the chemical treatments were consistently lower than the Control treatment although none of the chemical treatments were statistically significantly different from the Control treatment.

		Ant Mounds per 144 ft^2					
		6/17/04	6/23/04	7/1/04	7/7/2004	7/14/04	7/20/04
Control		55.7 a	63.0 a	61.2. c	50.2 b	69.2 a	70.5 a
DeltaGard T&O	0.6 fl oz/1000ft^2	67.7 a	48.3 a	51.5 bc	41.7 b	38.3 a	38.7 a
Tempo SC Ultra	0.27 fl oz/1000ft^2	57.5 a	44.8 a	50.2 abc	39.7 b	60.3 a	57.0 a
Scimitar GC	0.23 fl oz/1000ft^2	61.7 a	38.3 a	34.8 ab	25.7 ab	38.3 a	35.7 a
Dursban Pro	2 qt/A	64.0 a	45.8 a	34.2 a	21.3 a	35.0 a	58.3 a

Means followed by the same letter are not significantly different (P<0.05 ANOVA/Fisher's Protected LSD). Data were transformed using $\log_{10}$ (X+1) prior to ANOVA. Untransformed data are presented.

		% Control (compared with the control treatment)					
		6/17/04	6/23/04	7/1/04	7/7/2004	7/14/04	7/20/04
Control		0.0	0.0	0.0	0.0	0.0	0.0
DeltaGard T&O	0.6 fl oz/1000ft^2	0.0	23.3	15.8	16.9	44.7	45.1
Tempo SC Ultra	0.27 fl oz/1000ft^2	0.0	28.9	18.0	20.9	12.9	19.1
Scimitar GC	0.23 fl oz/1000ft^2	0.0	39.2	43.1	48.8	44.7	49.4
Dursban Pro	2 qt/A	0.0	27.3	44.1	57.6	49.4	17.3

Japanese Beetle Grub Control in a Golf Course Rough, 2004

An area of non-irrigated rough at The Country Club of Jackson in Jackson County, MI was used for this test. The 4 ft x 4 ft plots were separated by a 2 ft-wide buffer strip. The area in which the test was conducted has been infested with European chafer grubs for more than 12 years and Japanese beetle for the last 10 years. The treatments were all replicated 6 times and were blocked from one end of the plot to the other. Plots were established on 16 Jul. Treatments were applied on one of the following dates: 16 Jul, , 28 Jul or 27 Aug. Liquid treatments were applied at 50 psi through a single nozzle hand-held R & D Sprayers® CO_2 sprayer with an 8003 nozzle at a rate of 175 gal/acre of finished spray. Granular treatments were applied with a hand held "shaker". Treatments were made between 9:30 AM and 1:00 PM. All plots treated on a particular day were watered with 1/4" of irrigation after each set of applications. Replications 1-3 were sampled on 27 Sep and replications 4-6 were sampled on 6 Oct by digging 2 ft^2 from each plot. The first several hundred grubs were ID'd under a dissecting microscope to determine what species they were. The ratio was 80% European chafer, 19% Japanese beetle and less than 1% northern masked chafer.

July and August of 2004 were relatively wet and cool for Michigan. Therefore, Japanese beetle emerged over a longer period of time than normal and optimum conditions for oviposition and development for Japanese beetle existed through the summer. European chafer does better during dry years. All grub counts per 2 ft2 were log transformed prior to a 2-way ANOVA. All of the chemical treatments gave a minimum of at least 47% control from the untreated control

plots. All 3 of the untreated sets of plots contained one rep in which no grubs were found. As a result of the variability, the Sevin 6.3G, Dylox 6.2G and the Mach II 0.86% plus fertilizer were not significantly different from all of the control plots even though there was a great deal of grub reduction. All of the other treatments were significantly different from the controls with several different rates and formulations of Arena, Mach II and Merit giving better than 92% control. The Arena 50 WDG 0.2 lb ai/A treatment should especially be noted as one rep contained 25 grubs/2 ft2 and the other reps all had 0's. This would indicate there was a misplaced flag causing a plot to not be treated during the application as the Arena treatments all worked well at all rates.

Treatment	ai/A	App Date	Grubs per 2 ft^2	
Arena 0.5G	0.3 lb ai/A	28-Jul	0.00	a
Arena 0.5G	0.2 lb ai/A	28-Jul	0.00	a
Arena 50WDG	0.3 lb ai/A	28-Jul	0.00	a
Arena 50WDG	0.1 lb ai/A	28-Jul	0.17	ab
Merit 5g ai/kg G 50 lb form/A	0.25 lb ai/A	16-Jul	0.17	ab
Lebanon Turf Pro Mesa 1.33G	2 lb ai/A	16-Jul	0.33	ab
Mach 2 2 lb ai/G SC 8 pt form/A	2.0 lb ai/A	16-Jul	0.33	ab
Merit 75WP	0.4 lb ai/A	28-Jul	0.83	abc
Arena 0.5G	0.1 lb ai/A	28-Jul	1.17	abc
Spring Valley Fert w/Mach 2 1G	2 lb ai/A	16-Jul	1.50	abcd
Merit 0.5G	0.4 lb ai/A	28-Jul	1.67	abc
Merit 5g ai/kg G 60 lb form/A	0.3 lb ai/A	16-Jul	1.67	abcd
Shaw's 133/Mach 2 15-3-5 1.33G	2 lb ai/A	16-Jul	1.83	abcd
Shaw's 133/Mach 2 15-0-15 1.33G	2 lb ai/A	16-Jul	2.00	abcd
Arena 50WDG	0.2 lb ai/A	28-Jul	4.17	abcd
Dylox 80WP 0.25 lb form/1000 ft2	8.7 lb ai/A	27-Aug	2.00	bcde
Johnson's Mach 2 plus fertilizer 0.86%	2 lb ai/A	16-Jul	4.17	cdef
Dylox 6.2G 3.0 lb form/1000 ft2	8.1 lb ai/A	27-Aug	5.50	defg
Sevin 6.3G 3 lb form/1000 ft2	8.2 lb ai/A	27-Aug	6.17	efg
Water Control	0	16-Jul	11.67	fg
Untreated Control for new plots	0	27-Aug	12.50	fg
Untreated Control	0	16-Jul	16.33	g

Means follows by the same letter are not significantly different (P<0.05 ANOVA/Fisher's Protected LSD).
Data were transformed log (X+1) prior to ANOVA. Untransformed data are presented.

Bughrara, S.S., D.R. Smitley, D.L. Cappaert, and A.N. Kravchenko. 2003. Comparison of tall fescue (Cyperales: Graminae) to other cool season turfgrasses for tolerance to European chafer (Coloeoptera: Scarabaeidae). J. Econ. Entomol. 96: 1898 – 1904.