

2012 Final Report: Fungicide Resistance Assays for New England Dollar Spot Database Development

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Overview of Project Results

In 2011 and 2012 we were able to assay 16 different courses and disseminate site-specific recommendations on dollar spot control tailored to their unique management conditions. We were able to disseminate assay report results back to golf course superintendents approximately two weeks after sampling each golf course. We found that most superintendents found the report information to be helpful in scheduling future fungicide rotation strategies. Results of the golf courses assayed are summarized in Table 1 and show that benzimidazole and DMI resistance is the most common resistance profile. One encouraging sign was the absence of dicarboximide and SDHI resistance in New England.

Table 1. Fungicide resistance profiles of golf courses assayed from 2007-2012

	Golf Course	Year	Fungicide Sensitivity			
			Benzimidazole ^z	DMI ^y	Dicarboximide ^z	SDHI ^z
1	MHC	2007	Res	---	Sen	---
2	WGC	2008	Res	Res	Sen	Sen
3	CGC-1	2009	Res	Partial	Sen	Sen
4	CGC-2	2009	Res	Partial	Sen	Sen
5	MPCC	2009	Res	Res	Sen	Sen
6	HRCC	2009	Res	Res	Sen	Sen
7	HGC	2009	Res	Res	Sen	Sen
8	SMCC	2009	Res	Res	Sen	Sen
9	WBGC	2009	Res	Res	Sen	Sen
10	JTRF	2009	Sen	Sen	Sen	Sen
11	TCC	2009	Res	Res	---	---
12	TWCC	2009	Res	Partial	---	---
13	AGC	2009	Res	Partial	---	---
14	TRC	2010	Res	Res	Sen	Sen
15	SCC	2010	Res	Res	Sen	Sen
16	HRCC	2011	Res	Res	Sen	Sen
17	DGPC	2011	Res	Partial	Sen	Sen
18	ECC	2011	Res	Res	Sen	Sen
19	GAGC	2011	Res	Res	Sen	Sen
20	HGC	2011	Sen	Partial	Sen	Sen
21	GCCC	2011	Res	Res	Sen	Sen
22	RGC	2011	Res	Res	Sen	Sen
23	WCC-1	2011	Sen	Res	Sen	Sen
24	WCC-2	2011	Res	Res	Sen	Sen

^z Sen = population is sensitive to the fungicide class. Res = population is resistant to fungicide class.

