



# White Grubs in Turfgrass

## Species

White grubs (grubworms or simply, grubs) are the C-shaped larvae of a large group of beetles called scarabs. Many species of scarabs are found in the United States and several of these attack turfgrasses. The most important species are: Japanese beetle, *Popillia japonica* Newman; May or June beetles, *Phyllophaga* spp.; northern and southern masked chafers, *Cyclocephala* spp.; and black turfgrass ataenius, *Ataenius spretulus* (Haldeman). Other, more localized, white grub pests are: European chafer, *Rhizotrogus majalis* (Razoumowsky); the Asiatic garden beetle, *Maladera castanea* (Arrow); and the green June beetle, *Cotinis nitida* (Linnaeus).

## Distribution

White grubs are perennial pests of the cool-season and transition zone turf grasses. May/June beetles, masked chafers and Japanese beetles are found in all areas of Ohio (and generally east of the Mississippi River). The European chafer, Asiatic garden beetle and Oriental beetle are more recent introductions to Ohio and these pests are commonly encountered in counties bordering Lake Erie. The green June beetle is a native pest that seems to be causing more damage in Ohio's southern counties. The black turfgrass ataenius can be found throughout the state where it is a perennial pest on golf courses.

## Damage Symptoms

White grubs eat organic matter including the roots of plants. Therefore, damage first appears to be drought stress. Heavily infested turf first appears off color, gray-green, and wilts rapidly in the hot sun. Continued feeding will cause the turf to die in large irregular patches. The tunneling of the larvae cause the turf to feel spongy under foot and the turf can often be rolled back like a loose carpet. Grub populations may not cause observable turf injury but predatory mammals such as skunks, racoons, opossums, and moles dig in the turf in search of a meal.



*White Grub Larvae in Turfgrass*

## Description of Stages

Scarabs have a complete life cycle with eggs, larvae, pupae and adults. Japanese beetles, masked chafers, green June beetles, European chafers, Oriental beetles and Asiatic garden beetles have annual life cycles. The May/June beetles usually take two to three years to develop in Ohio but some southern species have annual cycles. The black turfgrass ataenius has two to three generations per summer. Most turf scarabs overwinter as larvae but the black turfgrass ataenius and mature May/June beetles overwinter as adults.

**Eggs** Most eggs are a creamy-white in color, about 1/16-inch (1.5mm) long and slightly oval when first laid in the soil. These absorb water from the soil and swell slightly, becoming more round.

**Larvae** The C-shaped white grubs are thick bodied, creamy-white with brown head capsules and short legs. All species have three instars, that is, the larvae molt three times.

**Pupae** The pupae are often slightly longer than the adults and are formed in chambers one to two inches in the soil. The pupae are first cream colored and darken before the adults emerge.

**Adults** The adults are typical scarabs - robust, oval beetles with the antennae ending in a large club of flattened plates. Most genera are easy to identify by sight but species identification of May/June beetles and masked chafers require a specialist.

## Identification of Species

The adults are easily identified to genus but the grubs are the stage usually found in the turf. The grubs are identified by the form, shape and arrangement of bristles (the raster) on the last abdominal segments. A 10 to 15 power hand lens is usually adequate for identification and the common white grub groups can be identified using a raster pictorial key.

## Control Strategies

White grubs seem to be periodic pests, attacking turf areas irregularly from year to year. The major factor influencing development of damaging numbers of grubs is soil moisture and rainfall. In general, in years with normal or above normal rainfall, grub populations increase. Well maintained turf next to ornamental plants favored by the adults seems to be more commonly attacked. However, masked and European chafer adults do not feed as adults and these pests build up in well watered and maintained turf. Black turfgrass atenioides and green June beetle adults seem to be highly attracted to turf with decaying thatch layers.

**Option 1: Cultural Control - Host Plant Modifications** - Certain species of scarab adults prefer specific host plants. Where Japanese beetles are common, do not plant roses, grapes and lindens around high maintenance turf areas. May/June beetles prefer oaks and the green June beetles feed on ripening fruit such as peaches. The fine and tall fescues are not as severely attacked as Kentucky bluegrass and perennial ryegrass.

**Option 2: Chemical Control - Preventive Pesticide Applications** - Since white grub occurrence is rather sporadic, applying pesticides for control of anticipated grub populations is not recommended. However, in areas where adult activity has been observed or perennial infestations have occurred, preventive applications may be warranted. Currently, imidacloprid (=Merit), isofenphos (=Oftanol) and isazophos (=Triumph) are the only registered products which seem to have extended activity. In field trials, imidacloprid and isofenphos generally perform best when applied before mid-August, or when white grub egg laying is underway.

**Option 3: Chemical Control - Late Season Reactive Pesticide Applications** - Occasionally, turfgrass damaging population of white grubs may go undetected until September or October. By this time the annual white grubs are usually third instars and may be 70 to 80 times the body weight of a newly hatched grub. These mature grubs are voracious feeders but are ready to dig down into the soil when cold weather arrives. Chemical control of these large grubs is difficult, at best. If a late season insecticide application is needed, diazinon, isazophos (=Triumph) and trichlorfon (=Dylox, Proxol) have been the most successful. Be sure to irrigate well after the application in order to keep the grubs near the soil/thatch interface and to wash in the pesticide.

**Option 4: Chemical Control - Spring Pesticide Applications** - As with the late-fall pesticide applications, spring treatments are often ineffective. Though the grubs feed during the spring, they are quite large and the span of time for treatment is short. If a spring application is deemed necessary, check to make sure that the grubs are actively feeding at the soil/thatch level.

Information obtained through the Ohio State Extension Factsheet HYG-2500-95



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