

Improvement of Water Management Strategies and Practices

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Objectives:

1. Collect, evaluate, and improve grass germplasm to reduce water use and other inputs on turfgrass stands.
2. Develop an understanding of the ecology and physiology of promising plant materials for the western U.S.
3. Evaluate promising North American and Asian plant materials for their use on public and private lands.
4. Facilitate germplasm exchange with Asian scientists.

Start Date: 2007

Project Duration: two years

Total Funding: \$35,000

This research involves the collection of seeds of promising reduced-input turfgrasses in Eurasia and their subsequent evaluation in representative field environments in Utah. The objective of this research is to identify germplasm that may be used for reduced-input turf in the western U.S.

Dr. Douglas Johnson from the FRRL joined staff from the N.I. Vavilov Institute of Plant Industry (VIR) in St. Petersburg, Russia to collect seeds of reduced-input turfgrass species in Kyrgyzstan (2006), northwestern Russia (2007), and the southern Ural Mountains of Russia (2008). Seeds were collected in the field, cleaned, and cataloged, and then exported to the U.S.

During 2006, 92 collections of *Agrostis*, *Festuca*, *Trisetum*, *Poa*,

Puccinellia, and other species used in the U.S. turf industry were made in Kyrgyzstan. These were planted in replicated field trials at Evans Farm at Logan in June 2007. During June 2008, Dr. Rob Soreng from the Smithsonian Institution obtained vouchers and taxonomically verified these collections. These collections will be evaluated for their drought tolerance and turf quality characteristics under 50% ET_o irrigation in 2009 and 2010.

During 2007, 49 collections of *Agropyron*, *Agrostis*, *Festuca*, *Koeleria*, and *Poa* were made in northwestern Russia that may have potential for reduced-input applications in the western U.S. In 2008, 42 collections in the genera *Agrostis*, *Festuca*, *Koeleria*, and *Poa* were also made in the South Ural Mountains of Russia.

These 91 collections from Russia will be evaluated in replicated field trials at the Greenville Farm at Logan and the Wasatch Front at the Utah Botanical Center near Kaysville. Transplants of these

Russian collections will be established in June 2009 and maintained under 50% ET_o irrigation. During 2010 and 2011, the most drought-tolerant materials with favorable turf quality characteristics will be identified under water-limited conditions.

A greenhouse salt screening experiment was completed, evaluating primarily accessions of *Poa pratensis* and some other *Poa* species. The experiment was conducted twice with sufficient replicates, and results are nearing publication.

Stimulated by a grant from the United States Golf Association, we brought on a Ph.D. student (Shyam Shridhar) to identify genes that respond to salt stress in *Poa*. Shyam completed the RNA-based differential gene expression technique and is currently cloning and sequencing the candidate genes. *Poa* collections, intended for water deficit stress response evaluations, are established in a replicated trial in the field.

A field study of fine fescue collections from central Asia was initiated to evaluate turf potential under low maintenance conditions characteristic of the Intermountain West.

Summary Points

- Many grasses of various species, have been collected in natural settings in Kyrgyzstan (2006), northwestern Russia (2007), and the southern Ural Mountains of Russia (2008). Many of these grasses have been planted in field trials to evaluate their turf potential and low water use efficiency.
- USDA germplasm and other *Poa* germplasm was screened in the greenhouse for salt tolerance.
- A Ph.D. student is using biotechnology to identify genes that confer salt tolerance in *Poa*.
- A collection of fine fescues were established in a field trial to evaluate their performance under low maintenance conditions.



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