Kentucky bluegrass, then biotechnology techniques were to be employed to help produce new endophytes that would work in these important turfgrass species.

The research project acquired a large turfgrass germplasm and endophyte culture collection from throughout the United States and other parts of the world. After extensive screening of more than 700 collections, some 14 fungal endophyte-infected species of *Poa* and *Agrostis* were obtained. A collection of 30 fungal endophyte cultures was established on agar medium and contains representative isolates from a variety of turfgrass genera.

Fungal endophyte-specific DNA probes were produced by the polymerase chain reaction (PCR). Ribosomal RNA internally transcribed spacer sequences (ITS-A) were isolated from *A. typhinum, A. starrii,* and *A. coenophiallum* using PCR primers. These are of similar size and their DNA sequences are being compared. The RAPD (randomly assigned primer DNA) method of using PCR with single ten-base DNA primers was tested with DNA extracts of eleven endophytes using different primers with varying guanine/cytosine contents. The technique is excepted to be useful for developing probes for detecting the presence of endophytes in grasses.

Callus cultures were obtained from six cultivars of Kentucky bluegrass (*Poa pratensis*) and four of creeping bentgrasses (*Agrostis palustris*) tested in tissue culture using mature seeds germinated on a callus induction medium. Several embryogenic callus lines were selected from 'Emerald' and 'Putter' bentgrass and 'Baron' Kentucky bluegrass. The usefulness of embryogenic callus as a target to create new endophyte-turfgrass combinations is under evaluation. The possibility of introducing foreign genes into turfgrass cells by DNA particle bombardment techniques also was investigated.

***Sea Island, Georgia - Dr. A. Leon Stacy***

*Mole Cricket Pheromones and IPM*

This project evaluated scouting methods to monitor population dynamics and the potential use of pheromones to reduce pesticide applications for the control of mole crickets on golf courses. Biologically active materials were discovered and, with further refinements, could be produced for commercial marketing. No previous research had been done with mole cricket pheromones when this study was initiated.

Various glands and body parts were dissected from both male and female crickets. During the cricket flight season, acetone homogenate of the spermatheca (♀ crickets) and an unknown gland (♂ crickets) were biologically active and appeared to act as attractants (sex or aggregating pheromones). An alarm substance from the rectum (♀ and ♂) significantly reduced "fly-in" crickets. Additional tests are still needed to improve on the pheromone dispensing system and to further refine optimum rates of activity.

Results from the study were extremely encouraging. The attractants and the alarm substance could eventually fit well into a pest management system by influencing the population dynamics of crickets, i.e. concentrating crickets into one area while repelling them from others. This use possibly could reduce the turf area requiring treatments.

Although no previous work had been done with mole cricket pheromones, the concept was used successfully in eradication programs for several insect pests of agronomic importance and millions of dollars were saved. This project successfully identified biologically active materials; however, cooperation with a qualified pheromone chemist will be needed before efficient testing of the effects of these compounds on the population dynamics can proceed.

**Mycorrhizae**

***University of Rhode Island - Dr. Noel Jackson***

*Use of Mycorrhizae in the Establishment and Maintenance of Greens Turf*

This research project took yet another approach to improve turfgrass water use in sandy soils. Mycorrhizal fungi grow in close association with plant roots and increase the surface area for nutrient and water uptake. Dominant species of mycorrhizal fungi associated with creeping bentgrass and *Poa annua* were isolated from old putting greens receiving routine fungicide applications. The dominant species of mycorrhizal fungi occurring in sand dune soils in New England also were collected. In fact, mycorrhizal fungi isolated from sand dunes were superior to non-dune fungi in stimulating growth of turfgrasses grown in the sand putting green medium.

Responses of creeping bentgrass to mycorrhizal fungi and growth mixes continue to be evaluated. Two methods for producing inoculum were developed for greenhouse conditions. A method to inoculate bentgrass plants with mycorrhizal fungi