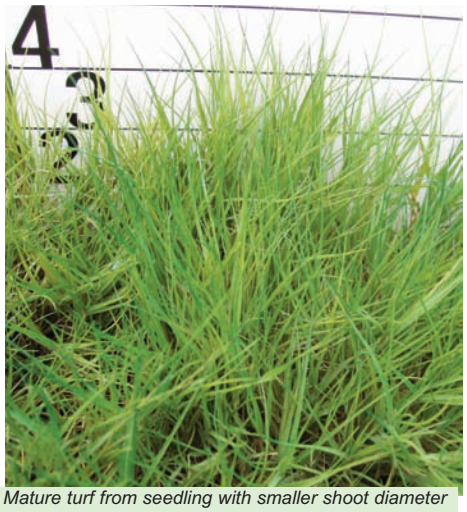
The native grass, desert saltgrass, has potential in western US golf courses because of its traffic resistance and tolerance of salty soils and water. Under these conditions it outperforms other drought resistant species such as buffalograss, bermudagrass, and blue grama.

The 3000 Cycle 2 plugs, planted August 2007, grew into their 3 by 3 foot plots this year. Each plug represents a different phenotype. We took measurements on percent grow-in, flowering dates, spike numbers, height, verdure, and leaf shred from mowing.

Resistance to leaf rust (*Puccinia subnitens*) has been an important trait for selection, as the disease can render saltgrass leaves brown the first week of August. This past year, natural infection along the Front Range of Colorado has been spotty and we have resorted to making collections of uredia (spores) throughout northeast Colorado. About 50 pounds of infected leaves are washed in 100 gallons of water with a commercial spray adjuvant/surfactant. The material is screened through cheese cloth, the cloth is washed, and all supernatant is put into a sprayer and sprayed onto nursery plants immediately.

Wild population behind chairs, Cycle 2 turf in front of chairs

Natural disease pressure can usually be quantified in June, so that collecting and artificial inoculation can be planned, if necessary, for the first week of August. We speculate the daily morning dews in August aid infection, since this is the time of year of natural re-infection by urediospores. Susceptible check phenotypes showed telia development in September. Ratings on telia on all plants can be made in October, using a modified wheat leaf rust rating. Inheritance of resistance is complex, and progeny testing is used to track resistance genes.



Mature turf from seedling with smaller shoot diameter

It is established that the size of an organ is proportional to the size of the meristem from which it develops. Based on this, large shoot meristems should give rise to large shoots, and small shoot meristems should give rise to small shoots. Correlations also exist between small shoots and high shoot density and large shoots and low shoot density. Between 1960 and 1980, there was a flurry of activity in measuring correlations and correlated responses in many species. Some of the success in breeding for turf traits can be attributed to positive correlations among turf traits.

Harvesting 2 cm long shoots to measure diameter

Much of the effort in a breeding program is planting and maintaining the nurseries. If the material going into the outdoor nursery were higher caliber, it would present increased efficiency in selection. We set up an experiment in which we measured the diameter of 2-cm long shoots of random new progeny seedlings in the greenhouse. We transplanted this experiment into the field and, after a year, measured height and shoot density. Seedlings with small diameter shoots matured into turf with shorter height and higher shoot density.

Summary Points

- Phenotypes planted in August 2007 were evaluated for percent fill-in, flowering date, height, and mowing quality.
- Artificially inoculate the nursery with leaf rust and rate response.
- Seedlings with small diameter shoots mature into turf-type plants.