

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

Dr. Jeffrey Krans

Mississippi State
University

Goals:

- Recover *Rhizoctonia 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.
- Select parents that exhibit resistance to *R. solani* in conjunction with other desirable turf characteristics.
- Evaluate progeny for resistance to *R. solani*.

Research efforts in 1994 focused on developing a valid, quantifiable procedure at the whole plant level to verify resistance to *Rhizoctonia solani* exhibited by Host Pathogen Interaction System (HPIS) derived creeping bentgrass variants. Several studies were conducted to address inoculation techniques, optimum environmental factors for disease, and evaluation of the pathogenicity of *R. solani* isolates.

Four creeping bentgrass lines have been identified with enhanced resistance to *R. solani*. This study was conducted using HPIS derived bentgrass variants maintained in pots in an environmentally controlled greenhouse. Under ideal disease conditions for brown patch, HPIS variants were inoculated with a highly pathogenic isolate of *R. solani*. Average diameter of diseased turf for lines displaying enhanced resistance were 21.6, 25, 27.5, and 28.3 mm. These values represent a significant improvement compared to PENNCROSS, with an average 50.0 mm of diseased turf.

This phase of research has shown that the HPIS is a valid *in vitro* cell selection technique for selecting creeping bentgrass germplasm with enhanced resistance to *Rhizoctonia solani*. Prior to field evaluations, selected creeping bentgrass lines have undergone three levels of exposure to *R. solani*. A cycle for selecting germplasm with enhanced resistant has been accomplished beginning at the cellular level, affirmed at the plantlet level (*in vitro*), and confirmed at the whole plant level.

Selected lines will be evaluated in the field under golf course conditions. Continued progress will lead to parental lines of creeping bentgrass that exhibit enhanced resistance to *Rhizoctonia solani*.