Integrating Biologically Based Strategies for Turfgrass Pest Management: Phase II

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Objectives:

1. To develop and refine environmentally oriented management practices for long-term maintenance on golf courses.
2. Evaluate the interaction between resistant plants and natural control of fall armyworm using both field and laboatory experiments.
3. Evaluate the efficacy of standard chemical, microbial and alternative approaches to controlling fall army worm.

Start Date: 2000
Project Duration: 3 years
Total Funding: $37,671

The encompassing objective is to develop and refine best environmentally oriented management practices for long-term maintenance on golf courses. The potential for compatibility among two biologically based management strategies: host plant resistance and biological control will be evaluated in this three-year project.

In Phase I, genotypes were screened for potential resistance to a guild of insect pests that limit turfgrass growth, establishment or appearance. During Phase II we propose to take the next step and develop a strategy that will allow enhancement of biological control with parasitoids and predators by using grasses with partial, yet incomplete, resistance to selected turfgrass pests.

Using turfgrasses with intermediate resistance introduces sustainability into the system by reducing the potential for insect pests to overcome the plant's defenses. By combining plant resistance to insects with enhanced activity of natural enemies, a more stable system may result with greatly reduced need for chemical intervention. A series of laboratory and field experiments will examine this relationship.

Six zoysiagrass, paspalum, and bermudagrass cultivars representing a range of resistance to fall armyworms will be used for the proposed field and lab studies. They include 'Palisades' and 'Cavalier' zoysiagrasses; 'Tifsport' and 'Tifeagle' bermudagrasses; 561-79 and Sea Isle 1 paspalumgrasses. These grasses have been planted in the field in a randomized complete block design with six replications. Plots (each 25 m^2) are located at the Georgia Station in Griffin.

Bermudagrass, zoysiagrass and Seashore paspalum genotypes were screened for potential resistance to a guild of insects that limit turfgrass growth, establishment or appearance.

A new turfgrass research area in the Research and Education Garden was developed during 2000. Irrigation was installed during May and research plots sprigged with appropriate grasses on May 22. Cover was nearly 100% in all plots by October 2000. Field sampling will be initiated summer 2001.

Prey acceptability studies were conducted during summer 2000 for the big eyed bug, *Geocoris uliginosus*, a very common predator in turfgrass. Turfgrasses included 'Cavalier', 'Palisades', '9601', 'Diamond' and 'Roya' zoysiagrasses; 'Tulsa' tall fescue, 'Dawson E+', 'Tifsport' and 'Tifeagle' bermudagrasses and '561-79' and 'Sea Isle 1' seashore paspalums.

The predator/prey profile developed indicated that big eyed bugs will feed on fall armyworms that fed on either susceptible or resistant grasses. Furthermore, while fall armyworm larvae reared on susceptible grasses were suitable prey for adult big eyed bugs only from day 1 through day 6, those larvae reared on more resistant grasses remain smaller and were acceptable prey for big eyed bugs for a much longer period. This expanded "window of vulnerability" is a positive indication of compatibility among two biologically-based management strategies.

Field plots will be treated with bacterial products (*Bacillus thuringiensis*), spinosad (Conserve), and Dursban to determine if grasses displaying partial resistance to fall armyworms also render the pest more susceptible to standard chemical, microbial and alternative products.

Summary Points

- Fall army worm reared on more resistant grasses remained smaller and were more vulnerable to predators (big-eyed bugs) longer than those raised on susceptible grasses.