

## **Influence of Spray Volume on Performance of Contact and Systemic Fungicides**

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### **Objective**

The objective of this research was to determine the effect of spray volume (gallons of water/1000 sq ft) on the performance of a contact and a systemic fungicide against brown patch (*Rhizoctonia* blight) on creeping bentgrass.

### **Rationale**

Most fungicide labels specify spray volumes from 2 - 4 gal/1000 sq. ft. Published literature on the subject is scarce, but suggests that systemic fungicides perform better with high volumes. Our preliminary results suggest that over a range of 0.75 - 4.0 gal/1000 sq ft, spray volume did not influence fungicide performance. Also, pertinent data on the performance of modern contact fungicides at various spray volumes are not current. This research is expected to contribute to improved turfgrass management by determining optimum spray volumes for disease control with modern contact and systemic fungicides.

### **How It Was Done**

The experiment was conducted on a creeping bentgrass (cv Pennlinks) stand maintained according to putting green standards at the Turfgrass Research and Diagnostic Center on the Purdue University campus in West Lafayette, IN. The experimental site had not been treated with any fungicide when a severe outbreak of brown patch occurred on 23 Jun. A contact fungicide (Daconil Weatherstik at 6.0 fl oz/1000 sq ft) and a systemic fungicide (Heritage 50W at 0.4 oz/1000 sq ft) were applied once in spray volumes equivalent to 4.0, 2.0, 1.5, 1.0, and 0.75 gal/1000 sq ft on 25 Jun. Individual plots measured 3.3 ft x 6.6 ft. The experimental design was a randomized complete block with four replications.

All plots were assessed (visually) for percentage brown patch using the Horsfall-Barratt (HB) scale before the fungicide treatment on 25 Jun, and thereafter at 3 - 10 day intervals through 14 Aug. The HB values were converted to percentages for presentation of the data.

### **Results**

There appeared to be no difference between fungicides or among spray volumes in the time to reduce the percentage blighted turf from around 50% to 2% or less (Tables 1 and 2). The decrease in disease severity occurred in eight days. Certainly, part of the decline in symptom expression was due to the prevalence of environmental conditions that did not favor disease development during that time, evidenced by the reduction to 13.6% disease in the untreated plots.

The Daconil treatment applied at 4.0 gal/1000 sq ft began to lose effectiveness around the third week in July, after which, disease levels in the treatment plots were no different, or significantly greater than in the untreated plots (Table 1). Daconil applied at 2.0 and 1.5 gal/1000 sq ft began to lose effectiveness in early August. Among Daconil-treated plots, the 0.75 gal/1000 sq ft treatment allowed the least amount of disease and performed well throughout the test period. The Heritage 50W treatments provided good control through 14 Aug, regardless of the spray volume applied (Table 2).

The data represent results from only a single experiment. The experiment will be repeated and data compiled before valid conclusions can be drawn. However, the results suggest that:

- spray volume did not affect the performance of the systemic fungicide (Heritage 50W).
- for the contact fungicide (Daconil Weatherstik 6F), lower spray volumes resulted in extended suppression of disease, possibly due to a direct effect of the high concentrations of fungicide on pathogen populations in the turf canopy.

Table 1. Effect of a single application of azoxystrobin (Heritage 50W, 0.4 oz/1000 sq ft) applied at spray volumes of 4.0, 2.0, 1.5, 1.0, and 0.75 gal/M against brown patch on creeping bentgrass.

Evaluation date	Spray volume (gal/M)					Untreated
	4.0	2.0	1.5	1.0	0.75	
----- # Dollar spots/plot -----						
24 June	49.4	38.2	60.6	43.7	33.0	43.7
03 July	0.8	0.8	1.0	0.6	0.8	13.6
06 July	0.8	0.6	0.8	0.6	0.6	9.1
14 July	0.6	0.6	0.6	0.6	0.6	2.5
21 July	0.6	0.6	0.6	0.6	0.6	4.8
31 July	0.8	0.8	0.8	0.6	0.6	6.0
06 August	0.8	1.0	1.3	0.8	0.6	28.2
14 August	0.8	1.6	3.1	1.6	0.8	43.7

Table 2. Effect of a single application of chlorothalonil (Daconil Weatherstik 6F, 6.0 fl oz/1000 sq ft) applied at spray volumes of 4.0, 2.0, 1.5, 1.0, and 0.75 gal/1000 sq ft against brown patch on creeping bentgrass.

Evaluation date	Spray volume (gal/1000 sq ft)					Untreated
	4.0	2.0	1.5	1.0	0.75	
----- # Brown patch/plot -----						
25 June	38.2	43.7	60.6	33.0	38.2	43.7
03 July	0.8	1.6	1.0	1.0	1.0	13.6
06 July	0.6	0.6	0.8	0.6	0.6	9.1
14 July	1.0	0.6	0.8	0.6	0.8	2.5
21 July	4.8	0.6	1.0	0.6	0.6	4.8
31 July	16.6	2.0	3.1	0.8	1.0	6.0
06 August	38.2	7.4	13.6	3.9	2.0	28.2
14 August	45.9	19.9	28.2	11.2	2.5	43.7