Management of Key Insect Pests of Golf Courses, Lawns, Sod Farms and Athletic Fields in Michigan

A
Research
Pre-proposal to the
Michigan Turfgrass Foundation

by

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1. Insecticide Control of Grubs. Grubs of Japanese beetle, European chafer, oriental beetle, masked chafer, June beetle and Asiatic garden beetle continue to be the most damaging group of insects to turfgrass in Michigan. Insecticides have similar activity against all of the white, C-shaped larvae of scarab beetles that we call "white grubs". Research is needed to determine which products are the most effective, and when they should be applied. Because several new products are now being developed for control of grubs in turfgrass, chemical companies funded the testing of over 30 treatments in 2006. MTF provided an additional $4,000 to test the best timing for some of these new products. We expect to have much information to share at the 2007 Turf Conference.

For 2007, it would be very helpful to again have $4,000 in funding from MTF to add some grub treatments not funded by chemical companies, and also for printing our test results. I would like to use the test results from 2006 to make a 2-page color bulletin for a hand-out at the 2007 Turf Conference (GLTE). This bulletin would summarize 2006 test results, identify which products were most effective, and give the optimum timing for application of each product. It would be designed so that the back-side of the bulletin could be taped to a wall or bookcase for quick reference. We can print 1,500 color copies on heavy paper with our new color laser printer for $800.00 An additional $1,200 is requested for the technical labor involved in preparing the lay-out for the bulletin. This would still allow $2,000 for adding some insecticide treatments to our 2007 grub test.

Funding requested for 2007: $4,000
No travel or equipment

2. Biological Control of Japanese Beetle in Michigan.

***Project Summary*:** In 1999, two insect parasites of Japanese beetle (*Tiphia vernalis* and *Istocheta aldrichi*) and one protozoan pathogen (*Ovavesicula popilliae)*, were collected in Connecticut and introduced into research plots on 5 golf courses in Michigan. For each introduction site, control plots were established at a different golf course located nearby, for a total of 10 golf course sites. In 2005 we returned to the same golf courses to sample for Japanese beetle and the introduced parasites and pathogen. *T. vernalis* was not found, *I. aldrichi* was detected at 4 of 10 locations, and *O. popilliae* was found at all introduction sites and two control sites, sometimes at epizootic levels (> 20% infection). Populations of Japanese beetle on golf courses where *O. popilliae* is epizootic are now much lower than levels in 1999 and 2000. In 2006 and 2007 we will attempt to demonstrate long-term biological control of Japanese beetle by comparing the population density of Japanese beetle at 5 locations with little or no *O. popilliae*-infection to the same at 5 locations with moderate to high levels of infection.

Table 1. Establishment and spread of *O. popilliae* to epizootic levels from 2000 to 2005 at 7 of 10 golf courses in this study. Japanese beetle grubs from the remaining 3 golf courses are still in the freezer awaiting assay for the pathogen. Percent infection in 2005 is listed in blue print for the Kalamazoo area where the *O. popilliae* was found as a result of natural spread in 2000, and in red print for the Detroit area where *O. popilliae* was not detected in 2000. Fairways where *O. popilliae* was introduced in 2000 are indicated with a '+'.

Golf course site	***O. popilliae* Introduction site**	***O. popilliae* % infection 2000**	***O. popilliae* % infection 2005**	**JB adults with *Istocheta***
Medalist #5			**11**	
Medalist #4	**+**	**0**	**0**	**4***
Binder Park #18			**51**	
Binder Park #6		**0**	**31**	**0**
Eastern Hills #7			**43**	
Eastern Hills #5	**+**	**20**	**17**	**0**
Kalamazoo CC #15			**17**	
Kalamazoo CC #1		**6**	**20**	**2**
Bloomfield Hills CC #13			**0**	
Bloomfield Hills CC #6		**0**	**0**	**2**
Willow #9	**+**		**5**	
Willow #10		**0**	**0**	**0***
Orchard Lake CC #10			**0**	
Orchard Lake CC #15	**+**	**0**	**10**	**0***
Cracklewood #6			**3**	
Cracklewood #4	**+**	**0**	**19**	**0**

*Sites where *Istocheta* was introduced in 2000

By comparing the incidence of pathogens and parasites and the density of Japanese beetle larvae at the introduction sites with the same at nearby control sites, we will be able to evaluate how successful the introductions were, and the impact they are having on Japanese beetle in Michigan. Furthermore, sampling for pathogens and parasites in 2006 and 2007 will help us to find a good location for a field day each year in early October so that turf professionals from all over the state can come and collect natural enemies of Japanese beetle for distribution in their own area. Details of the October *Grub Dig* will be announced in August.

Amount requested from MTF for 2007: *$5,000 (Matching funding for GREEEN)*
No travel or equipment
Amount funded by Project GREEEN for 2007: *$40,000*

3. Management of Ants and Earthworms on Golf Courses. The purpose of this project is to determine which pesticides are most effective in suppressing ant and earthworm mounding on golf course fairways, tees and greens. Although we added to our knowledge with earthworm and ant tests in 2005 and 2006, we should continue testing

new products to provide golf course superintendents with the best product information available. These tests are completely dependent on funding from MTF because chemical companies do not fund any tests on earthworms, and very few for ants.

Funding requested for 2007:
Ants……$5,000
$500 for travel
Earthworms…… $3,000
$300 for travel

4. A European Crane Fly in Michigan. In May, 2005, Dr. Jon Gelhaus, Associate Curator of Entomology for the Academy of Natural Sciences in Philadelphia, contacted me about the recent identification of *Tipula oleracea* from Farmington Hills, Michigan. This is the same species of crane fly that was recently discovered in the state of Washington. It is an important turf pest, and may require pesticide treatments on golf courses. With MTF funding in 2006 we purchased light traps and set them up at 6 golf courses in the Detroit area. In spring of 2006 we found European crane fly at Pine Lake, Orchard Lake, and Farmington Hills. We will repeat the light trap sampling again in fall of 2006 at 6 additional golf courses.

What is needed at this time is funding to purchase 6 more light traps, so that we will have a total of 12 traps for more extensive sampling in 2007. We hope to use the light trapping at golf courses to delineate the infestation in Michigan. The cost of the new light traps will be $300 each, for a total of $1,800. The cost of travel to the golf courses and labor to set and change traps at 12 sites in the spring and fall is $4,000.

Total requested from MTF for 2007 is $5,800
$1,800 in equipment
$500 in travel

Summary of projects and funding requested for 2006:

1. Insecticide control of grubs on golf courses……..$4,000
2. Management of ants on golf courses…… $5,000
   Management of earthworms on golf courses…….$3,000
3. Biological control of Japanese beetle in Michigan…… $5,000
4. European crane fly in Michigan……$5,800

Total amount requested from MTF:……..……$22,800