

Cultivar Development and Extreme Temperature Tolerance of Greens-Type *Poa annua*

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Objectives:

1. Collect, select, breed, and develop genetically stable and phenotypically uniform cultivars of greens-type *Poa annua* for commercial production.
2. Develop techniques to screen large numbers of germplasm accessions for tolerance to extreme temperatures and coverage by sheets of ice.
3. Identify genetic markers associated with genetic loci (genes) controlling agronomically important traits and specific stress tolerances in order to aid in the breeding and development of improved cultivars of greens-type *Poa annua*.

Start Date: 1998

Project Duration: 5 years

Total Funding: \$175,000

The purpose of this research is not to replace creeping bentgrass as a putting surface, but to offer an alternative grass to those golf courses where *Poa annua* L. is simply a better choice. The main focus of this project is to develop commercial seed sources of uniform and stable cultivars of greens-type *P. annua*.

2000 Trial Many of the 60 selections continued to display superior turf quality throughout the 2002 growing season. Differences among selections have been observed for resistance to naturally occurring dollar spot disease and anthracnose disease. The results thus far suggest that most selections in the breeding program are capable of being successfully established and maintained on sand-based root-zones, and that several selections have superior turf quality.

2001 Trial The 12 large demonstration plots are our "top 12" most elite cultivars. The regular cultivar plots contained several of the better performing cultivars from



Annual bluegrass nursery at Pennsylvania State University.

the 2000 trial along with more recently collected cultivars. Differential susceptibility to anthracnose was observed among all cultivars.

2002 Trial The 12 large hyperodes weevil plots contain a range of cultivars with different turf qualities. Regular cultivar plots also contain a range of variation including several of the better performing cultivars from the 2000 and 2001 trials along with more recently collected cultivars.

Dr. David Green at Cal Poly established plots of the "top 12" on an experimental golf green in November, 2001. By all accounts, several of the top 12 cultivars are exhibiting turf quality superior to that of creeping bentgrass. Differential susceptibility to anthracnose disease has also been observed among cultivars. Dr. Gwen Stahnke at Washington State Univ. established plots of some of the "top 12" along with several other breeding cultivars to give a range of diversity among plots. These plots were established in spring, 2002.

In fall, 2002, approximately 15 pounds of seed was used to overseed existing greens at two Pittsburgh area golf courses. These Pennsylvania projects are being performed under the direction of Keith Happ, USGA Regional Agronomist.

In August, 2001, approximately 20 pounds of seed, pooled from eight different selections of greens-type *Poa annua*, was used in a mixture (50:50) with a creeping bentgrass blend to establish four greens and two practice greens on a Rye, New York golf course. These greens became established in spring, 2002 and performed well

during the environmentally stressful summer of 2002. This New York project is under the direction of Dave Oatis, USGA Regional Agronomist.

The total seed harvest of 2002 yielded approximately 27 pounds of seed from all cultivars. Several different means of mechanical harvesting were evaluated. Additional mechanical harvesting techniques will be evaluated in spring, 2003.

Additional collections were made from several golf courses having predominately *Poa* greens from : 1) Australia: Sydney, Adelaide, Melbourne, and Tasmania; 2) New Zealand: Palmerston North and Auckland; and, 3) two higher elevation golf courses in Sweden.

We are continuing our long-standing collaboration with Drs. Julie Dionne (University of Guelph) and Yves Castonguay (Agriculture Canada) by supplying interesting germplasm for their research into the mechanisms of cold tolerance and disease resistance.

Summary Points

- Differential susceptibility to anthracnose disease has also been observed among cultivars.
- The total seed harvest of 2002 yielded approximately 27 pounds of seed from all cultivars. Several different means of mechanical harvesting were evaluated.
- Additional collections were made from several golf courses having predominately *Poa* greens from Australia, New Zealand, and Sweden.
- Collaborative cold tolerance investigations are continuing.