Improvement of *Poa annua* var *reptans* for Golf Turf

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Goals:

- Expand the evaluation and development of the advanced selections for turf quality, seed production, and seeding recommendations.
- Continue and expand seed production evaluations in Oregon.
- Continue and expand the development of a "breeder's" seed supply.
- Expand seeded evaluation plantings at selected golf course and university locations.

Three selections (Minnesota #'s 42, 184, & 208) were approved for release by the Minnesota Agricultural Experiment Station - Horticultural Plant Release Committee on 14 February 1994. Materials were approved for release under exclusive agreement to Peterson Seed Co., Savage, Minnesota. An exclusive agreement was subsequently executed by the University of Minnesota Office of Research and Technology Transfer (Patents and Licensing) and Peterson Seed Company.

One-acre seed production fields for numbered selections MN#42 and MN#184; and 2 acres of MN #208 were seeded on November 12, 1993 at a site in Oregon under agreement with the Peterson Seed Company. Some of the seed was harvested with a John Deere lawnmower with a grass catching attachment and spread in windrows on paper to cure. However, most of the seed heads were cut with a standard grass seed windrower, which worked well. The grass was cut on June 20, 1994.

MN#42 had the most uniform heading and exhibited the least amount of shattering. MN#184 and MN#208 exhibited some uneven ripening and shattering. There are some indications that two harvests per season may be possible. MN#42 produced 291 total pounds of seed; MN#184 produced 170 total pounds and MN#208 produced 305 total pounds of uncleaned seed.

Three important conclusions from this experimental planting are: 1) the late (November) planting was far more successful than expected; 2) harvesting can be accomplished with standard equipment and practices; and 3) each of the selections produced sufficient seed to warrant continued seed production and introduction.

On the basis of the seed harvest and other factors, we decided, in consultation with Peterson

Seed Company, to concentrate on MN#42 as the first introduction from the program.

On the basis of the decision to concentrate on the introduction of MN#42, a new 5-acre planting of MN#42 was seeded in Oregon about November 1, 1994 for the production of breeder's seed.

The cytology and flow cytometry research has been essentially completed and is currently being written up. Earlier studies documented the occurrence of diploid (2N = 2X = 14) and tetraploid (2N = 4X = 28) *Poa annua* in our breeding populations. Subsequent field sampling on one golf green revealed the presence of diploids to a level of approximately 24% of the population on greens. Interestingly, no 2N = 14 types have been found in either the fairway or the rough *Poa* populations. The diminutive stature, fine texture, slow growth, and persistence appear to be clear indicators of the 2N = 14 types. All of the 2N = 14 types observed to date have been sterile.

The inheritance of flowering habit and expression of characteristics, under our observations, is influenced by environmental conditions. Observations of crosses between annual (continuous flowering) and perennial (seasonal flowering) type of *Poa* indicate a 3:1 ratio of continuous flowering to seasonal flowering types. If the model holds, it could indicate a single gene difference between continual and seasonal flowering perennial types.

Numerous investigations continue to determine critical photoperiod and vernalization requirements of flower induction in our four genotypes. Preliminary observations indicate that 39 to 46^{0}F is the optimal vernalization temperature and that vernalization is required for 10 to 12 weeks. Plants require no fewer than 4 to 6 leaves in order to be receptive to these flower induction stimuli.

For at least 2 of our genotypes, the critical photoperiod appears to be between 10 and 12 hours.

Other Highlights

- Seed mixtures of MN#42, MN#184, and MN#208 were sown for evaluation for compatibility and performance under putting green conditions.

- Crossing blocks have been constructed to maximize natural crossing and to develop populations for future selection.

- The top 2 percent of new progeny materials were identified for further evaluation. Plants were identified based on superior growth habit, color, disease resistance, vigor and density. These plants will be selfed to observe uniformity and stability of the characteristics.

- Plants resulting from seed of interspecific crosses between *Poa supina* and *Poa annua* have produced some unique plant types which exhibit dark color and vigorous growth habits. These materials will be observed for several generations, and they will be evaluated as parents.

- Preliminary experiments were conducted to investigate the potential for using gibberellic acid to aid in the removal of flowers on *Poa annua* turf. Some concentrations of GA induced sufficient culm elongation to allow removal of substantial portions of flowers under normal mowing conditions.

- Seed has been furnished to the University of Nebraska for a replicated evaluation planting and to the University of North Carolina, Raleigh, for an experiment in overseeding bermudagrass.