

# Grounding out Grubs

Managing grubs with prevention and least-toxic strategies

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Do you have large swatches of brown or yellow patches on your lawn? Does your lawn peel back like carpet? If yes, chances are, you have grubs.

Grubs, or more specifically white grubs, are the larvae of scarab beetles, Japanese beetles, June beetles, chafers, and others. They are one of the nation’s most destructive lawn pests. These organisms are C-shaped, off-white in color with a characteristic dark brown head. The larvae feed on grass, plant roots and organic matter in the soil. As a result, grubs can be found at the root zones of damaged areas of the lawn. It is important to identify grubs as the source of your browning lawn before utilizing biological treatments highlighted below after trying preventive methods. Other factors, such as drought, disease, excessive fertilizer, poor soil or even another pest, may be the cause of your lawn’s brown spot.

## Prevention

Grubs are periodic pests that can attack your lawn with varying intensity from year to year. If you live in an area with above normal rainfall and have high soil moisture content, you may have a pre-disposition for grubs and may want to take preemptive measures.

### ■ Proper Lawn Maintenance

- **Mowing height.** Adult beetles prefer to lay their eggs in short grass. Cutting your grass tall – minimum of 2 inches high – may

discourage egg laying, and reduce future grub populations.

- **Aeration.** Cultivate a healthy lawn by encouraging deep grass roots. Deep roots have a greater chance of surviving a grub infestation. Grubs that may be feeding on roots deeper into the soil are spread out over a larger area, making their damage less discernable. Aerate your soil, either by hand or aerating equipment, in the spring and fall to promote deeper roots.



- **Watering.** Lawns that are heavily managed and watered regularly, especially during the summer months, may actually attract beetles. Eggs require moist soil conditions in order to hatch and prevent the larvae from drying out. Therefore, deep periodic soaking of the turf is more beneficial than frequent, light watering. Infrequent watering also encourages roots to grow deeper into the soil. If there is moderate grub infestation, watering in late August or September, can promote tolerance and recovery.

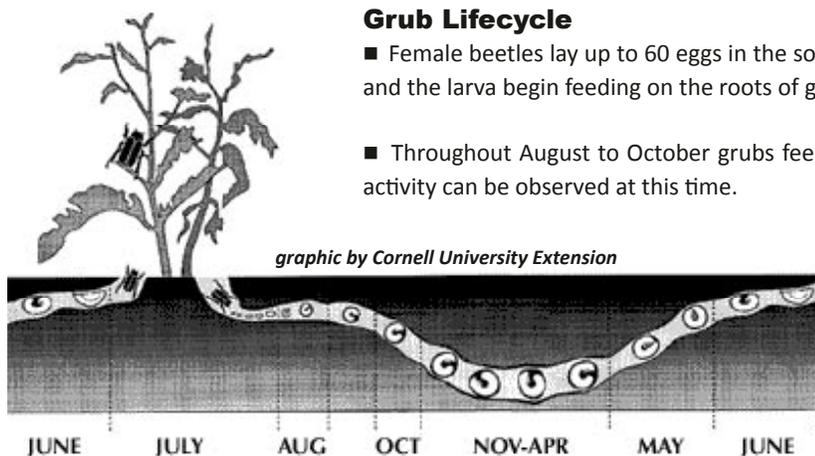
### ■ Encourage Natural Parasites and Predators

- **Parasitic wasps.** Certain species of wasps, such as *Tiphia* spp. and *Scolids* prey specifically on white grubs. They seek out grubs in which they lay their eggs. Their larva, when hatched, feed on

## Grub Lifecycle

- Female beetles lay up to 60 eggs in the soil over the course of 2-3 weeks. Eggs hatch 2 weeks later and the larva begin feeding on the roots of grass near the surface of the soil throughout the summer.

- Throughout August to October grubs feed and molt into larger bodies. Evidence of their feeding activity can be observed at this time.



- As temperatures fall, grubs burrow deeper into the soil to winter.

- During the spring, grubs return to sub-surface soil and feed. By late spring, feeding stops and the grubs turn into pupae. In late June and July, beetles emerge from the pupae and crawl out of the soil.

## Biological Control of Grubs

There are several least toxic methods for controlling grubs, many of them involving cultural and structural control. For these methods to be effective, it is important to plan ahead and of course, follow label directions:

### Milky Spore

The milky spore disease is a naturally occurring host specific bacterium (*Bacillus popilliae-Dutky*) that once applied to the lawn, releases spores that are swallowed by the feeding grubs. The ingested bacterium then begins to cripple and kill the grubs within a period of 7-21 days. The build up of spores in the grubs causes them to take on a characteristic milky appearance. Once the grubs are dead, new spores are released into the soil, providing years of protection. Milky spore has been effective in the eastern U.S., but not in the Midwest. This treatment is recommended for long term rather than short-term control. Note: Milky spore targets the Japanese beetle species of grub only.

### Nematodes

These microscopic worms live and breed in the soil and infect and kill feeding grubs. Commercially available nematodes for grub treatment can be obtained at local supply stores, and the strains *Steinernema carpocapsae* and *Heterorhabditis spp* seem to be the most effective against grubs. When applying nematodes to your lawn, it is important to irrigate before AND after application, since nematodes require moist soil conditions. It is recommended to treat the entire lawn.

### Bacillus Thuringiensis (Bt)

Though not as popular as milky spore, Bt can also be used to control grubs. Bt is a naturally occurring soil bacterium that, when ingested, acts as a stomach poison that interrupts feeding, and eventually leads to death. Bt is a microbial pesticide and is available at local garden shops. There are several strains of Bt used to control various types of pests, so it is important to use the strains specific for grubs.

