Evaluating Methods for Vegetative Propagation and Enhancement of Seed Production of Greens-type Poa annua *Cultivars*

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Objectives:

1. Establish efficient vegetative propagation methods of greens-type *Poa annua* for sod production and for establish ing/renovating golf course putting greens.
2. To scale-up our results for greens-type cultivar production to a larger commercial level by collaborating with sod producers.
3. To release a genetically stable, vegetative greens-type cultivar exhibiting superior putting green quality and stress tolerance.

Start Date: 2008
Project Duration: two years
Total Funding: $20,000

Poa annua is widely recognized to provide a large portion of high quality putting surfaces in many regions of the U.S., Canada, Australasia, and Scandinavia. However, despite repeated attempts to develop improved cultivars of greens-type *Poa annua* for the golf course industry, there currently are no commercially available sources suitable for use in new construction or renovation. Our previous genetic research suggests that the perennial greens-type phenotypes result from the action of mowing which causes a repression of the plant growth hormone gibberellic acid (GA) signaling pathway through a non-Mendelian epigenetic mechanism.

A somewhat analogous situation occurs in the wild, weedy annual-types of *Poa annua* from applications of plant growth regulators, such as Primo. However, in the absence of the mowing stimulus, the GA pathway progressively becomes unsilenced resulting in reversion of the greens-type plants back to the annual type. The annual type is undesirable as a putting surface and requires years of mowing in order to develop a perennial greens-type form. We believe that the genetic stability of perennial greens-type *Poa annua* is capable of being maintained through vegetative propagation in combination with mowing.

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We established vegetative plots using different source plant materials including aerification cores, solid sod, and shredded sod/plugs. Planting densities of these materials were varied in order to maximize the limited amount of our planting stock while, at the same time, attempting to achieve full coverage in a reasonable amount of time.

We also began evaluating vegetative establishment in the greenhouse in combination with the exogenous applications of gibberellic acid in an attempt to further reduce the time required to achieve full coverage. All greenhouse and field plots are being mowing to a height of 1 cm (approx. 3/8 inch) as soon as possible after plant materials have rooted in order to maintain the greens-type phenotype.

This year, we were fortunate enough to supply vegetative planting material of greens-type *Poa annua* to turfgrass researchers at 5 universities participating in the Northeast 1025 Project titled: "Biology, Ecology, and Management of Emerging Pests of Annual Bluegrass on Golf Courses".

Future expectations of this research project will be to extend the most successful techniques identified for the vegetative propagation of greens-type *Poa annua* to a larger scale approaching that of commercial sod production. Vegetative material from the previous vegetative propagation studies will provide the necessary planting material for us to work directly with interested sod producers for an evaluation of scaled-up production. Ultimately, our research will enable the commercial availability of greens-type *Poa annua* cultivars that possess high turf quality, disease resistance, and stress tolerance which will significantly reduce inputs for the management of *Poa* greens and will increase the supply of greens-type *Poa annua* for turfgrass scientists throughout the USA to conduct valuable collaborative research in other areas of *Poa annua* golf course management.

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Summary Points

- Our research continues to indicate that the dwarf nature of perennial greens-type *Poa annua* results from an epigenetic inhibition of the biosynthetic pathway for the plant growth hormone gibberellic acid (GA).
- We demonstrated that greens-type *Poa annua* is responsive to exogenous applications of gibberellic acid which may aid in its vegetative establishment.
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