LAKEWOOD, and *TXDB67* was superior to *TIFDWARF* at a mowing height of 0. 125 inch. Only *MINIVERDE* and *TIFEAGLE* produced higher quality than *TIFDWARF* at a mowing height of 0.187 inch. The results of this study indicate that several new bermudagrasses show promise for providing superior surfaces on golf greens.

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

Rutgers University/Cook College

James Murphy

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.*

Over the past decade, there has been a concerted effort by turfgrass breeders to develop improved cultivars of creeping and velvet bentgrasses that are denser, finer, more aggressive, more stress tolerant, and are more competitive than older industry standards. This affords the opportunity to take advantage of the genetic improvements in competitive ability of these bentgrasses in an annual bluegrass control program. The goals of this research project are to identify bentgrass cultivars that exhibit improved genetic competitive ability against annual bluegrass invasion under the influence of traffic, and to determine if the time of year for establishment affects the competitive posture of bentgrasses against annual bluegrass invasion. Putting green trials established on two dates in 1995 and one date in 1996 have consistently shown differences in the amount of annual bluegrass in mixed stands with bentgrass cultivars.

Data collected in June 1998. Percent annual bluegrass invasion on 8 June 1998 indicated *L-93* had less annual bluegrass invasion than all cultivars in the August 1995 seeded trial. *PENNCROSS* had a higher percent annual bluegrass invasion than all remaining cultivars in the same seeding date. In the September 1995 seeded trial, *A-4*, *L-93*, and *SOUTHSHORE* had less percent annual bluegrass invasion than *PENNCROSS*; *A-4* and *L-93* also had less annual bluegrass invasion than *PROVIDENCE*. *A-4*, *SOUTHSHORE*, and *G-2* showed less annual bluegrass invasion than *PENNCROSS* in the June 1996 seeded trial.

Data collected in October 1998. *A-4* and *L-93* had less percent annual bluegrass invasion than all cultivars except *SOUTHSHORE* in the August 1995 seeded trial. *SOUTHSHORE* had less annual bluegrass invasion than *PROVIDENCE* and *PENNCROSS*. *L-93* had less annual bluegrass invasion than all cultivars except *A-4* and *G-2* in the September 1995 seeded trial. *A-4*, *SOUTHSHORE*, and *G-2* had less annual bluegrass invasion than *PENNCROSS*. *A-4* also had less annual bluegrass invasion than *PENNLINKS* in the same seeding date. *L-93* had less annual bluegrass invasion than *PENNCROSS* and *G-2* in the June 1996 seeded trial. *A4* had less annual bluegrass invasion than *PENNCROSS* in the same seeding date.

A trial was initiated in 1998 to evaluate the time of year for bentgrass establishment that may enhance the competitive ability of bentgrass species and cultivars, against annual bluegrass. Initial data indicates that a June seeding date resulted in less annual bluegrass invasion than seeding dates in May and August. This would be expected because annual bluegrass is a winter annual, and peak seed germination would be late summer to early-fall.

Two additional trials were established in 1998. Both were established on soil and managed under putting green and fairways conditions. Both trials will assess the population dynamics between bentgrass and annual bluegrass under four levels of traffic. A third trial will be established on a sand-based (USGA style) root zone and maintained as a putting green (construction of the root zone was completed in October 1998). This third trial will also evaluate the effect of traffic on bentgrass and annual bluegrass population dynamics. More than a dozen cultivars of two bentgrass species are being evaluated in these three trials. Data will be collected for the percent population of each species as well as turf performance for each cultivar treatment under each level of traffic.

Improved Mole Cricket Management Through the Application of an Enhanced Ecological and Behavioral Data Base

North Carolina State University

Rick L. Brandenburg

Start Date: 1998
Number of Years: 3
Total Funding: $75,069

Objectives:

1. *Develop an effective integrated pest management program for mole crickets that ultimately reduces total pesticide use*

through improved implementation of chemical strategies and effective integration of biological and cultural options

2. *Apply the extensive research findings and validation of biological control strategies based upon our new knowledge of mole cricket ecology and behavior*

Studies during 1998 focused on four specific areas. These include: 1) defining high risk areas for mole cricket infestations, 2) determining the impact of soil moisture on oviposition and mole cricket development, 3) investigating the effect of irrigation and specific environmental parameters on insecticide (both conventional and biological) performance, 4) documenting the repellant response behavior of mole crickets to insecticide applications.

Defining high risk areas for mole cricket infestations: The field portion of this study was completed in 1998 year as a Masters student research project. The results of this study are currently undergoing statistical analysis and the measurement of the soil texture is still underway in the laboratory. However, preliminary findings indicate there is some degree of separation between those sites most commonly inhabited by tawny and southern mole crickets.

