

Use of Appear II in fungicide programs for control of dollar spot disease with effects on localized dry spot in a creeping bentgrass putting green in Chicago, IL, 2023

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Plant Disease Management Reports briefly describe the ongoing results of field trials. This report covers:

CREEPING BENTGRASS (*Agrostis stolonifera* ‘L-93’ and ‘Providence’)

Dollar Spot; *Clarireedia jacksonii*

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Dollar spot, caused by *Clarireedia jacksonii*, is a chronic fungal disease of creeping bentgrass in cool, humid environments. In closely mown golf playing surfaces, symptoms include small, circular, sunken spots of blighted turf that eventually coalesce if left untreated. Two fungicide programs by Syngenta were evaluated to control a natural infection of dollar spot disease in creeping bentgrass. The two programs differed only in the amount of Daconil Action applied (2.0 or 3.5 fl oz) in a majority of applications, otherwise both programs contained Appear II at 6.0 fl oz in every application. Appear II is a systemic potassium phosphite fungicide that is formulated with a green-pigment. Treatments were evaluated in a mature nursery putting green originally seeded in 2000 with an equal parts blend of ‘L-93’ and ‘Providence’ creeping bentgrass at North Shore Country Club, Glenview, IL, a north Chicago suburb. The site also had approximately 5-10% *Poa annua* population. The putting green was mowed at 0.125 in. height daily with no fertilizer applied during the study period. Individual plot size was 4 ft × 6 ft arranged in a randomized complete block design with four replications. Treatments were applied five times every 14 days from 31 Jul until 25 Sep using a CO₂ backpack boom sprayer with three XR TEEJET 8004VS nozzles at 40 psi in water equivalent to 2.0 gal per 1000 ft². The first application occurred curatively at first signs of dollar spot, and thereafter all applications were preventative. Dollar spot was evaluated visually each week and recorded as a percent plot area affected from 31 Jul until 6 Oct, with ≤ 10% considered acceptable control. When present, off-color, wilted patches of turf known as localized dry spot (LDS) were evaluated visually in the same manner as dollar spot. In this study, LDS presented as an abiotic disorder common to putting greens due to localized hydrophobicity of sandy soils which then impedes water’s ability to rewet the root zone. Area under the disease progress curve (AUDPC) for dollar spot was calculated using the trapezoidal integration method. Data were subjected to analysis of variance using Fisher’s protected least significance different test at $p \leq 0.05$.

Weather conditions were dry all spring. Normal rainfall and subsequent natural dollar spot development began in Jul. Low levels of dollar spot existed at the start of the study and ranged from 3.8 to 7.0% across all treatments. In untreated plots, dollar spot levels remained moderate until Sep when rapid dollar spot development began with peak severity (57.5%) occurring on 6 Oct (Table 1). AUDPC analysis found both fungicide programs provided dollar spot control during the entire study period from 31 Jul to 6 Oct. During peak disease pressure in Sep-Oct, the two programs provided dollar spot control without breakthrough. Additionally, both programs were associated with residual dollar spot control when rated on 8 Dec given last application was 25 Sep (Table 1). LDS was first identified in untreated plots at 10% on 28 Aug and appeared as yellow to bronze patches that sometimes progressed to brown in color with thinned green turf remaining. Both fungicide programs reduced LDS when high levels existed in untreated plots on 18 Sep and 25 Sep (Table 1). This additional benefit beyond dollar spot control by fungicides was not expected and we speculate Syngenta’s fungicide product formulations contained surfactants which positively influenced soil moisture characteristics by increasing water infiltration and retention.

Table 1. Use of Appeare II in fungicide programs for dollar spot disease control with effects on localized dry spot in a creeping bentgrass putting green.

Application strategy/ treatment rate per 1000 sq ft	Spray interval (days)	Dollar spot severity (%) ^x							Localized dry spot severity (%) ^x				
		11 Sep ^y	18 Sep	25 Sep	2 Oct	6 Oct	AUDPC ^z	8 Dec	11 Sep	18 Sep	25 Sep	2 Oct	6 Oct
Appeare II Program 1 ^v	14	0b	0b	0b	0b	0b	5.0b	3.2b	6.2a	2.5b	0b	2.5a	6.3a
Appeare II Program 2 ^w	14	0b	0b	0b	0b	0b	4.75b	3.2b	4.0a	0b	1.2b	1.2a	2.5a
Untreated.....	--	18.7a	22.5a	37.5a	43.7a	57.5a	156.2a	38.7a	25.0a	20a	16.2a	13.7a	12.5a

^v Program 1 description: 1st app: Secure 0.05 fl oz + Daconil Action 2 fl oz + Appeare II 6 fl oz, 2nd app: Daconil Action 3.5 fl oz + Briskway 0.7 fl oz + Appeare II 6 fl oz, 3rd app: Daconil Action 3.5 fl oz + Velista 0.5 oz + Appeare II 6 fl oz, 4th app: Daconil Action 3.5 fl oz + Briskway 0.7 fl oz + Appeare II 6 fl oz, and 5th app: Daconil Action 3.5 fl oz + Velista 0.5 oz + Appeare II 6 fl oz.

^w Program 2 description: Same as Program 1 except Daconil Action at 2 fl oz was used throughout and this impacted applications 2-5.

^x Percent severity of dollar spot and localized dry spot represents the mean of four replications.

^y Means followed by the same letter in a column are not significantly different ($P \leq 0.05$) according to Fisher's protected least significant difference test.

^z Area under the disease progress curve (AUDPC) for dollar spot was calculated using 11 weeks from Jul 31 to Oct 6.