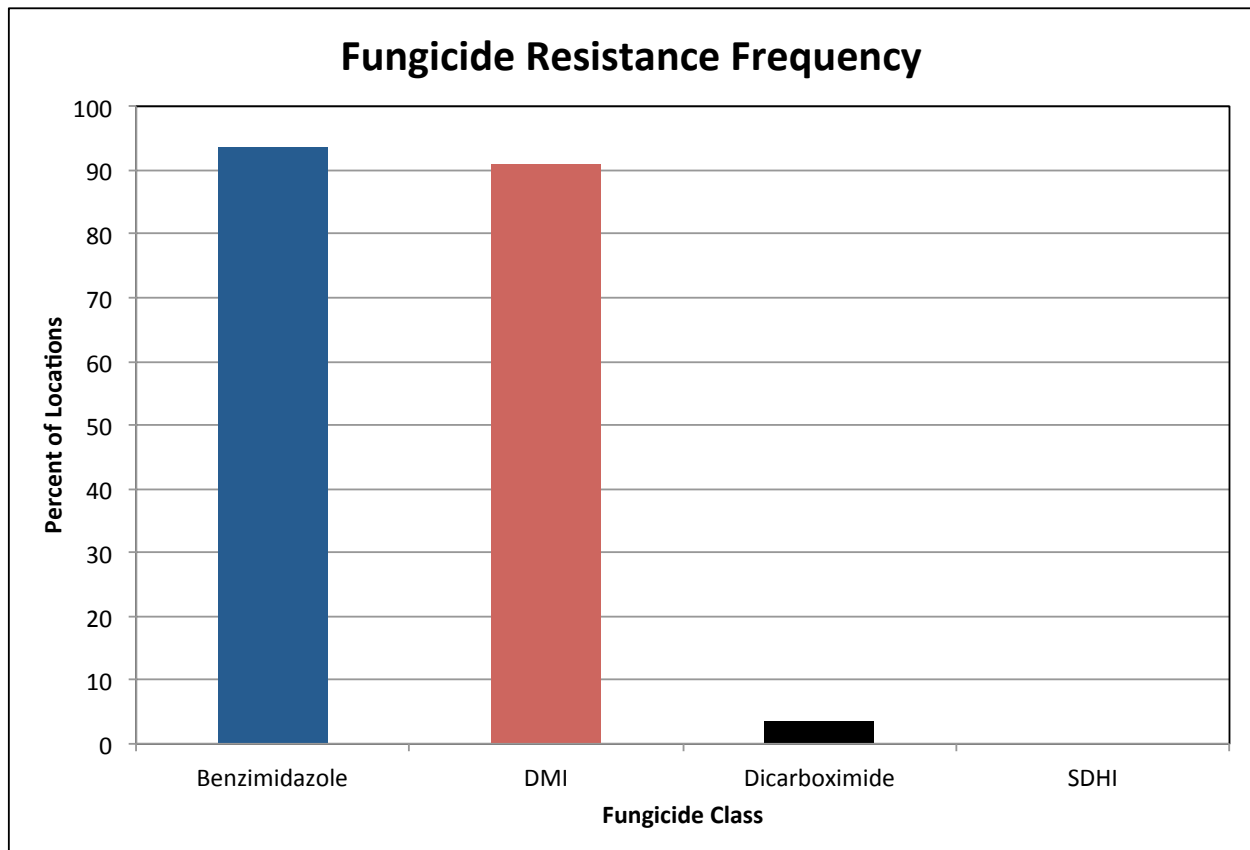
^y Partial = some portion of the population has shifted in DMI sensitivity.

Table 1 cont. Fungicide resistance profiles of golf courses assayed from 2007-2012

	Golf Course	Year	Fungicide Sensitivity			
			Benzimidazole ^z	DMI ^y	Dicarboximide ^z	SDHI ^z
25	WCC-3	2011	Res	Res	Sen	Sen
26	BRGC	2012	Res	Res	Res	Sen
27	MGC	2012	Res	Res	Sen	Sen
28	MVGL	2012	Res	Res	Sen	Sen
29	RGC	2012	Res	Res	Sen	Sen
30	RICC	2012	Res	Res	Sen	Sen
31	WGC	2012	Res	Partial	Sen	Sen

^z Sen = population is sensitive to the fungicide class. Res = population is resistant to fungicide class.

^y Partial = some portion of the population has shifted in DMI sensitivity.



Project Summary

We have also included results from previous courses that have assayed. The results show that benzimidazole and DMI resistance are widespread. Most superintendents we met with have ceased using Benzimidazole fungicides and resistance likely occurred some time ago. However, most superintendents still use DMI fungicides and some reported observing good control. DMI resistance is a more complicated resistance response, multiple genes are involved in the response and fungicide efflux is speculated to be the chief mechanism. Moreover, it is very

likely that the combination of genes interacting to reduce DMI efficacy is also the reason we do not see complete failure, but a reduction in the overall potential disease control we expect to see. As a result of many sites sharing both DMI and benzimidazole resistance, we recommended rotations strategies that relied heavily upon the use of Dicarboximide and SDHI fungicides. During this project, the active ingredient fluazinam (Secure™) gained registration in the New England area. This allows for a different multi-site mode of action rotation and tank-mix partner other than chlorothalonil and in worse case scenarios leaves 4 fungicide classes to select from to manage DMI and benzimidazole resistance.