
School Pest Solutions



White Grubs

Some of the most prevalent turfgrass pests are white grubs. These are the C-shaped larvae of a large group of beetles known as scarabs. Many scarabs attack turfgrasses and cause considerable damage. The three important species in Maine are the Japanese beetle, May or June beetle, and the European chafer.

White grubs in turf share similar life cycles. They develop in the soil and feed on grass roots. In the summer, adults emerge from the soil and feed on foliage and/or flowers before mating and depositing their eggs in turf. The eggs hatch in August and larvae feed on grass roots until October. As soil temperatures cool, the grubs move deeper into the soil to overwinter. The following April or May, they return to the surface and begin feeding again before emerging as adults.



Damage

White grubs eat organic matter including the roots of plants. Heavily infested turf is water stressed—off color, gray-green, and wilts rapidly in the hot sun. Fine and tall fescues are not as severely attacked as Kentucky bluegrass and perennial ryegrass. Continued feeding kills turf in large irregular patches.

Dense grub populations can reduce the playability of athletic fields. The tunneling of the larvae gives turf a spongy feel; large patches can often be rolled back like loose carpet. Animals, such as crows, skunks, or raccoons, are attracted to these areas to feed on grubs, causing considerable damage as they dig. While these animals help keep grubs under control, too much of this damage may be unacceptable on athletic fields.



White Grub

Japanese Beetle

The Japanese beetle was introduced into southern Maine during the early 1960s. Adults are dark metallic green beetles about 1/2-inch long. Adults are voracious plant feeders and may become serious pests of ornamental landscape plants and trees including maple, birch, mountain ash, linden, grape, blueberry, rose, apple, cherry, peach, and plum. Japanese beetle adults emerge from late June to mid- July, often in large numbers. They aggregate in dense populations inflicting heavy damage to ornamental leaves and flowers.

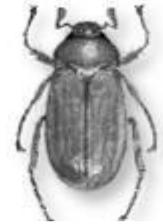


Japanese Beetle

May or June Beetle

May/June beetles are native and found throughout Maine. They are shiny, robust, reddish-brown beetles nearly 1-inch long. Adults emerge in May or June and are active at night. They are highly attracted to lights, frequently fly into windows and screen doors, especially during hours of peak

activity—7:00 to 9:00 pm. Egg laying may be concentrated near exterior lighting. May/June beetles have a three-year life cycle. The grubs are most damaging in their second year when they feed heavily from May through September.



June Beetle

European Chafer



European Chafer

The European chafer has recently been introduced to the southern and coastal areas of Maine. It is expanding its range inland. The adult is light-brown and 5/8-inch long. European chafers tend to remain in the root zone later in the fall and return to the root zone earlier in spring than other white grubs. Adults emerge from the soil in June and July. At dusk they congregate in conspicuous mating flights, usually at a tall object on the skyline, such as a tree 20-30 feet high. Swarms may number in the thousands and may look and sound like a swarm of bees. Larval damage is later concentrated in the turf around these swarms.

Monitoring

Monitoring for white grubs involves sampling several locations across an area of turf. It is important to use a uniform method to accurately assess the population. Walk in a zigzag pattern across the field, taking samples at 10-20 foot intervals from at least 10 locations. Begin sampling in August when grubs are easily seen and actively feeding, but before signs of injury are visible.

Take square foot samples using a small shovel to cut through the turf and thatch on three sides of a square. Peel back the turf and inspect the thatch and upper 2-3 inches of soil. To find the grubs, shake the sample, and probe through the soil and roots with a pocket knife or screwdriver. Count the number and species of grubs found at each sampling site and record these on a map of the area. Replace the sod after sampling and irrigate thoroughly. A quicker method is to use a golf course cup cutter. This cuts a round core of about 1/10 square foot. Multiply the average grubs per core by 10 to get the approximate number of grubs per square foot.

White grubs are distributed in patches. Be sure to sample in the most likely turfgrass habitats. Japanese beetles and European chafers prefer grass in sunny areas, and high quality turf near the adult's favorite food plants. May/June beetles often lay large numbers of eggs under or near exterior lights. If white grubs are not detected but damage is present, examine the turf for other causes of injury such as disease, excessive thatch, moisture stress, heat damage, or other insect pests.

Action Thresholds

Japanese beetle and European chafer: Irrigated turf has a tremendous ability to recover from injury. Even so, irrigated turf with more than 20 grubs per square foot will likely suffer from water stress. In un-watered turf, 5-10 grubs per square foot may result in brown patches.

May/June beetle: Large grubs can cause more damage. Turf injury is likely if more than 10 grubs per square foot are found on irrigated turf, or if more than 3-5 per square foot are found on low maintenance turf.

Prevention

Do not plant roses, grapes, or lindens around high maintenance turf areas.

Water Management

White grubs usually need moist soil for eggs to hatch. The young larvae are also very susceptible to dry conditions. In areas where turf can stand some moisture stress, do not water in July and early- August when

white grub eggs and young larvae are present. Use water management cautiously; dry soil will accentuate any existing white grub damage.

Traps

Adult Japanese beetles are highly attracted to traps baited with floral and pheromone lures. The traps are useful for monitoring the presence of adult populations, but they are not useful for controlling turf damage. Traps may have some utility for managing Japanese beetles on ornamentals, although plants near traps can sustain increased damage. These traps are recommended only as a means of drawing beetles far away from very susceptible landscape plants. Place them as far away as possible from valued ornamentals and high-maintenance turf.

Biological Control

Certain nematodes (microscopic wormlike animals that can cause disease in insects) have shown some promise for controlling white grubs in turf. *Steinernema glaseri* works consistently but may be difficult to find; *Heterorhabditis bacteriophora* and *H. heliothidis* provide moderate white grub control. Other species, including *S. riobravis*, *H. megidis*, and *H. zealandica* have provided good white grub control in research trials.

Nematodes are very sensitive to drying and must be used carefully. They should be watered in as soon as they are applied to turf, either by applying them during rain, or by irrigating immediately after application. Do not apply nematodes during the hottest parts of the day. When preparing them for use, keep them cool and out of the sun; store them in a cooler if the day is hot.

The naturally occurring soil fungus *Beauveria bassiana* is commercially available and may be effective against white grubs. *B. bassiana* requires high humidity to infect insects. Research has shown promising results, but only when the fungus is used during a wet summer.

Chemical Control

White grubs are most susceptible to chemical control when they are very small. The degree of control is highly variable from site to site and year to year, but insecticides may provide 50-80% control of white grubs. If irrigation is available, liquid insecticide applications can be effective if applied with proper timing (usually late summer). Granular insecticides are often more effective where irrigation is not possible.

Apply spot treatments in late August and early September. Early morning or evening is the preferred time for insecticide treatments. If soil moisture is unusually low at the time of application, consider irrigating the area a day or two before the intended application to draw the grubs up into the upper root zone. Irrigate after application to wash the treatment into the soil. Three weeks after treatment, evaluate the treatment by sampling for grubs where the original samples were taken. Be sure to record the results for future reference. Keep in mind that no insecticide will eliminate an entire grub population, but the numbers can be reduced below the action threshold.

Research indicates that most of the pesticide applied for grub control ends up in the thatch. Irrigating before or after an application does affect this binding. If the thatch layer is an inch thick or more, grubs probably will not contact an effective dose of any applied insecticide.

Anyone making pesticide applications on school property must be licensed by the Board of Pesticides Control. See “Standards for Pesticide Applications and Public Notifications”.

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