

YELLOW PATCH RESEARCH - 1982

C. L. Brown & J. M. Vargas
Botany and Plant Pathology
Michigan State University

There is little doubt that the disease yellow patch, otherwise known as cold temperature brown patch has become a serious disease problem and a major concern to the Michigan lawn care industry. Research on the problem began at Michigan State in the fall of 1981 and the following is a presentation of the work that has been done.

Work began by more closely examining field symptoms. Symptoms may be somewhat variable, but they generally occur as 6-12" patches of completely dead grass, or rings of dead grass with apparently healthy centers. Foliar lesions may be present as well as reddened leaf blades. At one location the disease progressed to only a foliar blighting stage and no plant death occurred.

The Pathogen and the Host

This disease is of fungal etiology and since 1981 several isolates have been collected from throughout the state. At this time the most universally accepted name for the causal organism is Rhizoctonia cerealis. However, the taxonomy for these fungi is highly unsettled at this time and two other terms, Ceratobasidium spp. and binucleate Rhizoctonia-like fungi can be found in the literature.

In order to identify the fungi isolated from infected tissues as R. cerealis and distinguish them from other fungi, i.e., relatives such as Rhizoctonia solani, hyphal morphology, nuclear state, anastomosis grouping and sexual spore production may be examined.

Several turfgrass species have been reported as hosts of R. cerealis, however in this region Kentucky bluegrass is the most severely damaged. Greenhouse studies were done to evaluate varietal resistance/susceptibility, however this type of study can be unreliable and for this reason results will not be reported until field research is done. The Kentucky bluegrass host is also being examined to see how age affects it's susceptibility and what particular organs are affected, i.e., roots, crowns.

The Host-Pathogen Interaction = Disease

Koch's postulates is a set of criteria that must be satisfied before one can conclude that an organism is pathogenic on a particular host. Foliar necrosis was accomplished with ease in the greenhouse, but we wanted to go one step further. Often with turfgrass disease research, an argument is presented that field symptoms are rarely produced with inoculations. We get foliar necrosis, but yellow patch, as it's name denotes is a patch disease. Is this organism R. cerealis capable of killing a patch of grass?

A block of Fylking Kentucky bluegrass at the Hancock Turfgrass Research Center was inoculated by placing wheat seeds on which R. cerealis was growing down into the thatch. Within 30 days we had circular necrotic areas as large as 14". Foliar lesions as well as reddened tissue were present. Entire plants were killed and we were able to reisolate the fungus. Thus, it was demonstrated that under natural conditions R. cerealis is capable of killing turf in a circular orientation. This seed

inoculation method also introduced a good technique that can be utilized in later experiments.

A major portion of this research is dedicated to gaining information which will lead to the development of an effective control or management program. This includes cultural practices, the first being considered, nitrogen fertility. When looking at nitrogen fertility we can perform greenhouse inoculations as well as field studies. The greenhouse study undertaken involved fertilizing pots of Cheri and Fylking Kentucky bluegrass with rates from 0-4 lbs N/1000 sq ft/month. The pots have recently been inoculated and they will be examined to determine if any differences in severity can be noted. Two field studies are also in progress. In one study total N is examined i.e., 0, 1/2 or 1 lb N/1000 sq ft/application and another study is examining the dormant nitrogen programs. Could this fall application be making the turf more susceptible in the spring?

An extensive study is also underway evaluating potential fungicidal controls. The three steps involved in this study are:

1. in vitro bioassay
2. greenhouse inoculations
3. field plot studies.

The in vitro bioassay showed Daconil 2787, Bayleton, Tersan 1991, CGA 64250 and Chipco 26019 to provide the best control for all isolates. The information obtained is illustrated at the end of this paper in a graph showing the growth of Isolate 1 after 5 days on media (PDA) amended with 100 ppm of each fungicide.

The first run of greenhouse inoculations confirmed most of the laboratory finding; however, as with all experiments this must be repeated before being reported. The most conclusive test is a field study and two have been undertaken to date; however, no disease appeared in the controls. This spring fungicide studies will again be attempted, the areas will be sprayed and then inoculated with the wheat seed technique to assure disease.

There is comparatively little reference material available on this pathogen or this disease. Any information obtained aids in gaining a further understanding of this interaction. Being examined also, includes how the organism penetrates host tissue and how it overwinters. Studies are also planned for spring to look at the best methods to renovate yellow patch damaged turf.

GROWTH (CM)

