

Recovery of *Rhizoctonia solani* Resistant Creeping Bentgrass Germplasm Using the Host-Pathogen Interaction System

Dr. Jeffrey Krans

Mississippi State University

Goals:

- Recover *R. solani* selected variants of creeping bentgrass using the Host-Pathogen Interaction System (HPIS).
- Screen and grade recovered *R. solani* selected creeping bentgrass variants using an *in vitro* whole plant disease screening system.
- Establish a clonal repository of *in vitro* screened *R. solani* resistant creeping bentgrass variants.
- Verify whole plant resistance of *in vitro* screened variants using greenhouse studies for determining *R. solani* resistance.
- Evaluate progeny for resistance to *R. solani*.
- Select parents that exhibit resistance to *R. solani* in conjunction with other desirable turf characteristics.

Considerable progress has been made toward recovering brown patch (*Rhizoctonia solani*) resistant creeping bentgrass germplasm. In the laboratory, 203 plant variants were recovered from bentgrass callus that was co-cultured with *R. solani* via the Host-Pathogen Interaction System (HPIS). Due to the success in recovering germplasm in the HPIS, we are able to select large numbers of variants, while maintaining a predictable production schedule of germplasm that will be subjected to additional screening in the laboratory, greenhouse, and field evaluations.

Laboratory studies addressing *in vitro* plantlet screening against *R. solani* is progressing favorably. Plantlets recovered from HPIS screening were inoculated by placing 1 mm plugs of *R. solani* mycelium on the leaves. Preliminary results indicate segregation of resistance among the variants. A comprehensive study has been initiated based on these findings. If this procedure proves reliable, another level of screening will be incorporated into an already intense screening procedure. Bentgrass germplasm will undergo cellular, plantlet, and whole plant screening prior to field evaluation.

The variants we are working with at the whole plant level are being maintained in our newly acquired environmental control greenhouse (ECG). The ECG is equipped with a 3 ton heatpump air conditioner that allows us to provide an optimum, stress-free environment for growing creeping bentgrass on a year round basis. Thus we can provide adequate light, optimum temperatures, humidity, and so forth while isolating the variants

from various greenhouse contaminants.

A fritted clay growth medium is used to propagate the variants and prepare them for the next level of *R. solani* screening experiments. These screenings are scheduled to begin in November 1993. The variants will be rated on their response to *R. solani* and recovery rate from infection. Those displaying enhanced resistance will be maintained in a clonal repository for preservation, field evaluation, and seed production.

Our objective is to take superior lines to the field and evaluate them for enhanced resistance to *R. solani*. Ultimately we hope to isolate and provide *R. solani* resistant genetic material to the available germplasm collection for the purpose of developing superior creeping bentgrass varieties.