

pheromone was pinpointed by gas chromatography and electroantennogram analysis, and its molecular weight was determined. Gas phase IR was used to further characterize the compound's structure. Hopefully, the identification can be completed this winter, so that field testing during beetle flights can begin in 1999. ¶

## **A Parasitic Fly that Kills Mole Crickets: Its Use in States North of Florida.**

### **University of Florida**

*Dr. J. Howard Frank*

Start Date: 1998

Number of Years: 3

Total Funding: \$26,680

#### **Objectives:**

1. *To explore farther south in South America (colder climates) to obtain stocks of the fly *Ormia depleta*, a natural enemy of the mole cricket.*
2. *To culture the captured South American flies in our laboratory and supply them to collaborators in other states for release.*

*Ormia depleta* is a tachinid fly specialist on some species of *Scapteriscus* mole crickets. It is native to Brazil and Paraguay. A stock of this fly, captured at Piricicaba in subtropical Brazil (about 23°S) was brought to Florida in 1987 and cultured in quarantine. Beginning in 1988, progeny of these flies were released in all areas of Florida in an attempt to establish a population - about 10,000 flies were released. A population became established in peninsular Florida and persists year-round to about 28°N latitude, and seasonally (the fall of each year) in a marginal area extending to about 29°N. Subsequent releases in Georgia, North Carolina, and Alabama did not result in establishment of populations there.

Although the established populations of the fly exhibit strong seasonality in Florida, with much greater numbers trapped in May-June and in November-December than at other times of year, the fly seems capable of breeding throughout the year. That is, there is no dormant period (diapause) in winter. In the laboratory, adult flies need artificial nectar as a dietary item. Thus, it seems that the established stock of the fly, from subtropical Brazil, fares poorly in winter in northern Florida perhaps because it is not adapted to diapause during those months of the winter when plant nectars are in short supply (after freezes).

The fly is known to exist in southern Brazil to 30°S. It is possible that flies at 30°S are adapted to withstand colder winters by entering diapause. Therefore, they might be expected to survive in the southern USA at 30°N, and perhaps much farther north. The objective of this project is to obtain a stock of the fly from extreme southern Brazil, bring it to quarantine in

Gainesville, culture it, and provide stock to collaborating turfgrass entomologists in Alabama, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Texas.

In November 1998, two entomologists will travel to southern Brazil to spend almost four weeks collecting living *Scapteriscus* mole crickets as hosts for the fly. When scores of mole crickets have been assembled and maintained in containers in a laboratory in southern Brazil, flies will be trapped. Larvae of the flies will be reared on the mole crickets, and brought to the pupal stage. Fly pupae will be brought to quarantine in Florida for establishment of a laboratory culture. The timing of the visit (early summer) is based upon what is known about abundance and seasonality of *Scapteriscus* mole crickets and the fly in subtropical and temperate Brazil.

Work in 1999 will focus on labor-intensive culturing of several of the fly for distribution to other southern states. ¶

## **Best Management Practices for New Dwarf Bermudagrasses**

### **Texas A&M University**

*Richard H. White*

Start Date: 1998

Number of Years: 3

Total Funding: \$69,989

#### **Objectives:**

1. *Determine the performance, mowing tolerance, and pest resistance of 15 experimental and commercially available bermudagrass and one zoysiagrass on a golf green.*
2. *Determine the effects of vertical mowing, topdressing, and nitrogen fertility on performance, thatch development, fall and spring overseeding transition, and turf quality of five dwarf bermudagrasses.*

New dwarf bermudagrasses are, in general, more aggressive thatch producers than *TIFDWARF*. Judicious nitrogen fertilization will be required to slow the rate of thatch accumulation for many of the new bermudagrass cultivars. Nitrogen amounts greater than 10 pounds annually per 1000 square feet improved turf quality but contributed to increased thatch, decreased ball roll distance, and did not substantially increase shoot density. No differences in thatch accumulation have been observed among light (frequent) and severe (infrequent) vertical mowing and topdressing regimes. However, severe, infrequent vertical mowing reduced turf quality for long periods. Overseeded *Poa trivialis* establishment the first season was good for all grasses when light, frequent vertical mowing was applied during the growing season.

Several new-dwarf bermudagrasses provided good to excellent turf quality and were superior to *TIFDWARF* at 0.125 inch mowing heights. Mean turf quality of *MINIVERDE*, *TIFEAGLE*, *CHAMPION*, *MOBILE*, *FLORADWARF*, *MS SUPREME*,

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*