

A3275

# Turfgrass disorder: White grubs

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White grubs feeding on the turfgrass roots can cause either irregular patches or uniformly thin, droughty turf that looks dead. Affected turf often looks like it lacks moisture, even after adequate irrigation or rainfall.



A white grub, larva of *Phyllophaga* spp. Note creamy white color, dark hind end, brown head, and six well-developed legs. Depending on age, grubs range in length from ¼ to 1½ inches.

## Symptoms and effects

White grubs eat the roots of grasses and other plants. Where grubs are few, turf may look healthy because grass plants may develop new roots as fast as grubs eat the old ones. Depending on the grub species, grub populations averaging five or more per square foot can damage the root system and cause unhealthy, turf above ground. Damaged turf will readily “roll-up,” like a rug.

Turfgrass roots normally grow rapidly in the spring and fall, and slowly during summer. Therefore, problems with grubs are greatest in summer because roots don’t recover normally. Inadequate soil moisture may increase the problem since the few healthy roots have no moisture to take up. For this reason, grub damage typically shows up during the normally drier months of August and early September, although grubs

may have been feeding earlier in the summer depending on the grub species.

Typically, white grubs are most common in sandy or sandy-loam soils rather than heavier soil types. However, they also attack turf on clay soils.

Animals such as skunks, raccoons, and moles find white grubs a tasty food. The feeding activity of these mammals can cause more damage to the turf than the grubs themselves.

## Description and life cycle

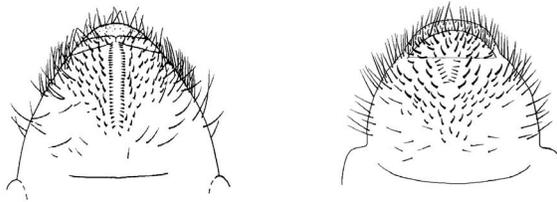
Grubs of the May/June beetle (*Phyllophaga* spp.) and the Japanese beetle (*Popillia japonica*) are both present in Wisconsin. Although the grubs look similar and cause the same type of damage, it’s important to be able to tell them apart as the control timing is very different.

To identify them, you’ll need a 10x hand lens to examine the pattern of hairs and spines on the underside of the tail end of the grub. May/June beetles have two parallel rows of short spines, a pattern that closely resembles a zipper. Japanese beetles have spines that are arranged in the shape of a V.

After mating, adult females seek out a grassy location with adequate soil moisture to lay eggs in the thatch or soil. Within 1–3 weeks, tiny white grubs, ⅛–¼ inches long, emerge and immediately begin feeding on the roots. They continue to feed until they are fully grown, at which



Turf damage caused by white grubs feeding on the root system. Turf looks droughty, even though there may be adequate soil moisture.



May/June beetle grubs (left) have two parallel rows of spines while the spines of the Japanese beetle grubs (right) converge in a V pattern.  
 Courtesy D.J. Shetler, The Ohio State University.

time they transform into nonfeeding pupae. About 1–3 weeks later they emerge as adults and leave the soil to mate and lay eggs, completing their life cycle.

#### May/June beetle

Various species of the genus *Phyllophaga* damage turf in Wisconsin. These grubs grow to nearly 1½ inches long. The adults, commonly referred to as May beetles, June beetles, May/June beetles, or June bugs, do not directly cause damage to turf. They are medium-to-large, brown-to-black beetles, frequently attracted to lights during May and June. Although some *Phyllophaga* complete their life cycle in as little as 1 year, other important species including *Phyllophaga rugos* and *P. anxia*, require 3 years for each generation. As a result, damage is often cyclical, with most damage occurring every third year.

#### Japanese beetle

Japanese beetles first became a problem in Wisconsin in the early 1990s. The larvae are now the most damaging turfgrass-infesting pest in the United States. Adult Japanese beetles don't attack turf, but they are a serious pest of herbaceous and woody ornamental plants.

Adult beetles are shiny, metallic green with coppery-brown wing covers. There are six patches of white hairs along the sides and back of the body under the edges of the wings. The adults are broadly oval, measuring up to ½ inch long. They tend to gather in large groups, often in the upper canopy of plants. Unlike the May/June beetle, the Japanese beetle has one generation per year, so damage is fairly consistent from year to year.

