



<p>Pest</p>	<p>Two kind of grubs cause economic damage to Michigan lawns:</p> <ul style="list-style-type: none"> ❑ European Chafer (<i>Rhizotrogus majalis</i>) ❑ Japanese Beetles (<i>Popillia japonica</i>) 												
<p>Symptoms</p>	<p>Browning and dying sod causing bare spots on lawn. Maturing grubs feed on grass roots in the spring and fall reducing water uptake. When pulled the sod comes off easily without roots. Frequently irrigated turf is able to withstand grub damage to some extent. Grub damage is often confused with salt damage near walkways and fertilizer burn. Grubs attracts birds, moles, skunks, and raccoons to lawns.</p>												
<p>Life Cycle</p>	<div style="text-align: center;"> </div> <p>Grubs undergo complete metamorphosis. The adults lay eggs on the soil surface in June/July. The Japanese beetle adults prefer to lay eggs in irrigated turf. European chafer adults lay eggs in both irrigated and dry turf.</p> <p>The grubs emerge in July and continuously feed on grass roots until November. After a brief inactive period in the winter, feeding is resumed in March of the following year. Grubs complete their feeding in May. After a brief hibernation period as pupa, adults emerge in June/July. The adult Japanese beetle is a voracious feeder of foliage of many ornamental plants whereas the European chafer adults are not a plant pest.</p>												
<p>Identification</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;">Adult Stage identification is easy</td> <td colspan="2" style="text-align: center;">Grubs stage need a magnifying lens.</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; text-align: center;">Y- shaped raster pattern</div> </td> <td style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; text-align: center;">V- shaped raster pattern</div> </td> </tr> <tr> <td style="text-align: center;">European chafer</td> <td style="text-align: center;">Japanses Beetle</td> <td style="text-align: center;">European chafer</td> <td style="text-align: center;">Japanses Beetle</td> </tr> </table>	Adult Stage identification is easy		Grubs stage need a magnifying lens.				<div style="border: 1px solid black; padding: 2px; text-align: center;">Y- shaped raster pattern</div>	<div style="border: 1px solid black; padding: 2px; text-align: center;">V- shaped raster pattern</div>	European chafer	Japanses Beetle	European chafer	Japanses Beetle
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<p>Integrated Pest Management</p>	<p>Refers to the application of all available strategies that are effective, economical and environmentally friendly.</p> <ul style="list-style-type: none"> ❑ Keeping the grass healthy by applying BMP's, (timely irrigation, fertilization, mowing and thatch management) helps the lawn to withstand grub damage ❑ Scout for grubs and count the number per square foot of sod ❑ For medium to low maintenance lawn the economic threshold is 5 grubs/sq.ft. For irrigated turf, the threshold is 15-20 grubs/sq.ft. ❑ Do not use Japanese beetle traps for control ❑ Grub control does not automatically prevent mole damage. ❑ Tall fescue lawn varieties are less susceptible to white grub damage ❑ Consider options for pesticide use and spot treat, if possible 												
<p>Pesticide Use</p>	<ul style="list-style-type: none"> ❑ Correct grub identification, active ingredient and timing are keys to success ❑ Applications of merit (imadacloprid)and halofenozide pesticides (preventive) to immature grubs in July are the most effective ❑ Apply Carbaryl and Trichlofon pesticides (curative) in the spring and fall ❑ Products with lambda-cyhalothrin, bifenthrin, and permethrin are ineffective ❑ Follow label directions ❑ Apply half-inch water to get the pesticide to target zone ❑ Wait one week to re-seed lawn 												

Pesticide Recommendations for Lawn Grubs - Homeowner

Product	Active Ingredient	Time of Application	Toxicity to earthworms
Sevin	Carbaryl (Curative)	Spring and Fall Not effective on pH >7.8	High
Dylox Bayer 24 – hour Grub Killer Plus	Trichlorfon (Curative)	Spring and Fall Not effective on pH >7.8	Moderately Toxic
Bayer Advanced Season Long Grub Control (<i>Merit</i>)	Imidacloprid * (Neonicotinoid) (Preventive)	Mid-July* Very effective on European Chafer grubs soon after they are hatched	Less Toxic
Ortho <i>GrubEx</i>	Imidacloprid * (Preventive)	Mid-July* -Same as above-	Less Toxic
<i>Grubstop</i> Spectracide Mach2 <i>Ex</i>	Halofenozide * (Hormonal-affects molting) (Preventive)	Mid-July* Not as persistent as Imidachloprid, but works well for young grubs, cutworms and webworms	Less Toxic

* Most effective pesticide treatments. These pesticides are not effective in the spring and fall.

Organic Options for Home Owners*

Product	A.I.	Remarks	Toxicity to earthworms
Milky Spore Bacterial spores (Curative and Preventive)	Host specific bacterium <i>Bacillus popilliae</i>	Effective only for Japanese beetles. Apply 3 times, Spring, Summer and Fall for two consecutive years with a drop spreader.	Non-Toxic
Grub Away (Curative and Preventive)	Parasitic nematode	Only available through catalogs and internet The gel is dissolved in water and sprayed on the soil surface.	Non-Toxic

* Recent research at Michigan State University has shown the potential use of several other soil microbes, Other natural enemies such as nematodes and a gut parasite called gregarine that attacks the intestine of the grubs. These products are not commercially available yet.

References to commercial products or trade names does not imply endorsement by MSU Extension or bias against those not mentioned. Michigan State University is an affirmative-action, equal opportunity employer. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, marital status or family status. This information is for educational purposes only.