*Ohio State University - Dr. Karl Danneberger*

*Mechanisms for Heat Tolerance in Annual Bluegrass*

A number of factors govern heat tolerance in turfgrass plants. This research specifically evaluated what role heat shock proteins play in high temperature tolerance of annual bluegrass and other turfgrass species. Results demonstrated the difference observed at the whole plant level was also present at the cell level.

Heat shock proteins are produced during periods of high temperature stress. Normal protein synthesis shuts down at high temperatures, while heat shock proteins are beginning to synthesize. Their occurrence is ubiquitous in nature, but their role in heat tolerance is not fully known.

Initial screening of numerous annual bluegrass biotypes revealed a 12°C (54°F) difference between the most sensitive and the least sensitive biotypes. In addition, attempts were made to determine the location of the heat shock protein genes within the genomic DNA from turfgrasses.

**Pathology**

*Texas A&M University - Dr. Phillip F. Colbaugh*

*Developing Rhizoctonia Brown Patch and Pythium Disease Resistance in Bentgrass and Zoysiagrass*

The research efforts of this project focused on the development of screening techniques for resistance to brown patch and *Pythium* blight and root rot; assessment of *Pythium* blight and root rot resistance in the bentgrass germplasm and polycross populations; and the evaluation of the National Turfgrass Evaluation Program (NTEP) bentgrasses and zoysiagrasses for resistance to *Pythium* and *Rhizoctonia* blight.

The inheritance of foliar disease resistance appears to be a predictable and stable characteristic based on investigations using crosses of disease resistant bentgrass parental lines. Synthetic polycross populations were tested for resistance to *Pythium* blight. Disease resistant bentgrass progeny were identified after inoculating populations produced from reciprocal crosses of resistant and susceptible bentgrass parental lines. In two inoculation studies, genetic populations from four crossing blocks were more blight resistance than other populations studied.

In addition, a disease heritability analysis was conducted which utilized intercrossed resistant and susceptible parental lines and reciprocal cross progeny plants obtained from a *Pythium* blight resistant population. The susceptibility of progeny from crosses involving at least one of the resistant parental lines gave an overall mean blight of 6.9 percent, while crosses without a resistant parent resulted in a 14.3 percent mean blight rating. This information will be very useful in determining the segregation of disease resistance in future disease screening research.

A root inoculation procedure was used to screen bentgrass germplasm lines for resistance to *Pythium* root rot. This method was used to screen over 1,550 plants. At present, 123 germplasm lines of bentgrass appear to have some resistance to *Pythium* root rot disease. The surviving population represents about 12% of the total plants screened.

Standard inoculation techniques were used to determine the susceptibility of the National Turfgrass Evaluation (NTEP) bentgrass and zoysiagrass entries to *Rhizoctonia* and *Pythium* blight diseases. In repeated *Rhizoctonia* foliar inoculations, the NTEP bentgrass entry Syn3-88 demonstrated the lowest mean percent blight among the 20 entries tested. Syn3-88, Providence, Penncross and UM8401 were statistically better than National, Forbes and Syn4-88. For the NTEP zoysiagrass trial, the experimental line DALZ 9006 and commercial cultivar Meyer demonstrated a low susceptibility to *Rhizoctonia* foliar blight following inoculation.

Inoculation studies with *Pythium* blight on NTEP bentgrasses demonstrated that Pennlinks, Penncross, National, MSCB-6, Syn3-88 and Cobra were among the most resistant genotypes. Similar inoculation studies with *Pythium* blight on 40 zoysiagrasses demonstrated that germplasm lines TAES3357, TAES3365, TAES3356, TAES3364, TAES3358, DALZ8508 and DALZ8517 were the most resistant among those tested. The relationship of *Rhizoctonia* blight susceptibility and Zoysiagrass leaf blade texture was investigated. In contrast to other grasses, the fine textured zoysiagrass were less susceptible to foliar blight.

*Cornell University - Dr. Richard W. Smiley*

*Resistance of Bentgrass to Leptosphaeria and Phialophora Diseases*

Seedlots of 42 bentgrasses from Pennsylvania State University were screened for resistance to two isolates from root-infecting fungi that cause summer patch and necrotic ring spot diseases. The resistance studies were conducted for an 8 week