

Suppression of Dollar Spot by the Growth Regulator Paclobutrazol

By JULIEN MERCIER and WARD STIENSTRA

Dept. of Plant Pathology—University of Minnesota

The possible advantage of controlling dollar spot by using the growth regulator paclobutrazol (Turf Enhancer) was tested on a creeping bentgrass/annual bluegrass turf area at the University of Minnesota in 1997. Plots sprayed with paclobutrazol were compared with plots sprayed with no growth regulator or sprayed with trinexapac-ethyl (Primo). From June to September, plots were sprayed every three weeks with growth regulators, staggered by about 10 days with fungicide treatments, chlorothalonil (Daconil Weatherstick) or propiconazole (Banner), also applied every three weeks at full and reduced rates. Paclobutrazol alone significantly reduced the number of dollar spots by 75% to 97% at times of low disease incidence (about 45 infections/m² in untreated control), to a level comparable to the fungicide treatments in untreated plots. Under high disease pressure (more than 200 infections/m² in untreated plots), disease control by paclobutrazol alone (44%) was not sufficient and turf quality declined. However, under these conditions, paclobutrazol improved the control obtained with low rates of chlorothalonil treatments by up to 68%. No reduction in dollar spot resulted from applications of the growth regulator trinexapac-ethyl. It can be concluded from this study that paclobutrazol can help control dollar spot but will not replace fungicide treatments when infection is severe.

Population Dynamic of Introduced Biological Control Agents Of Dollar Spot on Turf

The biological control of plant diseases is the inhibition of pathogens on plants by antagonistic microorganisms which are applied as protective agents. High populations of introduced antagonists must be maintained on turf in order to achieve maximum disease control and to minimize the number of applications during the growing season. The population dynamic of three antagonists considered for the biological control of dollar spot was studied after their application to a bentgrass/annual bluegrass turf. The antagonists, a fungus (*Epicoccum nigrum*), a bacterium (*Pseudomonas fluorescens*) and an actinomycete (*Streptomyces* sp.), were chosen for their ability to colonize turf and their potential to inhibit *Sclerotinia homoeocarpa*, the casual agent of dollar spot on turf. Regardless of the antagonist or the method of application (suspension in water or solid top dressing), the population of antagonists did not increase after their introduction to turf. At best the popu-

lations remained stable for a few days or started declining gradually, depending upon the antagonist. One possible reason for the difficulty of these antagonists to establish and grow on turf leaves and thatch may be the very high population of indigenous bacteria and fungi, which were about 1×10^8 and 1×10^6 propagules per gram, respectively. By contrast, *Pseudomonas fluorescens*, the antagonist which reached the highest populations on turf, never occurred at populations higher than 3×10^6 propagules per gram of turf. Populations of the biocontrol agents were higher and persisted longer (up to 22 days) when they were applied as a solid top dressing to the turf. Spraying antagonists in cell or spore suspension was not as effective in establishing and maintaining high populations on turf. The effectiveness of top dressing may be due to the higher amount of inoculum applied and the nutritional base it provides to the antagonists. Studies are being carried out in 1998 in order to determine whether the establishment of antagonist populations is a function of the amount or type of inoculum applied.

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