

THE PRACTICAL SIDE OF DOLLAR SPOT POPULATION BIOLOGY

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For a long time the conventional wisdom on dollar spot has been, “Why do we need to know anything about it? We can just spray for it”. And for decades, conventional wisdom has been right: dollar spot *has* been relatively easy to control with fungicide applications. The need for a basic understanding of this pathogen was never really that important. However, the strict reliance on fungicides to control the most important pathogen on golf courses in Michigan is changing. Chlorothalonil, a contact fungicide which is widely used to control dollar spot, may have restrictions and limitations imposed on its use in the future. This means that superintendents will not have enough product to uniformly cover the greens, tees, and fairways over an entire season. Most of you may be thinking, “well, I’ll just use another fungicide”. However, other fungicides are susceptible to fungicide resistance. So, this thinking is OK for those of you who are on courses where fungicide resistance isn’t present (yet). But what about those who already have fungicide resistant populations? What about those that develop resistance once they start spraying an alternate fungicide? The key to managing dollar spot effectively in these situations will be taking advantage of information about dollar spot population biology.

A research project was started in the summer of 2000 and continued through the summer of 2002 with two major questions in mind: 1) How are dollar spot populations organized on golf courses? 2) Does dollar spot occur in a pattern? The first question was addressed with the assistance of three golf courses across MI, and involved sampling these three golf courses in 2000 and 2001. Samples were taken from four fairways at each golf course. In total, almost 900 samples were collected from the three locations. Once samples were collected, a test was performed to determine which of six different groups each sample fit into. The results indicated that on all of the golf courses three groups were present in large numbers, and the three remaining groups were present less frequently. The distributions of these groups on each fairway were compared and it was found that each fairway represented a unique distribution on 2 out of the 3 golf courses. On the other golf course, each fairway had a similar distribution of groups. Interestingly, this golf course was completely renovated in 1996 whereas the other two golf courses have been in play for a considerable time. These results indicated that dollar spot is not able to move very far, and that spread via equipment happens infrequently.

DNA fingerprinting was also performed on a subset of the samples collected from these three courses as well as samples from two additional courses. Results of this analysis revealed that samples were not organized in a pattern by geographic origin, or by the group to which they belong. This data indicates that dollar spot is a relatively recent introduction into Michigan. This is not entirely surprising given that golf has been played in Michigan for about 100 years, and dollar spot is not known to undergo sexual recombinations which would introduce diversity into these populations and cause some organization to occur.

The second major question that was raised was if dollar spot occurred in a pattern. This was measured by observing dollar spot epidemics at the Hancock Turfgrass Research Center each summer from 2000-2002. 892 individual locations were counted for the number of dollar spots present every 2-3 days throughout each summer. A set of statistical tools called geostatistics was

used to determine if the number of spots present in each location were arranged in a pattern. Interestingly, the results of this analysis indicated that there was a pattern, and the pattern did not change much from year to year. Also, the pattern occurred on a small scale. The conclusions of this study were that dollar spot is not able to move around much, and that the host and pathogen were the most likely reasons for the occurrence of a pattern.

The impact of these studies is important for several reasons. First, the information generated from these studies shows that it is probable that dollar spot could be modeled so that weather station information can accurately predict pending outbreaks of dollar spot, saving fungicide applications in the process. This information is also useful to those superintendents that monitor their pest problems as they might think about treating those areas that have dollar spot present differently than areas that do not have the disease. Also, turfgrass breeders will use this information to develop more resistant cultivars. Finally, superintendents that remove clippings can be confident that their mowers are not moving the pathogen very far during mowing operations.