

Japanese Beetle

David Smitley

Department of Entomology

Origin and Distribution: As its name implies, the Japanese beetle came to North America in the early 1900s. It has slowly spread from New York and New Jersey to the Mississippi River. In Michigan, Japanese beetle can be found in all counties in the southern half of the lower peninsula.

Pest Status: The Japanese beetle grub is the most widespread grub pest of turf in the eastern United States. It is the most damaging insect pest of irrigated lawns.

Injury: Larvae (white grubs) feed on turf roots in May, early June, and again in September and October. Damaged turf may turn brown in patches if it is not frequently watered.

Life History: Japanese beetle adults are a dark metallic green color, stout-bodied and approximately 1/2" long (Figure 1). They emerge in July and early August, feed on flowering fruit trees, roses, basswood and wild grape before mating and deposit their eggs in turf in August. Tiny larvae (1/16") hatch from eggs in August and begin feeding on turf roots. By late September the larvae have grown from 1/2" to 1" long and in heavy infestations cause root pruning damage to turf (Figure 2). In October when soil temperatures begin to drop, the C-shaped larvae or white grubs move down deeper into the soil to overwinter. The following spring, in April or May, they move back close to the surface and begin feeding again. Sometime in June the larvae quit feeding and pupate. They stay in a white pupal form for several weeks before emerging as adult beetles in July. The adult beetles are highly attracted to Japanese beetle traps. Traps are useful for monitoring adults to see if you have beetles in your area and to determine when they are active, but they do not provide any control.

Management: Turf managers usually discover Japanese beetle grubs in September or May, peak times for grub feeding and the resulting turf injury. These are also peak feeding times for skunks and raccoons that tear up turf in search of the grubs. Many times skunk damage is observed first before the grubs are found. Irrigated turf has a tremendous ability to recover from insect injury. Even so, turf with more than 20 grubs per square foot is at high risk to water stress because the root system becomes heavily pruned. More than 10 grubs per square foot may result in brown patches in turf that is not irrigated. Check for grubs where skunks are active or where turf is damaged in late August or September. Dig several square foot sections and count the number of grubs. If many grubs are found ($> 10/\text{ft}^2$). Start frequent irrigation to prevent the soil from becoming dry, and apply an insecticide. Irrigation is the best way to limit or prevent grub damage. Late August and early September are preferred times to apply an insecticide. Because insecticides have some undesirable effects, spot treatment of heavily infested areas is preferred over treating the entire area. The degree of control is highly variable from site to site and year to year, but insecticides usually provide 50-80 percent control.

Be sure to apply all products at the proper rate for grub control. All the sprayable materials must be watered immediately after application with 1/2" of irrigation. Do not allow people or pets on treated turf until after it has been irrigated and dries. Early morning or evening is the preferred application time for sprayables. Be sure the pH of your water is at a level compatible with the insecticide. Several insecticides such as trichlorfon and bendiocarb break down rapidly at a high pH (> 8.0). If your irrigation water is at a high pH choose a product that is stable in your pH range. Buffering the water in your spray tank will preserve the insecticide while it is in the tank but once it is applied to turf and irrigated heavily with high pH water it may break down at that time.

Three weeks after applying an insecticide return to where you took the original grub samples and collect another set of samples. This will determine the effectiveness of the insecticide application.

Results of tests where milky spore has been applied for grub control have been poor. Do not expect to see a reduction in grubs the same year that a milky spore product is used. Long term studies have not been conducted. Insect parasitic nematodes available at this time (*Steinernema carpocapsae*) are also not very reliable for grub control. *Steinernema glaseri*, expected to be available in 1995, is more effective for control of Japanese beetle larvae. If nematodes are applied, spray in early morning or evening. Water turf lightly before (1/4") and after application (1/4"). Do not apply nematodes to dry turf.



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Table 13. Insecticide Recommendations. From Michigan State University Extension Bulletin E2178.

Insect	Insecticide	Amount per		Signal word	Timing and remarks
		1,000 sq ft	acre		
Annual grubs (European chafer, Japanese beetle)	Crusade 5G	1.8 lb	80.0 lb	Warning	Apply insecticide if enough grubs are present to cause damage (>20 per sq ft for high maintenance turf, and >10 per sq ft for low maintenance turf). Apply insecticide in 4 gal water per 1,000 sq ft. Use 1/2 inch of irrigation to soak insecticide into soil.
	Diazinon 4E/AG500*	4.0 oz	5.5 qt	Warning	
	Dylox 80 SP	3.7 oz	10.2 lb	Danger	
	Dylox 6.2 G	3.0 lb	131.0 lb	Caution	
	Mainstay 2G	4.6 lb	200.0 lb	Caution	
	Mocap 10G**	1.15 lb	50.0 lb	Warning	
	Oftanol 5G	0.9 lb	40.0 lb	Caution	
	Oftanol 2I	3.0 oz	4.0 qt	Warning	
	Oftanol 1.5G	3.0 lb	131.0 lb	Caution	
	Proxol 80 SP	3.7 oz	10.2 lb	Danger	
	Sevimol	6.0 oz	8.0 qt	Caution	
	Sevin SL	6.0 oz	8.0 qt	Caution	
	Sevin 80 WSP	4.0 oz	10.9 lb	Caution	
	Sevin 6.3G	3.0 lb	131.0 lb	Caution	
	Triumph 4E***	1.5 oz	2.0 qt	Warning	
	Turcam 76 WP	1.25 oz	3.4 lb	Warning	
	Turcam 2.5 G	2.4 lb	105.0 lb	Warning	

* Do not use diazinon on golf courses or sod farms.

** Do not exceed 100 lb/acre of Mocap to turfgrass cut to a height of less than .375 inches. Bentgrass and ryegrass are more susceptible to injury. Do not apply within the dripline of Chinese elm as it has shown sensitivity.

*** Do not use Triumph on golf course fairways.

New Product: Merit 75 WP 0.4 (6.4 oz) per acre. For lawn care, golf course and other turf maintenance professionals. Merit should be applied between May 1 and August 15 for control of European chafer and Japanese beetle grubs. Merit will also control Ataenius, Aphodius, and Bluegrass billbug larvae if applied during the egg-laying period.