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

Strains exhibiting the best turf quality typically have the lowest seed yields. The seed yield of some greens-types *Poa annua* are so low that they might not be cost effective to produce for the marketplace. Nonetheless, these strains are being increased because currently seed costs are only a small part of the overall cost of new green construction and establishment.

We are currently harvesting seed as either mower clippings or by vacuuming seed directly off of uncut inflorescences. The spring 2000 seed harvest produced approximately 12 pounds of seed (the combined total of all selections). This seed was earmarked for regional trial testing.

Levels of contamination from wild, weedy strains of *Poa annua* within these seed lot could not be reliably determined. Therefore, the establishment of regional trails will be postponed until Fall, 2001.

An on-site evaluation trial was established at the Valentine Research Facility in Fall 2000 using weed-free seed from 60 of the breeding program's finest selections. Each of these selections has been planted into seed increase fields in Fall, 2000. The program should be capable of harvesting enough seed of these 60 selections in Spring, 2001 to establish a regional test in Fall, 2001.

Annual bluegrass nursery at Pennsylvania State University.

The project's experimental green for root zone examination (planted Fall,1999) has become established this year and the camera inserts (two per plot) have been installed. This experimental green is the project of Eric Lyons, an NSF Graduate Student Fellow, whose goal will be to elucidate the root biology of greens-type *Poa annua* under extreme temperatures (both heat and cold) throughout the growing season.

George Hamilton's Ph.D. dissertation research on the cold and ice coverage tolerance continues to detail differences between *Poa annua* and creeping bentgrass in terms of temperature and day length sensitivity during the hardening process.

The breeding program is continuing its long-standing collaboration with Ms. Julie Dionne (Laval University) and Yves Castonguay (Agriculture Canada). Her results are also giving us new directions to focus our future research.

Heat tolerance testing of greens-type *Poa annua* selections continues to be the weak link in the project. During spring 2000, samples of greens-type *Poa annua* were collected from golf greens located in the mid-Atlantic region through the organization and helpful assistance of Mr. Stan Zontek, Director, USGA Mid-Atlantic Region.

Summary Points

- General problem remains: best turf types are the low (or limited) seed producers.
- Root biology will be evaluated under high and low temperature stress using field camera tubes.
- Substantial effort devoted to request the US Patent and Trademark Office to re-examine the Minnesota Utility Patent (US Patent 5,912,412).
- Cooperating with Laval University on cold hardiness.
- Regional testing of 60 selections scheduled for Fall, 2001.