

Coring Enhances Benomyl Treatment for Dollar Spot

Dollar spot is a serious disease problem of bentgrass, the grass species most often grown on bowling greens. In addition thatch is a recurring problem on bowling greens. It is controlled in part by coring. Professors Tom Hsaing and Jack Eggens and graduate student Leon X. Liu of the Univ. of Guelph have combined the treatments for the two problems to enhance the effectiveness of a fungicide used for the control of dollar spot on bentgrass.

Benomyl is a commonly used systemic fungicide on turf as a soil drench for the control of the disease, dollar spot. The soil drench is usually achieved by apply a large volume of water to distribute the fungicide into the soil. Where infiltration is low and where a significant depth of thatch occurs the benomyl movement into the soil may be restricted. This is particularly true where thatch occurs because thatch may absorb large amounts of the fungicide.

Hollow tine coring is an accepted procedure for increasing the infiltration rate and decreasing the thatch accumulation, while at the same time stimulating root and shoot growth. The surface area of turf exposed to the chemical may be more than doubled when the surface area of side walls of the core hole are taken into consideration.

The GTI researchers applied benomyl at 3 kg/ha in 1250 litres of water/ha, 1, 7 and 14 days after hollow tine coring. Twenty mm of irrigation was applied immediately after the benomyl treatments.

Turfgrass clippings, the upper 10 mm of thatch (thatch depth ranged from 14 to 21 mm) and the upper 10 mm of soil were removed at 0-10, 11-20 and 21-30 mm from the core holes for benomyl analysis.

The insure a uniform dollar spot disease occurrence the plots were inoculated with a mixture of five strains of the dollar spot fungus at weekly intervals commencing the day after benomyl application. Visual evaluation of the disease was made 1, 7, 14, 21 and 28 days after the fungicide application.

Four replicates of the treatments were applied in each of 1992 and 1993. The average of the two years of data are reported herein.

Among all coring treatments, those cored 14 days before benomyl treatment gave the highest concentration of benomyl in the grass clippings one day after the fungicide application (Table 1). The increase was primarily associated with the turf immediately adjacent to the core hole. Core cultivation one day prior to benomyl treatment provided the longest lasting uptake of the fungicide, reaching a maximum 14 days after application (data not shown).

The level of benomyl in the thatch was significantly higher than in the grass clippings (Table 1). Benomyl concentration decreased as the distance from the coring hole increased and with the time which had elapsed from the time of coring.

The soil from treatments which had been cored one day prior to benomyl applica-

tion had significantly higher concentrations of the fungicide than coring seven or 14 days for all distances from the coring hole. Thus the core holes were the avenue for major water movement into the soil during the irrigation of the plots after benomyl application.

Benomyl application significantly reduced the occurrence of dollar spot on the bentgrass (Table 2). The longer the delay in fungicide application after coring the lower the degree of control of the disease; to the extent that allowing 14 days to elapse gave no better control than benomyl without coring.

This interesting experiment clearly demonstrates that the timing of one management practice with respect to a pesticide practice can result in an enhancement of efficacy of the pesticide. Another management practice whose timing can also influence dollar spot control is light nitrogen applications.

A worthy project for the researchers to consider is the degree by which the rate of benomyl application can be reduced when the application is coordinated with coring and nitrogen applications. It would be interesting to determine if the same concept applies to other systemic pesticides.

Table 1: The influence of coring at three times prior to fungicide application on the concentration of benomyl in the bentgrass leaf, thatch and soil at three distances from the core hole.

Coring prior to application (days)	Benomyl concentration @ 3 distances (mm) from core hole								
	Leaf			Thatch			Soil		
	0-10	11-20	21-30	0-10	11-20	21-30	0-10	11-20	21-30
1	0.6	N.D.	N.D.	38.6	26.6	6.8	6.3	3.7	3.7
7	0.8	0.5	0.5	31.2	25.2	22.0	3.2	1.4	1.6
14	1.2	0.8	0.7	26.3	22.8	19.8	1.0	N.D.	N.D.

Table 2: The influence of coring at three times prior to application of benomyl on the control of dollar spot in bentgrass.

Coring prior to application (days)	Days after benomyl application				
	1	7	14	21	28
	(No. of dollar spot patches/two m ²)				
1	0	0	0	0	0
7	0	0	0	8	18
14	0	0	2	19	43
Benomyl less coring	0	0	7	21	48
Check	0	3	19	51	103