

# Cultivar and Traffic Effects on Population Dynamics of *Agrostis* spp. and *Poa annua* Mixtures

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Start Date: 1998

Number of Years: 3

Total Funding: \$74,820

Objectives:

1. *Assessing the population dynamics of turf mixtures comprised of annual bluegrass and individual cultivars of creeping and velvet bentgrass grown on soil and sand-based root zones.*
2. *Evaluating the influence of traffic stresses on the populations dynamics of individual bentgrass cultivars mixed with annual bluegrass.*
3. *Identifying the time of year when it is most effective to establish bentgrass cultivars with minimal annual bluegrass invasion.*
4. *Assessing the effect of environmental conditions at the time of germination on the expression of annual or perennial biotypes in a sward containing annual bluegrass turf.*

A number of cultivars of creeping and velvet bentgrasses have been released that exhibit greater phenotypic variation than was previously available. This affords the opportunity to assess the potential genetic differences in the competitive ability of these bentgrasses against annual bluegrass. The goals of this research project are, first, identify bentgrass cultivars that exhibit improved genetic competitive ability against annual bluegrass invasion under the influence of traffic. Second, determine if the time of year for establishment affects the competitive posture of bentgrasses against annual bluegrass invasion.

A trial was conducted in 1998 and 1999 on sandy loam to evaluate the influence of seeding date and bentgrass (creeping and velvet bentgrass) cultivar on the amount of bentgrass that will establish in competition with emerging annual bluegrass plants. First year results are available for the 1998 trial. The least invasion of *Poa annua* during establishment was for the June seeding date compared to all other dates. The second best establishment of bentgrass occurred with an August seeding, whereas seeding in September and October resulted in the lowest bentgrass populations. A seeding date by cultivar interaction occurred on all observations dates. *PENNCROSS* had consistently lower bentgrass population than other cultivars. *PROVIDENCE* had similar bentgrass population compared to *PENNA4*, *L-93* and *SR-7200* for the June, August and September seeding dates, but was less than these cultivars for the May and October seeding. *PENNA4* and *L-93* had consistently high bentgrass population for all seeding dates. *SR-7200* (velvet bentgrass) had similar bentgrass populations to *PENNA4* and *L-93* in the May, June and August seedings; however, *SR 7200* had lower bentgrass population than these cultivars in the September and October seedings. It is apparent that cultivar selection affects the success of renovating *Poa annua* infested turf. Further evaluation is needed to understand the importance of the interaction between seeding date and cultivar.

Field trials have been initiated to evaluate *Poa annua* encroachment into creeping bentgrass and velvet bentgrass cultivars maintained as putting green and fairway turf. These studies are assessing the bentgrass cultivars under the traffic stresses: wear, compacted soil, and wear plus compacted soil. Fairway and putting green trials were established on sandy loam with *Poa annua* population ranging from 10 to 19% in the fairway trial and 5 to 16% in the putting green trial. Traffic treatments were initiated in August 1999 and have affected turf quality. The combination of wear and compaction produced the lowest quality turf in the fairway trial. Ratings in August and October 1999 indicate that wear treatment has been more detrimental to turf quality than compaction treatment. There has not been a significant interaction between cultivar and traffic treatment, indicating that cultivar ranking under the non-trafficked conditions was statistically similar to the cultivar rankings under traffic. *Poa annua* and bentgrass populations will be assessed in November 1999 and in spring, summer and fall of 2000. A putting green trial was seeded 28 May 1999 on a sand-based (85:15 sand:peat by volume) root zone conforming to USGA guidelines. A mowing height of 3.2-mm (1/8-inch) was achieved on 9 September 1999. The entire experimental was overseeded in September and November 1999 with Petersen's creeping bluegrass (perennial *Poa annua*) at  $\leq 0.5 \text{ g m}^{-2}$  (0.1 lb / 1000 ft<sup>2</sup>). The study will be overseeded periodically to simulate the gradual introduction of weed seed commonly experienced on golf turf. Traffic treatments were initiated in October 1999. Evaluation of turf performance in response to traffic has been initiated and will continue through the duration of the project