

ENTOMOLOGY RESEARCH UPDATE: LONG-TERM SOLUTIONS FOR  
JAPANESE BEETLE AND EUROPEAN CHAFER, AND MANAGEMENT OF ANTS  
ON GOLF COURSES

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**I. Introducing pathogens of Japanese beetle into Michigan.** Research supported by Michigan Turfgrass Foundation and Project GREEN from 2000 to 2003 showed that milky disease and the Eugregarine parasite, *Stictospora villani* tended to be absent in new infestations of Japanese beetle in Michigan. Overall, they were much less abundant in Michigan than in Connecticut (Table 1). Another pathogen that may help suppress Japanese beetle in Connecticut, *Ovavesicula popilliae*, was completely absent in Michigan except for one location in Kalamazoo. Japanese beetle is not nearly as abundant in Connecticut now as it was 30 years ago. Based on these results, we are not attempting to distribute these pathogens throughout the state, including an effort in the Saginaw Valley Region, where we are collecting data to determine what effect these pathogens have on populations of Japanese beetle there.

**Table 1. Incidence of three pathogens of Japanese beetle in Michigan and Connecticut**

Pathogen	% infection in Michigan	% infection in Connecticut
<i>Paenibacillus popilliae</i> (milky disease)	0.9	3.7
<i>Ovavesicula popilliae</i> (Microsporidean)	0.2	24.0
<i>Stictospora villani</i> (Eugregarine)	34.0	50 - 100

At five locations (3 at Currie Golf Course, 1 at Brookwood Golf Course, and 1 at Crooked Creek Golf Course), we introduced Japanese beetle grubs infected with *Stictospora* and *Ovavesicula*. Before introducing the infected grubs, *Stictospora* was absent at 4 of 5 of these sites. At one site, 5% of the grubs were already infected with *Stictospora*. One year later, 11 to 58% of the grubs in the introduction plots were infected, while only 0 to 3% of the grubs in the control plots were infected (Table 2).

**Table 2. Incidence of *Stictospora* one year after introducing infected grubs.**

Golf course	Treatment	Number of grubs examined	% <i>Stictospora</i> infected
Currie #2	Introduction	30	27
	Control	30	0
Currie #5	Introduction	27	11
	Control	30	3
Currie #8	Introduction	18	22
	Control	20	0
Brookwood	Introduction	19	58
	Control	23	30
Crooked Creek	Introduction	30	53
	Control	25	0

**II. Suppression of ant mounding on tees, greens and fairways.** Dursban has been a standard product for ant suppression on golf courses for many years, but with new guidelines introduced by the Environmental Protection Agency for the use of organophosphate insecticides, we need some alternative products that suppress ant mounding. The apron area around a practice green at Wuskowhan Players Club was divided into 60 plot areas to test insecticides for ant suppression. All the plots except for the controls were sprayed on June 2, 2004. Ant mound data were collected weekly, for 5 weeks after treatment (Table 3). The first 4 products in Table 3, below Dursban, provided good suppression of ant mounding for 5 weeks, at a level similar to Dursban. In this test Scimitar worked as well as Dursban. Of interest to many golf course superintendents is how well Merit worked, since this product is often used for grub control. Merit reduced ant mounding by about 50% in this test. Because it persists for 6 months or longer in the soil and in grass plants, Merit may have a suppressive effect on ants for most of the growing season. In other tests, Merit did work as well for ants as it did this time.

**Table 3. Percent reduction in ant mounds for 5 weeks after a single application at Wuskowhan Players Club.**

<b>Product</b>	<b>Rate (ai/A)</b>	<b>6/2</b>	<b>6/9</b>	<b>6/16</b>	<b>6/23</b>	<b>6/30</b>	<b>7/7</b>
Dursban Pro	1 lb	0	71	100	92	84	80
Scimitar	0.069 lb	0	87	97	92	77	75
Talstar F	0.05 lb	0	87	95	86	56	57
Precise	5 lb	0	63	63	75	55	80
Astro	0.2 lb	0	92	60	64	79	70
Tempo 20WP	0.135 lb	0	87	62	26	21	0
Sevin SL	8 lb	0	52	45	54	55	38
DeltaGard GC	0.85 lb	0	84	35	40	17	9
Merit 75WP	4 lb	0	55	22	48	66	46
Unsprayed	--	0	0	0	0	0	0

**III. Earthworm mounding on golf courses.** Earthworm mounds are so abundant in the spring on some golf courses with heavy soils, that over 50% of the turf is lost on some fairways. Although earthworms are also very beneficial to turf, this kind of damage is unacceptable to golfers. Two products commonly used for suppressing earthworms, Cleary 3336 and Sevin SL, were tested at Kalamazoo Country Club in April of 2003. Data were collected as the number of earthworm mounds per plot at 2, 4 and 6 weeks after application (Table 4). Dursban had little effect on earthworms. Sevin reduced mounding by 96% the first 2 weeks after application, but had no suppressive effect after 6 weeks. Cleary 3336 applied at the 11 lbs ai/A rate reduced mounding by 90% for the 6 weeks of this study.

**Table 4. Suppression of earthworm mounding on a fairway at Kalamazoo Country Club.**

<b>Product</b>	<b>Rate (lbs ai/A)</b>	<b>4/14</b>	<b>4/28</b>	<b>5/14</b>	<b>5/27</b>
<b>Cleary 3336</b>	10.9	0	94	93	88
<b>Dursban</b>	1.0	0	0	0	0
<b>Sevin SL</b>	8.0	0	96	42	0

**IV. Grub test at Country Club of Jackson.** The 4 ft x 4 ft plots were arranged in area that has been infested with European chafer grubs for more than 11 years and Japanese beetle for the last 9 years. The treatments were all replicated 6 times and were blocked from one end of the plot to the other. Plots were established on 5 Jun. All plots were watered with 1/4" of irrigation after insecticide treatment. All plots were sampled on 8 Oct by digging 2 ft<sup>2</sup> from the center of each plot. .

July of 2003 was relatively wet in Michigan. Therefore, European chafer populations were very low and Japanese beetle grubs made up more than 85% of the population. The Merit, Mach 2, Sevin and Dylox gave 80% control or better of Japanese beetle grubs. The Precise (acephate) treatments and the calcium treatments did not give significant control although the highest rate of the calcium did give a 60% reduction in the grub population.

**Table 5. Number of grubs per 2.0 ft<sup>2</sup> in research plots at Country Club of Jackson after treatment insecticide products.**

<b>Treatment</b>	<b>Application Date</b>	<b>Japanese beetle grubs/2.0 ft<sup>2</sup></b>
Merit 75 WP	July 11	0
Dylox 6.2 G	Aug 22	2.0
Sevin SL	Aug 22	2.3
Mach 2	July 11	3.7
Calcium 500 lbs/A	July 11, July 25, Aug 22	6.7
Precise Acephate G	July 25	8.7
Control	-	18.0
Calcium 250 lbs/A	July 11, July 25, Aug 22	16.8