Control and treatment of grubs vary depending on the species. It is therefore recommended that you determine which species of grub is affecting your lawn. Take a sample to your local county extension agent for identification before starting treatment. Remember, a healthy lawn is key to deterring pests. For tips on maintaining a healthy lawn, contact Beyond Pesticides or visit, [www.beyondpesticides.org](http://www.beyondpesticides.org).



Grubs, which cause lawn damage in their larval stage, develop into various adult insects, including the Japanese beetle.

the grub hosts. It is estimated that Tiphia wasps can parasitize up to 60% of grub in an area. However, a sizable population is required. To attract these wasps plant maple, cherry and elm trees, and peonies. These wasps are not aggressive and normally will not sting.

- **Birds.** Some birds can consume large number of insects in your yard, including adult beetles and grubs. Crows, starlings, robins, cardinals, meadowlarks, and grackles gobble up beetles and grubs. Attract birds to your property by providing bird feeders, houses and baths. For more information on attracting birds to your property, contact Beyond Pesticides.

### ■ Adult Beetle Management

Noticing when adult beetles arrive on your property and taking action can prevent eggs being laid to produce the next generation of grubs.

- **Hand Picking.** Hand picking adult beetles off plants can help prevent larger populations from visiting your property. Adult beetles can be destroyed by placing them in soapy water.

- **Plant Beetle Repelling Plants.** Adults tend to avoid garden balsam, begonia, buttercups, carnations, cornflower, daisies, dogwood (flowering), firs, forget-me-not, forsythia, hemlock, hydrangeas, junipers, kale (ornamental), lilacs, lilies, magnolias, maple (red or silver only), mulberry, pines, poppies, sweet pea, tulip tree, violets and pansy, or yews. You can plant some of these plants in and around your garden, or around your lawn to discourage beetles.

- **Avoid Beetle Attracting Plants.** Adult species are attracted to certain host plants. If Japanese beetles are common in your area, do not plant roses, grapes, hibiscus, sunflowers, and lindens around highly maintained lawns. May/June beetles prefer oaks while the green June beetle loves feeding on ripening fruit.

- **Traps.** Mechanical traps that lure adult beetles (with food type lures or pheromones) can be placed around the borders of your property and can capture around 75 percent of beetles that approach it. Setting up traps should coincide with the emergence of beetles in your area. Since these traps attract more beetles than they can catch, it is advised that traps be placed away from plants susceptible to beetle damage. However, do not use traps if you currently do not have beetles visiting your property!! Traps can be obtained from many garden centers.

## ■ Control

- **Make sure you have grubs!** To determine whether you have a serious grub problem, check the extent of lawn damage. If the sections of damaged lawn detach from the soil and peel away, you have severe grub damage. White grubs may be seen here as you lift away the turf. To prevent significant damage, locate and treat high grub populations before they start doing damage:

- **Sample lawn.** Sample in early to mid August, at the start of the grub’s life cycle. Early sampling of your lawn is one way to identify young grubs before they are capable of seriously affecting your lawn. With a spade or shovel, cut three sides of a square into your turf and peel back the turf like you would a carpet. Look for c-shaped grubs on the exposed soil and under the sod mat. Repeat this every 20-30 feet.

- **Count grubs.** For an otherwise healthy lawn, a couple grubs per square foot (0-5 grubs per sq ft) is not considered to be a problem. If there are 6-9 grubs per sq ft, you may want to take into consideration the overall health of your lawn. If your lawn is healthy, has a robust root system and is dense, it can probably withstand

a few grubs. Otherwise, you may want to consider treating your lawn. For more than 10 grubs per sq ft, treatment should be carried out.

- **Know when to use biological controls!** Treating your lawn for grubs is most effective in late summer or early fall, when grubs are most susceptible. This is because grubs are small and near the soil surface while the temperature is warm. Treatment done at other times may not be as effective once the grubs have grown bigger.

## Common Hazardous Grub Control Insecticides

The chemicals listed below are commonly used for grub control, but are toxic and are associated with numerous adverse health and environmental effects. Use the steps above so that you do not have to use these chemicals on your lawn.

**Imidacloprid (Merit)** – This chemical, a chloro-nicotinyl insecticide, is toxic to the nervous system and is very toxic to beneficial insects like wasps and bees, as well as upland game and birds. Symptoms of acute poisoning include twitching, cramps, muscle weakness and fatigue.

**Isofenphos (Oftanol)** – Isofenphos is an organophosphate insecticide that has been proven to cause delayed neurotoxicity in animals and is toxic to birds, fish and beneficial insects. Symptoms of exposure include headaches, fatigue, nausea/vomiting, convulsions, respiratory depression and even death.

**Carbaryl (Sevin)** – One of the most widely applied insecticides in the U.S., this carbamate is neurotoxic and toxic to bees and other beneficial insects. Primary exposure occurs via the skin and can cause allergic dermatitis and irritation. Acute signs and symptoms of carbaryl poisoning include blurred vision, nausea, headaches, breathing difficulties, muscle twitching and ataxia. Long-term effects in humans include behavioral disturbances such as aggressive behavior, irritability and paranoia. Carbaryl is also toxic to the liver and kidneys, and damages ovaries and testes.

**Trichlorfon (Dylox)** - Trichlorfon can cause a reduction of the enzyme necessary to transmit nerve impulses, cholinesterase; that is, it can over-stimulate the nervous system causing nausea, dizziness, confusion, and at very high exposures can cause respiratory paralysis and even death.