

Final Project Report to the NYS IPM Program, Community IPM 2000 – 2001

Title:

Control of White Grubs with Beneficial Nematodes on School Athletic Fields and Golf Turf

Project Leader(s):

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Cooperator(s):

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Type of grant:

Implementation, continuing

Project location(s):

Hauppauge High School athletic field, Hauppauge NY
Timber Point Golf Course, Great River, NY

Abstract:

The objectives of this project are to familiarize school athletic field managers and county golf course workers with turf infesting grubs and alternative management strategies. The goal is to hold a demonstration project and hands-on workshop for each audience. Participants will be able to sample for grubs, recognize damage, use proper thresholds for management decisions, and gain confidence in non-chemical control options.

Background and justification:

White grubs may be the most important insect pests of athletic turf in New York. While patchy and sporadic in nature, grubs can cause serious damage to turf, and to the untrained eye, this damage might resemble other cultural or disease problems. White grubs are commonly managed with conventional insecticides, such as chlorpyrifos and carbaryl. As public awareness focuses on the risks associated with pesticides, and chemicals like chlorpyrifos are phased out of use, athletic field managers are forced to seek alternatives. This trend provides an excellent opportunity for Cornell Extension and the Integrated Pest Management Program to demonstrate grub sampling, thresholds, and the use of beneficial nematodes for grub management to practitioners, such as school grounds staff and golf course managers. Many New York state schools already follow no-pesticide policies for athletic field maintenance and would benefit from learning how scout and to use beneficial nematodes, when necessary, to manage damaging grub populations. In addition, Suffolk County has recently passed a pesticide phase-out law that will require golf courses to become nearly organic by January 2002. Golf course managers will need to understand the alternative pest control options available to them and will benefit from demonstration of their use.

A successful integrated pest management program relies on the use of sampling, thresholds, and knowledge of pest biology. In addition, an important control strategy is the use of beneficial organisms. The use of beneficial nematodes for white grub control in turf has been explored for a number of years. It is well established that several species of nematodes, including *Heterorhabditis bacteriophora* and *Steinernema glaseri*, are effective in many situations for the control of grubs. Some environmental parameters of nematode use have been established by researchers in New York, thus improving the chances of using them successfully.

Previous IPM efforts have focused on the use of nematodes on golf course turf with more limited demonstrations in school athletic field turf. Demonstrations were successful in both situations and it would be of great use to bring this type of information to schools and golf courses on Long Island. Local need is such that many school districts are phasing out pesticide use, leaving the field managers worried that they will have no grub control options. In addition, county owned and operated golf courses are subject to a pesticide phase-out law that will leave many workers with little idea of how to manage pests effectively. Our goal is to give practitioners a working knowledge of the use of beneficial nematodes for grub control. At the same time, this project will help practitioners accurately determine whether the problem is grub related and whether treatment will be necessary. It will also teach them how to use a biological strategy when necessary.

Objectives:

1. To teach proper grub sampling and identification
2. To instruct practitioners in the use of economic thresholds
3. To demonstrate the use of beneficial nematodes (*H. bacteriophora*) for control of white grubs

Procedures:

Preliminary grub sampling was done in late August to locate appropriate fields in which to test the effectiveness of entomopathogenic nematodes for grub control. Heavily infested areas were identified on a fairway at Timber Point Golf Course (Suffolk County) and at Hauppauge High School, Hauppauge NY (Suffolk County). Sampling indicated that grubs (mostly Oriental beetles) in each area had surpassed the threshold of 8-10/sq ft, or 1 per 4" diameter golf course cup cut. Four treatments plus one control were applied in a randomized complete block design plot in each location. Each treatment was 3'x3' square. Treatments included: *H. bacteriophora*, *S. carpocapsae*, a newly marketed species, *Heterorhabditis marilatus*, and a new formulation of *H. bacteriophora* from BioWorks, Inc. All were applied at a rate of 1 billion per acre with ½" of water, by hand application. This procedure was slightly different from the original plan of applying nematodes of the same species and supplier at two different rates. Unexpectedly, we were offered the new *H. marilatus* and the new formulation from BioWorks, so we decided to compare effectiveness by species / formulation rather than by rate.

Analysis of the plot was to be conducted as a workshop to be held in each location. Hauppauge school district had generously offered to host all employees of any other school district interested in attending the workshop. All municipal golf course employees of Suffolk County were to be invited and encouraged to attend the workshop at Timber Point.

Results and discussion:

As a result of the events of mid-September, our hands-on workshops were delayed. Due to later budget constraints we decided not to hold the workshops at all. To salvage the project, we chose to analyze the effectiveness of the nematode applications by quantifying the numbers of grubs in each plot, both alive and dead. These data were collected on October 2nd by randomly selecting four 4" cup cores, using a standard golf course cup cutter. Cores were examined for live and dead grubs. Statistical analysis was performed on the number of remaining live grubs in each plot. The majority of grubs collected were Oriental beetles. A smaller number were Asiatic garden beetles. Results showed that the number of grubs found alive at each location was greatly different, as might be expected. Timber Point Golf course was more heavily infested with grubs by late September than the athletic field at Hauppauge School District. This may have been because Timber Point golf course is irrigated on a regular basis, whereas Hauppauge SD fields are not irrigated. Another factor may have been the enormous presence of ants at Hauppauge. A gigantic ant colony was discovered in and nearby our plot that stretched for dozens of square feet beneath the turf. Ant predators may have contributed to lower numbers of grubs in this field.

Comparison of the data by two-way ANOVA (by reps and treatments) yielded no significant differences in the numbers of live grubs and therefore no measureable difference between the nematode treatments ($p=0.964$). Variation within and between plots was high and this may have obscured results. Although many grubs collected from plots appeared to be or may have been infected with nematodes, infection was not detectable in any grubs under a dissecting microscope. This may have been due to the delay of our collection date.