

CUTT

NYSTA Research Reports

Our NYSTA-supported study was designed to evaluate the impacts of application scheduling on the disease control efficacy of introduced microbial inoculants.

Optimization of Application Timing and Frequency of Microbial Inoculants for Turfgrass Disease Control

Considerable information is now available concerning the use of microbial inoculants for the control of turfgrass diseases. However, despite positive experimental results, few microbial inoculants have been highly effective in field studies or in commercial use on golf courses.

A number of studies have shown that microbial agents perform most effectively when populations can be maintained at high levels, usually at populations exceeding 10^7 cells/g soil. However, applications made during the daytime hours may limit population development due to UV exposure or to desiccation. The limited number of success stories of biological control on golf courses have been from sites where applications of biological control organisms were applied during the overnight hours. Our NYSTA-supported study was designed to evaluate the impacts of application scheduling on the disease control efficacy of introduced microbial inoculants.

Intuitively, daily applications made during the evening hours should greatly enhance activity of microbial inoculants over conventional weekly applications or daily daytime applications since the overnight hours should provide more suitable conditions for microbial growth and activity and reduce mortality due to UV exposure and desiccation. Furthermore, applications would be made at the times when pathogens are most active.

Our results clearly show the potential for improving upon disease control efficacy of microbial inoculants by adjusting application schedules; moving away from traditional daytime applications on a two-week schedule to nighttime applications on a daily schedule. Our results have specifically shown that daily nighttime applications of various inoculants are superior to daytime applications or weekly applications. This response was also apparently independent of population level.

Our work in 1999 also focussed on the evaluation of a number of microbial inoculants for turfgrass disease control. Last season was a particularly tough season for disease control studies since temperatures were extremely high

and rainfall was well below normal. As a result, disease development was not extensive and turfgrass stress was high. We essentially saw no dollar spot on the site where the liquid formulations were evaluated and no anthracnose on the adjacent site where the solid formulations were evaluated.

Following liquid applications, anthracnose severity remained relatively constant over the course of June and July with mean disease ratings ranging from 0.67 to 1.67. One week after the first application (June 17), plots treated with Roots+Bacteria A, Roots+Bacteria B, or Serenade at 10lb/A showed significantly lower levels of anthracnose than the non-treated plots. By the 24th of June (after two applications) only plots treated with Serenade at 10lb/A had significantly lower levels of anthracnose. For the remainder of the season no treatment provided significant levels of disease control. However, some responses are worth noting. On the last two rating dates, Daconil Ultrex failed to provide a significant level of anthracnose control throughout the season. Additionally, Roots Powder+Standup provided a significantly greater level of anthracnose control than other products such as Bio-A Plus, Companion, and RD-107.

Dollar spot incidence was observed relatively early on plots to which solid formulations of biological control products were applied. Through the month of July, dollar spot incidence remained constant. Slight increases were then observed by the August 23rd rating date. Many treatments were effective in reducing dollar spot incidence. All but GC-O and HHI-4 showed consistent levels of control through the latter part of the season (up until the last rating date). HHI-2 seemed particularly suppressive to dollar spot. Daconil Ultrex a significant level of control up to the last rating date. By the last rating date, only plots treated with the GC formulation showed a significantly lower incidence of dollar spot.

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