the callus to various concentrations of the toxic substances for only 24 hours.

The results from both procedures indicate *R. solani* must be actively growing in the HPIS for at least 7 days before the level of toxic substances is such that only 25 percent of the viable callus population can be recovered. From that 25 percent viable callus population, an average of two plantlets are regenerated. Some of these plantlets display enhanced resistance to *R. solani*.

A special HPIS chamber was developed for screening the germplasm obtained from the HPIS refinement experiments. This system is similar to the HPIS in principle, but is adapted to allow unrestricted growth of the plantlets. The bottom compartment of the chamber consists of the actively growing *R. solani*. The top compartment has been modified by the addition of a 9.5 cm (high) by 9.0 cm (diameter) glass cylinder. This expended space in the upper compartment permits the use of additional growth medium required by larger plantlets, and provides adequate 'head space' which plantlets require for optimum development.

The plantlets were screened in the HPIS chamber for two weeks. Thirty-three percent of the plantlets exposed to *R. solani* died. The surviving plantlets were extremely stressed, displaying purple leaves and stunted growth. They were then transferred to tissue culture boxes where vigorous shoot and root development occurred. The plantlets subsequently have been transferred to soil and will be screened for resistance to *R. solani* at the whole plant level. This will provide critical and much needed evidence on the efficacy of the HPIS approach, as well as providing plants with enhanced resistance to *R. solani*.

Ohio State University - Dr. William W. Shane and Dr. Stephen T. Nameth

Monoclonal Antibodies for Rapid Diagnosis of Summer Patch and Necrotic Ring Spot Diseases of Turfgrasses

Slow-growing patch diseases are among the most difficult problems to diagnose on turfgrasses. This project focused on the development and use of immunological techniques for rapid diagnosis. A monoclonal antibody-producing clone, selective for necrotic ring spot (*Leptosphaeria korrae*), was produced. The antibody, a small protein that can bind to the fungus, can be grown in great quantity within a laboratory flask. The antibody was highly reactive against all fungal strains of *Leptosphaeria korrae* tested.

The usefulness of the antibody for *L. korrae* was tested thoroughly against diseased turfgrass samples collected thoughout the United States or submitted to the Ohio State University Plant and Pest Diagnostic Clinic. The *L. korrae* pathogen was successfully isolated from all Kentucky bluegrass samples exhibiting a significant reaction with the LK antibody. In addition, the LK antibody was successfully used to study the distribution of *L. korrae* in the various regions of "frog eye" patches, and on individual turfgrass plant parts to gain a better understanding of the life cycle of this disease. Through this research effort, sampling techniques for the detection of *L. korrae* with the LK antibody were optimized.

In addition, the LK antibody successfully detected *Leptosphaeria korrae* from certain bermudagrass sites with spring dead spot symptoms. Therefore, the antibody could be useful in determining the causal agent of spring dead spot. Currently, at least three fungi (*L. korrae, Ophiosphaerella herpotricha,* and *Gaeumannomyces graminis*) have been shown to be cause this disease. Despite the successes associated with the LK clone, no commercial company followed through with formal licensing of the technology.

Development of a monoclonal antibody for summer patch (*Magnaporthe poae*) was not completed. Difficulties occurred with the toxicity of the pathogen to immunized mice and rabbits. Reactivity of the mouse serum which was produced did not adequately select *M. poae* from diseased turfgrasses. Unfortunately, the project was terminated early when the principal investigator left Ohio State University for another position in industry.

Soil Compaction

Michigan State University - Dr. Paul E. Rieke

Hollow and Solid Tine Cultivation Effects on Soil Structure and Turfgrass Root Growth

Hollow and solid tine cultivation effects, as influenced by soil compaction and moisture content during cultivation, were evaluated on the basis of soil structural properties and root growth.

As expected, compaction resulted in pronounced detrimental effects on soil structure and root growth. Both cultivation methods resulted in positive and negative effects on soil structure. Cultivation increased the amount of large soil pores, with hollow tine coring being the most effective in producing this response. Regardless of