#### Diagnosis

If you suspect white grubs are a problem, the best way to tell for sure is to look for the grubs in the soil. Use a shovel, trowel, or heavy knife, cut out and remove approximately 1 square foot of sod. Grubs typically feed near the soil surface or just under the sod. Loosen and inspect the soil to a depth of 4–6 inches. Check in two or three other areas to confirm.

After sampling, carefully replace the sod and irrigate well, keeping the sample sites uniformly moist until the roots are reestablished.

If you find more than five grubs per square foot, consider using an insecticide. Keeping an ongoing record of the number and type of white grubs present will help to determine timing for future treatments.

#### Control

##### Cultural

A turfgrass root system pruned by grubs is shallow and has a limited ability to supply plants with needed water. Such turf needs light irrigation two to three times a week during warm, dry weather. Watering only masks the grub damage by maintaining plant health, however, the grubs continue to destroy developing roots.

In late summer or early fall, start monitoring turfgrass root development. When roots begin actively growing, adjust to heavier, less frequent irrigation. Fertilizing at this time with nitrogen will also aid turf recovery.

##### Natural

Numerous parasitic wasps and flies attack white grubs and provide some natural control. Unfortunately, you cannot rely on them to prevent damage. A commercially available bacterium that causes "milky disease" attacks the grubs of Japanese beetles but not May/June beetles.

## Chemical

There are two approaches to controlling white grubs: preventative (before damage occurs) and curative (when lawns show damage). Often, both approaches are needed to adequately control white grubs.

**Preventative treatments** must be in place when eggs are laid. Imidacloprid (Merit) and halofenozide (Mach 2) will provide up to 95% control of white grubs. These treatments have no effect on larger white grubs. Preventative treatments are long-lasting and are applied at lower rates than their curative counterparts.

**Curative treatments** provide effective control of young white grubs; larger grubs are more difficult to control. These chemicals break down quickly in the soil and offer 50–75% control. Curative insecticides include carbaryl (Sevin) and trichlorofon (Dylox).

Regardless of insecticide brand or formulation, you must water the insecticide into the root zone where grubs feed for the treatment to be effective. This means at least ¼ inch of irrigation or rainfall, and slightly more on heavier clay soils. Water as soon as possible after application to get the most benefit from insecticides. When using spray formulations, be sure to wash the insecticide off grass plants and into the soil before the spray dries. For this reason, especially where water or irrigation is limited, you may find granular formulations easier to use.

**Timing when ONLY May/June beetle grubs are present:** The May/June beetle's 3-year life cycle and overlapping generations make it a difficult pest to control. Treatment timing is critical. Keeping a record of the number found per square foot along with the dates will help you anticipate years when populations will likely peak. Apply a preventative insecticide in May to control egg hatch in early June. Watch for damage in July and treat with a curative product as soon as symptoms appear. If damage continues, a second curative treatment may be warranted 7–14 days later.

**Timing when ONLY Japanese beetle grubs are present:** Since Japanese beetles have one generation per year, treatment strategies are fairly predictable. A preventative insecticide treatment must be applied by early August to assure that it is in place at or before egg hatch. If you see damage from mid-August to late October, apply a curative insecticide to actively feeding grubs. You may also need to make a rescue treatment in the spring (April and May) when Japanese beetle grubs resume feeding for several weeks before they pupate.

**Timing when BOTH May/June and Japanese beetle grubs are present:** If you find both May/June and Japanese beetles in your lawn, timing and control can be challenging. Apply a preventative insecticide in mid- to late May. This long-lasting treatment will control both the May/June beetles that hatch in early June and the Japanese beetles that hatch in late July and early August. Multiple curative treatments will likely also be necessary. For this, you'll need to monitor turf closely from July through late October and treat as soon as damage appears.

Whenever using insecticides, ALWAYS carefully read and follow all label instructions!

References to products in this publication are for your convenience and are not an endorsement or criticism of one product over other similar products. You are responsible for using chemicals according to the manufacturer's current label directions. Follow directions exactly to protect the environment and people from chemical exposure.



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R-02-04