(Continued from page 15)

FIG. 1

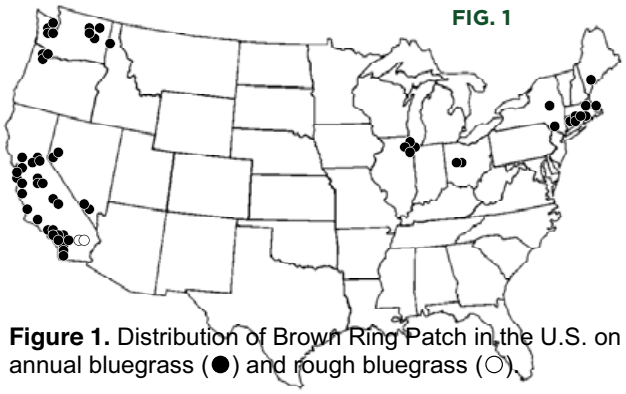

Figure 1. Distribution of Brown Ring Patch in the U.S. on annual bluegrass (●) and rough bluegrass (○).

labs has confirmed its identity using morphological and molecular methodologies (de la Cerda et al. 2007). It appears that the pathogen is closely related to two known pathogens of turfgrass, Rhizoctonia zeae (telemorph: *Waitea circinata var zeae*) and *Rhizoctonia oryzae* (*Waitea circinata var oryzae*) (Figure 2), but appears to be a separate species that had not been found as a pathogen of turfgrass until now. *Waitea circinata var circinata* appears to be able to cause damage to turf over a wide range of temperatures, having been observed at approximately 15 to 35°C daytime temperatures. Symptoms are manifested as circular rings several cm to a meter in size that causes yellowing and necrosis of turf that is often difficult to recover from (Figures 3 & 4). This wide temperature range is uncommon for many *Rhizoctonia* diseases (Burpee and Martin 1992) and this pathogen has been problematic for many golf courses as a year-round disease.

There is no information available on the origin or spread of the disease. Information on the basic biology of the pathogen (reproduction, temperature and humidity requirements) would greatly help forecast periods of disease susceptibility. Understanding the population structure of the pathogen would also help potentially determine its origin and method of spread (Milgroom 1996; Milgroom and Peever 2003). Recent work in the Douhan and Wong labs has shown that the pathogen is widespread in multiple states.

Practically, fungicidal control of this pathogen has been problematic. Often, repeated fungicide applications are required to halt the disease. Recent work by the Wong Lab has already identified that this pathogen is completely resistant to benzimidazole fungicides and potentially QoI-resistant isolates have already been identified from California populations (Rios et al. 2006). Laboratory trials have shown that fungicide timing is crucial for the control of the pathogen. In these tests, preventive applications of fungicides provided near complete control while curative applications provided only 20 to 78% control (Wong and Kaminski 2007). The role of nitrogen in the management of this disease is unknown. Nitrogen is known to increase the severity of R. solani (Brown Patch) (Cubeta and Vilgalys 1997), but its effects are not well documented for other *Rhizoctonia* diseases (Couch 1995). Anecdotally, many of the locations with chronic Brown Ring Patch have been using low nitrogen fertility programs to increase ball roll and greens speed. Lack of recovery due to inadequate fertility seems to be a plausible reason for the increased severity of the disease at these locations.

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