

## Use of Biological Control Agents for Management of Dollar Spot on Creeping Bentgrass

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### Objective

The objective of this research is to investigate how biological control options contribute towards effective and efficient management of dollar spot on creeping bentgrass.

### Rationale

An effective disease management strategy should include non-chemical control options such as biological agents in addition to effective fungicides. A commercial preparation of *Trichoderma harzianum* is one of the few biological agents registered for specific turf diseases. Results of previous research indicate that biologicals could contribute towards early season disease suppression if applied at appropriate times and frequencies. This research was designed to investigate the influence of application timing on the development of dollar spot on creeping bentgrass.

### How It Was Done

The research was conducted on a stand of creeping bentgrass (*Agrostis palustris* cv. 'Penncross') at the Purdue Agronomy Research Center. The experimental design was a randomized complete block, with four replications of treatments. Individual treatment plots measured approximately 3.3 ft x 6.6 ft. A commercial preparation of *Trichoderma harzianum* (BioTrek 22G) was applied at various times and frequencies as described in Table 1. Also, in order to determine if the carrier of the biological control agent contributed towards disease suppression, the treatments were duplicated with autoclaved preparations BioTrek 22G. The autoclaving effectively killed the biocontrol fungus without changing the composition of inert ingredients. For comparison with standard chemical control options, the experiment included a fungicide treatment (Banner 1.1 EC at 2 fl. oz./1000 sq. ft applied twice during the season). Dollar spot development was assessed periodically through the summer by counting the number of infection centers that appeared in each plot.

### Results

Dollar spot symptoms appeared in mid-June and increased in severity through the summer in plots except those treated with fungicide (Table 1). With one exception, there was no difference in the rate of dollar spot development among any of the BioTrek treatments or the untreated plot. The exception involves BioTrek 22G applied on May 4, and May 18. The rate of disease development was significantly slower for that treatment than for any of the non-fungicide treatments.

Results show that timing of the application is critical for any disease-suppressing effect of the biological control agent. Soil temperatures at the time of the 04 May application ranged between 59°F and 64°F. Temperatures for later applications exceeded 68°F. These results support research conducted in 1997, when then product failed to provide any measurable control if applied when soil temperatures approached 70°F.

These results also show that although the biological control agent reduced disease development compared to untreated plots, the level of control alone was unacceptable and significantly less than control provided by the fungicide treatment.

Table 1. Comparison of dollar spot development in creeping bentgrass plots treated with autoclaved (killed) and non-autoclaved preparations of BioTrek 22G. The experiment also included an untreated plot and a fungicide-treated plot.

Treatment, rate, and application date	Dollar Spot <sup>a</sup>					
	17 Jun	26 Jun	03 Jul	10 Jul	21 Jul	30 Jul
BioTrek 22G 1.5 lb/M 04 May, 18 May	0.8	4.0	5.8	12.0	24.3	35.8
BioTrek 22G 1.5 lb/M 04 May, 01 Jun	1.3	4.5	10.8	27.8	33.8	48.3
BioTrek 22G 1.5 lb/M 01 Jun, 15 Jun	2.0	2.5	9.0	20.5	38.3	52.8
BioTrek 22G 1.5 lb/M 01 Jun, 29 Jun	2.3	5.5	13.8	22.0	38.5	58.3
X-BioTrek 22G 1.5 lb/M 04 May, 18 May	2.3	5.5	8.8	24.8	45.0	58.0
X-BioTrek 22G 1.5 lb/M 04 May, 01 Jun	2.8	7.5	16.8	36.3	61.0	69.5
X-BioTrek 22G 1.5 lb/M 01 Jun, 15 Jun	0.8	2.8	9.8	22.8	47.3	41.3
X-BioTrek 22G 1.5 lb/M 01 Jun, 29 Jun	3.0	8.5	20.0	41.3	63.5	75.5
Banner 1.1EC 2.0 fl oz/M 12 Jun, 09 Jul	1.8	1.3	0.3	0.5	0.0	0.0
No treatment	2.5	8.3	18.0	32.3	48.5	53.0

<sup>a</sup>Dollar spot infection centers/plot.