Developing Programs to Reduce the Environmental Impact Quotient Field Use Rate
For Dollar Spot Management on Creeping Bentgrass Greens

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EIQ ratings were developed by a group of researchers working on fruit (Kovach et al. 1992). The EIQ values incorporate the toxicity data submitted to the EPA as part of the registration process. An equation that incorporates toxicity data was developed to incorporate risks to workers and consumers (dermal toxicity, half-life, reproductive and teratogenic effects to name a few) as well as the environment (leaching potential, aquatic toxicity, persistence, pollinator effects. The resulting equation is: EIQ = [C[(DT × 5)+(DT×P)]+[(C×((S+P)/2)× SY)+(L)]+[(F×R)+(D×((S+P)/2)×3)+(Z×P×3)+(B×P×5)]]/3

where: DT = dermal toxicity, C = chronic toxicity, SY = systemicity, F = fish toxicity, L = leaching potential, R = surface loss potential, D = bird toxicity, S = soil half-life, Z = bee toxicity, B = beneficial arthropod toxicity, P = plant surface half-life (Kovach et al., 1992).

Importantly, the EIQ value is very much meaningless on its own. For example, a chemical with a very high EIQ applied in very small amounts may have less of an impact than a product with a low EIQ value that is applied at higher rates more often. This is why it is important to calculate the EIQ Field Use rate:

EIQ Field Use Rating = EIQ x % active ingredient x Rate

Last year, our preliminary experiments demonstrated that we were able to create programs with up to a 70 % reduction in field use rate EIQ compared to common dollar spot programs by substituting chlorothalonil for fluazinam and by using a 21 day interval instead of a 14 day interval. This year, we have been investigating a variety of programs on golf course fairways and greens at three golf course locations and on greens height grass at the TROE. Programs evaluated are described in Table 1. Each program is being tested at Medina GCC, Craguns' Legacy Resort, and Rush Creek GCC and the UMN TROE. We will only report on the results at the TROE for the MTGF field day.

Results

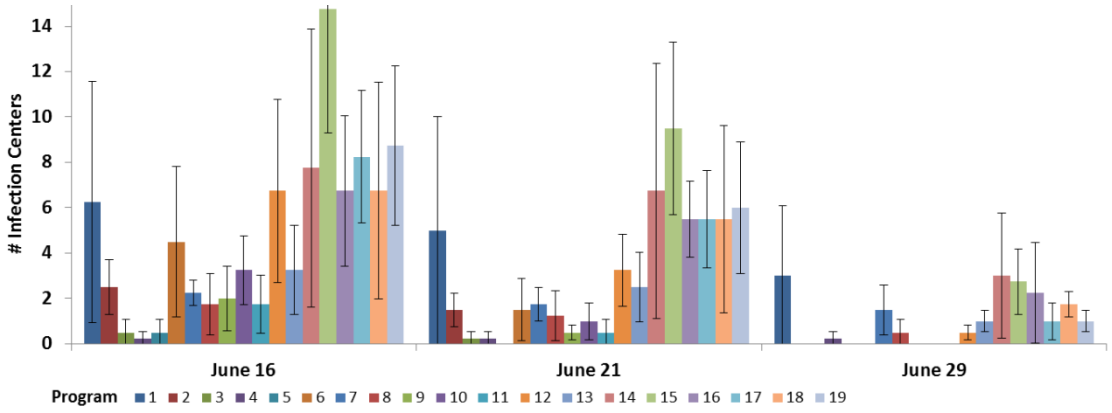

Figure 1: Number of infection centers per plot on UMN TROE greens height grass on June 16, June 21, and June 29. Bars represent standard error of the mean.

Table 1: Fungicide programs tested in this study on a 28 day interval. Fungicides with the same application code are applied at the same time.

	Program (Rate)	Application Code
1	Untreated Control	A
2	Banner Maxx II (1 fl oz/1000), Daconil WS (2.5 fl oz/1000)	AD
	Emerald (0.18 oz/1000)	BE
	3336F (3 fl oz/1000)	CF
3	Banner Maxx II (1 fl oz/1000), Chipco 26 GT (3 fl oz/1000)	AD
	Emerald (0.18 oz/1000)	BE
	3336F (3 fl oz/1000)	CF
4	Xzemplar (0.26 fl oz/1000)	AD
	Mirage (1 fl oz/1000), Daconil WS (2.5 fl oz/1000)	BE
	Curalan (1 oz/ 1000)	CF
5	Xzemplar (0.26 fl oz/1000)	AD
	Mirage (1 fl oz/1000), Secure (0.5 fl oz/1000)	BE
	Curalan (1 oz/1000)	CF
6	Trinity (2 fl oz/1000)	AD
	Emerald (0.18 oz/1000)	BE
	Chipco 26GT (3 fl oz/1000)	CF
7	Trinity (2 fl oz/1000)	AD
	Velista (0.5 oz/1000)	BE
	Chipco 26GT (3 fl oz/1000)	CF
8	Bayleton (0.5 fl oz/1000)	AD
	Emerald (0.18 oz/1000)	BE
	Disarm 480 (0.36 fl oz/1000)	CF
9	Bayleton (0.5 fl oz/1000)	AD
	Emerald (0.18 oz/1000)	BE
	Chipco 26GT (3 fl oz/1000)	CF
10	Banner Maxx II (1 fl oz/1000), Daconil WS (2.5 fl oz/1000)	CE
	3336F (3 fl oz/1000)	DF
11	Oreon (6 fl oz/1000), Par (0.37 fl oz/1000)	ABCD
12	Oreon (8 fl oz/1000), Par 0.37 fl oz/1000)	ABCD
13	Banner Maxx II (1 fl oz/1000), Chipco 26 GT (3 fl oz/1000)	CE
	3336F (3 fl oz/1000)	DF
14	Mirage (1 fl oz/1000), Daconil WS (2.5 fl oz/1000)	CE
	Curalan (1 oz/1000)	DF
15	Mirage (1 fl oz/1000), Secure (0.5 fl oz/1000)	CE
	Curalan (1 oz/1000)	DF
16	Trinity (2 fl oz/1000)	CE
	Emerald (0.18 oz/1000)	DF
17	Trinity (2 fl oz/ 1000)	CE
	Velista (0.5 oz/1000)	DF
18	Bayleton (0.5 fl oz/1000)	CE
	Emerald (0.18 oz/1000)	DF
19	Bayleton (0.5 oz/1000)	CE
	Chipco 26GT (3 fl oz/1000)	DF

Dollar spot outbreaks started in the first week of June, 2016. Data for evaluation dates in June is presented in Figure 1. The results clearly demonstrate that some programs are able to suppress dollar spot on a 28 day interval. Similar results were obtained at other locations on greens and fairways with varying degrees of dollar spot pressure. While programs 2 to 9 were started preventatively as indicated by some fungicide labels (at soil temperatures of 55 F), programs 10-19 were started after dollar spot was detected on plots in early June. The efficacy of early season dollar spot programs relative to programs starting at the first sign of dollar spot disease will become more evident as the July and August results are compiled.

Our fungicide programs were designed to include multiple modes of action. In some cases, minimal rotations are made to reduce the cost of dollar spot management for the program.

Similar to previous years, we attempted to reduce EIQ field use rate through substitution of Daconil with Secure. Both fungicides provide a multi-site, contact protection from dollar spot.

The final results of this study will be available in Fall 2016.

Cited: Kovach, J., Petzoldt, C., Degni, J., and Tette, J. 1992. New York's Food and Life Sciences Bulletin 139:1–8.