Determining the impact of soil moisture on oviposition and mole cricket development: Greenhouse studies to document the impact of soil moisture on oviposition have been completed by a Ph.D. candidate student. These studies were conducted in 7.5 cm diameter by 15 cm deep PVC cylinders filled with a uniform mixture of Kureb fine sand maintained at specific soil moistures. The results conclusively demonstrated that crickets lay eggs more quickly and in higher numbers when soil moisture is maintained above 7 percent (Figure 5). This effect helps explain the annual variation we observe in mole cricket oviposition and egg hatch in the field, on not only a calendar basis, but also based on degree-day accumulations.

Investigating the effect of irrigation and specific environmental parameters on insecticides (both conventional and biological) performance. Soil dissipation studies in association with insecticide rate and irrigation regimen treatment indicate that irrigation may play less of a role in positioning the insecticide than it does in affecting mole cricket behavior. This area is scheduled for additional investigation.

Documenting the repellant response behavior of mole crickets to insecticide applications: Field studies have examined a wide range of insecticide rates, formulations, and soil moisture levels for short and long-term control effects. Similar studies have been conducted for biological control (*Beauveria bassiana*). Results indicate that reverse rate responses often occur with higher rates providing less control. This may be the result of avoidance behavior associated with higher rates.

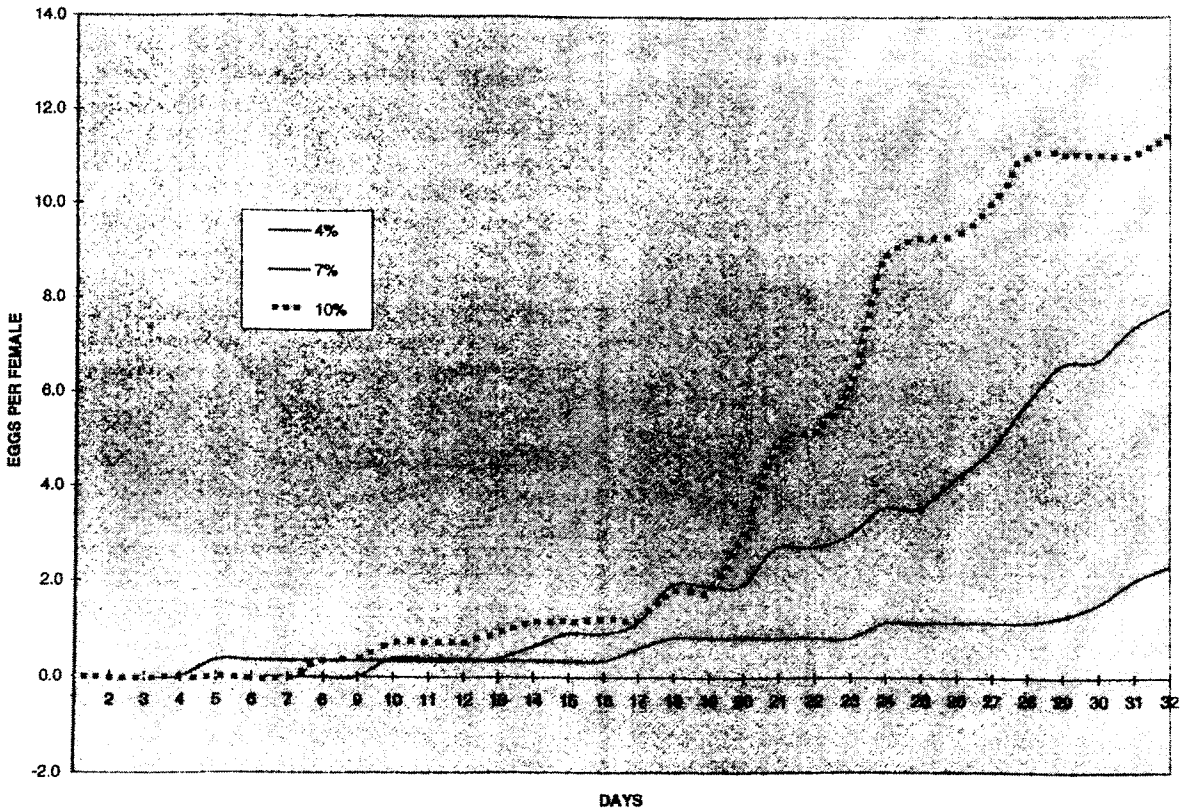

Figure 5. Mean number of eggs per ovipositing female held at different soil moistures in a greenhouse study.